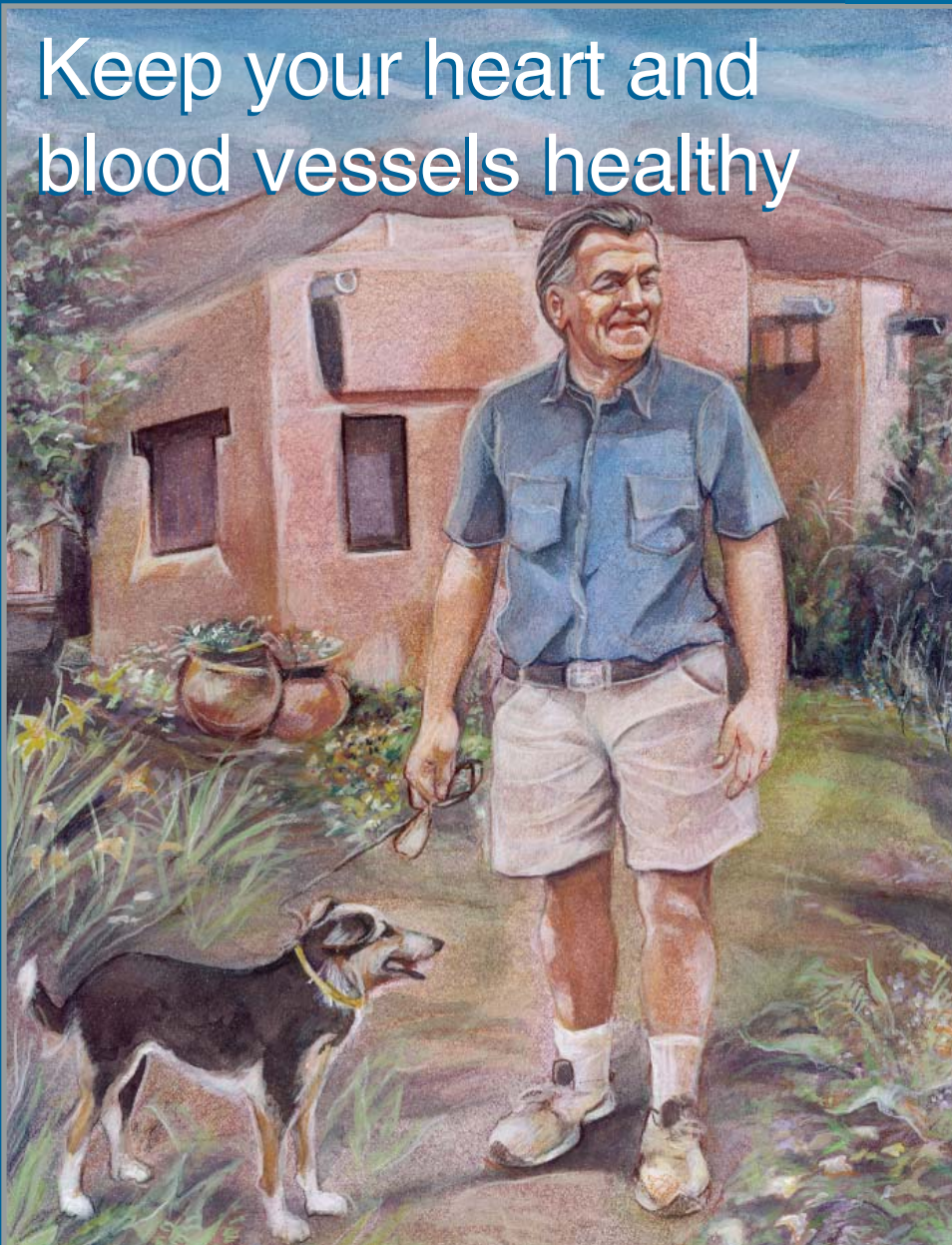


Number  
**2**  
in a  
Series  
of 7

# Prevent diabetes problems

## Keep your heart and blood vessels healthy





Prevent diabetes problems:  
Keep your heart and  
blood vessels healthy

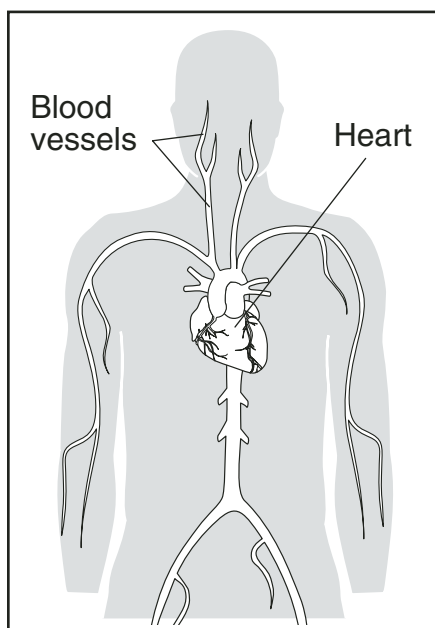
## Contents

What are diabetes problems?.....	1
What should I do each day to stay healthy with diabetes? .....	2
What do my heart and blood vessels do? .....	3
What can I do to prevent heart disease and stroke?.....	4
How do my blood vessels get clogged? .....	7
What can happen when blood vessels are clogged? .....	8
What are the warning signs of a heart attack? .....	9
How do narrowed blood vessels cause high blood pressure? .....	10
What are the warning signs of a stroke? .....	12
How can clogged blood vessels hurt my legs and feet? .....	13
What can I do to prevent or control peripheral arterial disease? .....	13
For More Information .....	14
More in the Series .....	16
Acknowledgments .....	17

