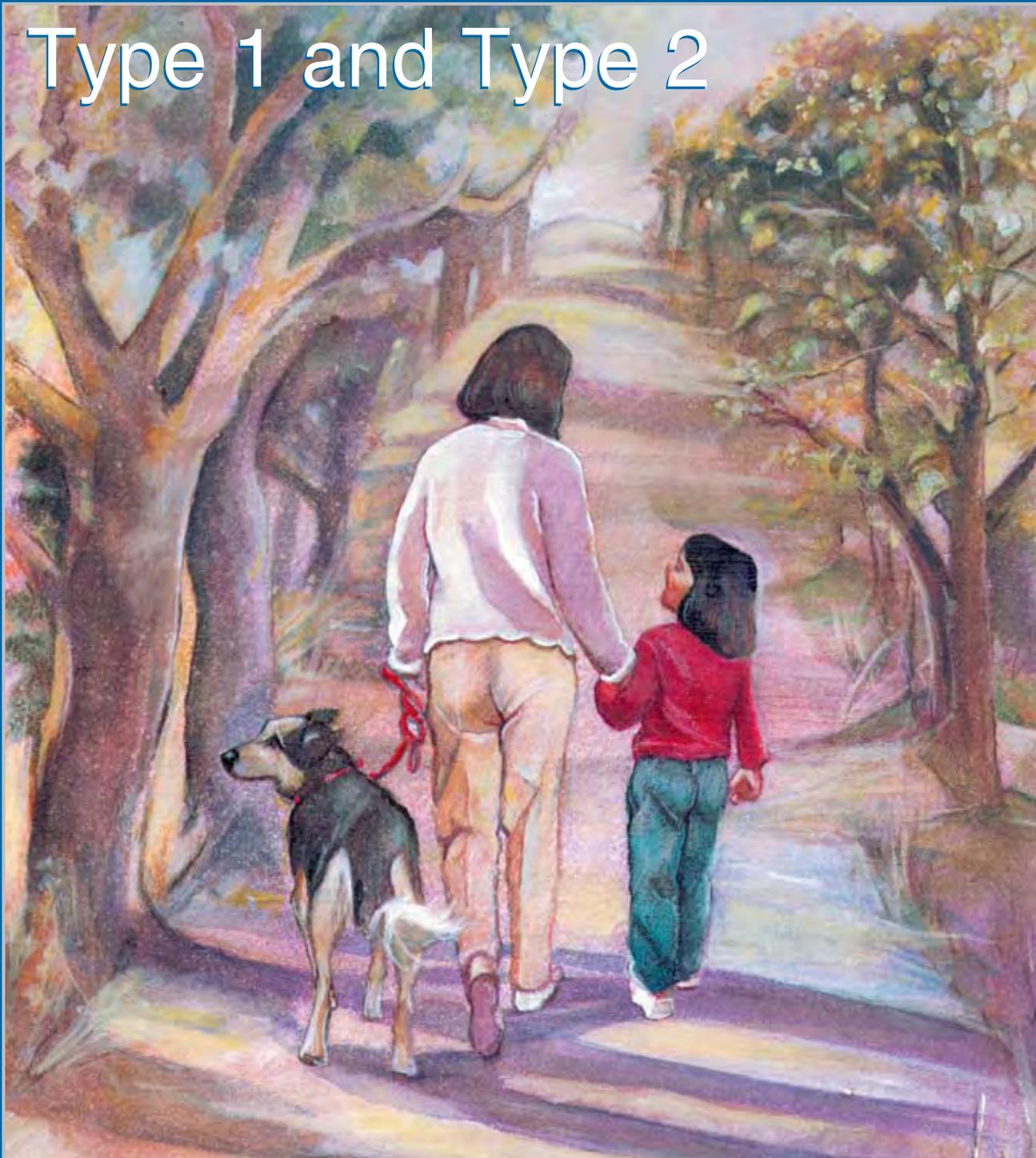


Your Guide to Diabetes: Type 1 and Type 2



U.S. Department
of Health and
Human Services

NATIONAL INSTITUTES OF HEALTH

NIDDK NATIONAL INSTITUTE OF
DIABETES AND DIGESTIVE
AND KIDNEY DISEASES

National Diabetes Information Clearinghouse

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Introduction

Your doctor says you have diabetes. You can learn how to take care of your diabetes and how to prevent some of the serious problems that diabetes can cause. You may want to share this booklet with your family and friends so they too will understand more about diabetes and how they can help you live a healthy life. And remember, you can always ask your health care team any questions you might have.