## What are diabetes problems?

Too much glucose 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, the leading causes of death for people with diabetes. You can do a lot to prevent or slow down diabetes problems.

This booklet is about heart and blood vessel 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 heart and blood vessel 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 medicines as directed.



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 every day.



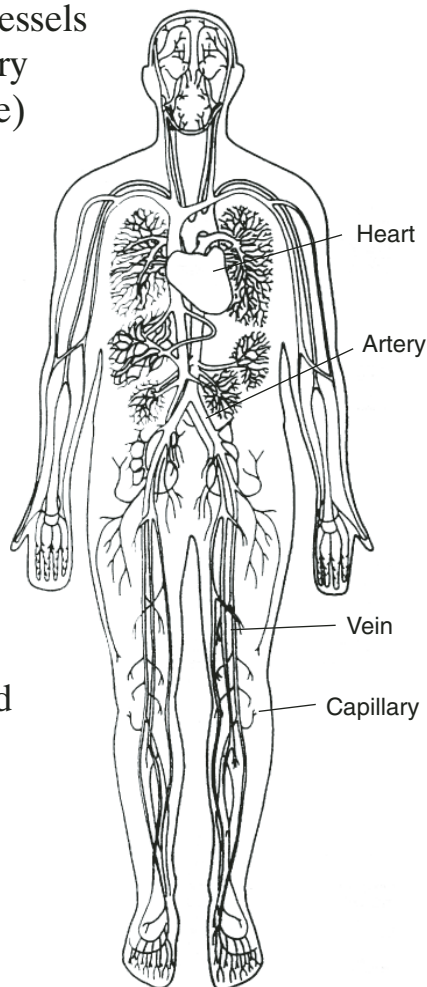
Control your blood pressure and cholesterol.



Don't smoke.

## What do my heart and blood vessels do?

Your heart and blood vessels make up your circulatory (SUR-kyoo-luh-TOR-ee) system. Your heart is a muscle that pumps blood through your body. Your heart pumps blood carrying oxygen to large blood vessels, called arteries (AR-tur-eez), and small blood vessels, called capillaries (KAP-ih-lair-eez). Other blood vessels, called veins, carry blood back to the heart.



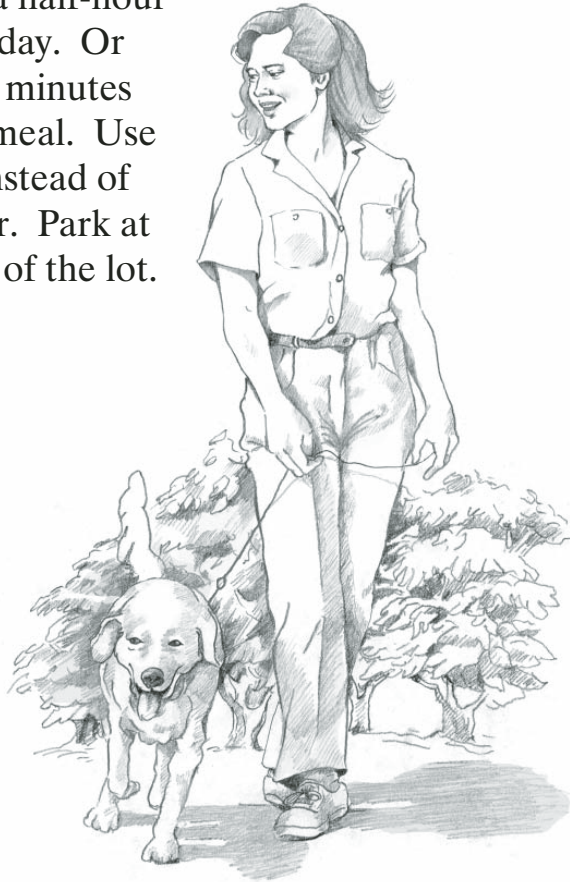
## What can I do to prevent heart disease and stroke?

You can do a lot to prevent heart disease and stroke.

- **Keep your blood glucose under control.** You can see if it is under control by having an A1C test at least twice a year. The A1C test tells you your average blood glucose for the past 2 to 3 months. The target for most people is below 7.
- **Keep your blood pressure under control.** Have it checked at every doctor visit. The target for most people is below 130/80.
- **Keep your cholesterol under control.** Have it checked at least once a year. The targets for most people are
  - LDL (bad) cholesterol: below 100
  - HDL (good) cholesterol: above 40 in men and above 50 in women
  - triglycerides (another type of fat in the blood): below 150



- **Make physical activity a part of your daily routine.** Aim for at least 30 minutes of exercise most days of the week. Check with your doctor to learn what activities are best for you. Take a half-hour walk every day. Or walk for 10 minutes after each meal. Use the stairs instead of the elevator. Park at the far end of the lot.



---

Choose an activity you like and stay active.

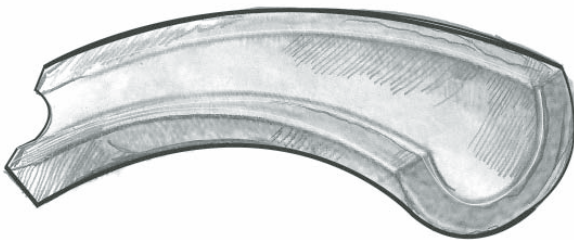
- **Make sure that the foods you eat are “heart-healthy.”** Include foods high in fiber, such as oat bran, oatmeal, whole-grain breads and cereals, fruits, and vegetables. Cut back on foods high in saturated fat or cholesterol, such as meats, butter, dairy products with fat, eggs, shortening, lard, and foods with palm oil or coconut oil. Limit foods with trans fat, such as snack foods and commercial baked goods.
- **Lose weight if you need to.** If you are overweight, try to exercise most days of the week. See a registered dietitian for help in planning meals and lowering the fat and calorie content of your diet to reach and maintain a healthy weight.
- **If you smoke, quit.** Your doctor can tell you about ways to help you quit smoking.
- **Ask your doctor whether you should take an aspirin every day.** Studies have shown that taking a low dose of aspirin every day can help reduce your risk of heart disease and stroke.
- **Take your medicines as directed.**

## How do my blood vessels get clogged?

Several things, including having diabetes, can make your blood cholesterol level too high. Cholesterol is a substance that is made by the body and used for many important functions. It is also found in some food derived from animals. When cholesterol is too high, the insides of large blood vessels become narrowed or clogged. This problem is called atherosclerosis (ATH-ur-oh-sklur-OH-siss).

Narrowed and clogged blood vessels make it harder for enough blood to get to all parts of your body. This condition can cause problems.

**Cross section of a healthy blood vessel**



**Cross section of a narrowed blood vessel**



## What can happen when blood vessels are clogged?

When blood vessels become narrowed and clogged, you can have serious health problems:

- **Chest pain**, also called angina (an-JY-nuh). When you have angina, you feel pain in your chest, arms, shoulders, or back. You may feel the pain more when your heart beats faster, such as when you exercise. The pain may go away when you rest. You also may feel very weak and sweaty. If you do not get treatment, chest pain may happen more often. If diabetes has damaged the heart nerves, you may not feel the chest pain.
- **Heart attack**. A heart attack happens when a blood vessel in or near the heart becomes blocked. Not enough blood can get to that part of the heart muscle. When an area of the heart muscle stops working, the heart becomes weaker. During a heart attack, you may have chest pain along with nausea, indigestion, extreme weakness, and sweating.
- **Stroke**. A stroke can happen when the blood supply to the brain is blocked. Then the brain can be damaged. See page 12 for more information about strokes.

## What are the warning signs of a heart attack?

You may have one or more of the following warning signs:

- chest pain or discomfort
- pain or discomfort in your arms, back, jaw, or neck
- indigestion or stomach pain
- shortness of breath
- sweating
- nausea
- light-headedness

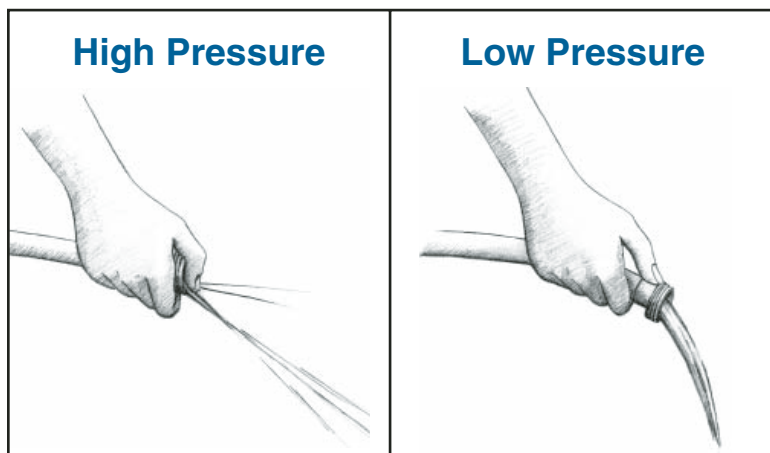
Or, you may have no warning signs at all. Warning signs may come and go. If you have any of these warning signs, call 911 right away.

## How do narrowed blood vessels cause high blood pressure?

Narrowed blood vessels leave a smaller opening for blood to flow through. Having narrowed blood vessels is like turning on a garden hose and holding your thumb over the opening. The smaller opening makes the water shoot out with more pressure.

In the same way, narrowed blood vessels lead to high blood pressure. Other factors, such as kidney problems and being overweight, also can lead to high blood pressure.

Many people with diabetes also have high blood pressure. If you have heart, eye, or kidney problems from diabetes, high blood pressure can make them worse.



A smaller opening makes the water pressure higher. In the same way, clogged blood vessels lead to high blood pressure.

You will see your blood pressure written with two numbers separated by a slash. For example, your reading might be 120/70, said as “120 over 70.” For people with diabetes, the target is to keep the first number below 130 and the second number below 80.

If you have high blood pressure, ask your doctor how to lower it. Your doctor may ask you to take blood pressure medicine every day. Some types of blood pressure medicine can also help keep your kidneys healthy.

You may also be able to control your blood pressure by

- eating more fruits and vegetables
- eating less salt and high-sodium foods
- losing weight if you need to
- being physically active
- not smoking
- limiting alcoholic drinks



To lower blood pressure, get to a healthy weight.

## What are the warning signs of a stroke?

A stroke happens when part of your brain is not getting enough blood and stops working. Depending on the part of the brain that is damaged, a stroke can cause

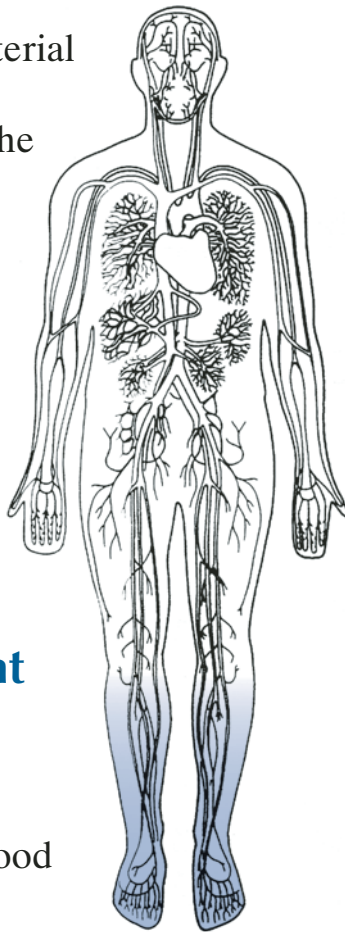
- sudden weakness or numbness of your face, arm, or leg on one side of your body
- sudden confusion, trouble talking, or trouble understanding
- sudden dizziness, loss of balance, or trouble walking
- sudden trouble seeing in one or both eyes or sudden double vision
- sudden severe headache

Sometimes, one or more of these warning signs may happen and then disappear. You might be having a “mini-stroke,” also called a TIA (transient [TRAN-see-uhnt] ischemic [iss-KEE-mik] attack). If you have any of these warning signs, call 911 right away.



## How can clogged blood vessels hurt my legs and feet?

Peripheral (puh-RIF-ur-uhl) arterial (ar-TEE-ree-uhl) disease, also called PAD, can happen when the openings in your blood vessels become narrow and your legs and feet don't get enough blood. You may feel pain in your legs when you walk or exercise. Some people also have numbness or tingling in their feet or legs or have sores that heal slowly.



## What can I do to prevent or control PAD?

- Don't smoke.
- Keep blood glucose and blood pressure under control.
- Keep blood fats close to normal.
- Exercise.
- Ask your doctor if you should take aspirin every day.

You also may need surgery to treat this problem.

## 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](http://www.diabeteseducator.org) and click on “Find an Educator.”



### **Dietitians**

To find a dietitian near you, call the American Dietetic Association toll-free at 1-800-877-1600, or look on the Internet at [www.eatright.org](http://www.eatright.org) and click on “Find a Nutrition Professional.”

### **Government**

The National Heart, Lung, and Blood Institute (NHLBI) is part of the National Institutes of Health. To learn more about heart and blood vessel problems, write or call the NHLBI Health Information Center, P.O. Box 30105, Bethesda, MD 20824-0105, 301-592-8573; or see [www.nhlbi.nih.gov](http://www.nhlbi.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  
Fax: 703-738-4929  
Email: [ndic@info.niddk.nih.gov](mailto:ndic@info.niddk.nih.gov)  
Internet: [www.diabetes.niddk.nih.gov](http://www.diabetes.niddk.nih.gov)

**National Diabetes Education Program**

1 Diabetes Way  
Bethesda, MD 20892-3560  
Phone: 1-800-438-5383  
Fax: 703-738-4929  
Internet: [www.ndep.nih.gov](http://www.ndep.nih.gov)

**American Diabetes Association**

1701 North Beauregard Street  
Alexandria, VA 22311  
Phone: 1-800-342-2383  
Internet: [www.diabetes.org](http://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](http://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  
Fax: 703-738-4929  
Email: [ndic@info.niddk.nih.gov](mailto:ndic@info.niddk.nih.gov)

These booklets are also available at [www.diabetes.niddk.nih.gov](http://www.diabetes.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

*For Centers for Medicare & Medicaid Services*

Baltimore, MD  
Jan Drass, R.N., C.D.E.

*For Diabetes Research and Training Centers*

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.  
Indiana University  
School of Medicine  
Indianapolis, IN  
Madelyn Wheeler, M.S.,  
R.D., F.A.D.A., C.D.E.

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.

*For 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.

*For 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.  
Red Lake, MN  
Charmaine Branchaud,  
B.S.N., R.N., C.D.E.

*For Medlantic Research Center*

Washington, DC  
Resa Levetan, M.D.

*For 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  
Fax: 703-738-4929  
Email: [ndic@info.niddk.nih.gov](mailto:ndic@info.niddk.nih.gov)  
Internet: [www.diabetes.niddk.nih.gov](http://www.diabetes.niddk.nih.gov)

The National Diabetes Information Clearinghouse (NDIC) is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK is part of the National Institutes of Health of 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. The 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 by both NIDDK scientists and outside experts.

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 at [www.diabetes.niddk.nih.gov](http://www.diabetes.niddk.nih.gov).



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



National Institute of Diabetes and  
Digestive and Kidney Diseases

NIH Publication No. 07-4283  
February 2007