You can learn how to take care of your diabetes.



What Diabetes Is

Diabetes means your blood **glucose***, also called blood sugar, is too high. Your blood always has some glucose in it because your body needs glucose for energy to keep you going. But too much glucose in the blood isn't good for your health.

How do you get high blood glucose?

Glucose comes from the food you eat and is also made in your liver and muscles. Your blood carries the glucose to all the cells in your body. **Insulin** is a chemical, also called a hormone, made by the **pancreas**. The pancreas releases insulin into the blood. Insulin helps the glucose from food get into your cells. If your body doesn't make enough insulin, or if the insulin doesn't work the way it should, glucose can't get into your cells. It stays in your blood instead. Your blood glucose level then gets too high, causing pre-diabetes or diabetes.

*See pages 65 to 66 for tips on how to say the words in **bold** type.

What is pre-diabetes?

Pre-diabetes is a condition in which blood glucose levels are higher than normal but not high enough for a diagnosis of diabetes. People with pre-diabetes are at increased risk for developing type 2 diabetes and for heart disease and stroke. The good news is, if you have pre-diabetes, you can reduce your risk of getting diabetes. With modest weight loss and moderate physical activity, you can delay or prevent type 2 diabetes and even return to normal glucose levels.

What are the signs of diabetes?

The signs of diabetes are

- being very thirsty
- urinating often
- feeling very hungry or tired
- losing weight without trying
- having sores that heal slowly
- having dry, itchy skin
- losing the feeling in your feet or having tingling in your feet
- having blurry eyesight

You may have had one or more of these signs before you found out you had diabetes. Or you may have had no signs at all. A blood test to check your glucose levels will show if you have pre-diabetes or diabetes.

What kind of diabetes do you have?

People can get diabetes at any age. Type 1, type 2, and gestational diabetes are the three main kinds. Type 1 diabetes, formerly called juvenile diabetes or insulin-dependent diabetes, is usually first diagnosed in children, teenagers, or young adults. With this form of diabetes, the **beta cells** of the pancreas no longer make insulin because the body's **immune** system has attacked and destroyed them. Treatment for type 1 diabetes includes taking insulin and possibly another injectable medicine, making wise food choices, being physically active, taking aspirin daily—for some—and controlling blood pressure and **cholesterol**.

Type 2 diabetes, formerly called adult-onset diabetes or noninsulin-dependent diabetes, is the most common form of diabetes. People can develop type 2 diabetes at any age—even during childhood. This form of diabetes usually begins with insulin resistance, a condition in which fat, muscle, and liver cells do not use insulin properly. At first, the pancreas keeps up with the added demand by producing more insulin. In time, however, it loses the ability to secrete enough insulin in response to meals. Being overweight and inactive increases the chances of developing type 2 diabetes. Treatment includes using diabetes medicines, making wise food choices, being physically active, taking aspirin daily—for some—and controlling blood pressure and cholesterol.

Some women develop **gestational** diabetes during the late stages of pregnancy. Although this form of diabetes usually goes away after the baby is born, a woman who has had it is more likely to develop type 2 diabetes later in life. Gestational diabetes is caused by the hormones of pregnancy or a shortage of insulin.

The National Diabetes Information Clearinghouse offers a free booklet called *What I need to know about Gestational Diabetes*. Read it online at www.diabetes.niddk.nih.gov/dm/pubs/gestational or call 1-800-860-8747 to request a printed copy.

This booklet is for people who have either type 1 diabetes or type 2 diabetes.

If you use insulin, look at the white boxes like this one for “Action Steps.”

Action Steps If You Use Insulin

If you don't use insulin, look at the blue boxes like this one for “Action Steps.”

Action Steps If You Don't Use Insulin

Why do you need to take care of your diabetes?

After many years, diabetes can lead to serious problems with your eyes, kidneys, nerves, and gums and teeth. But the most serious problem caused by diabetes is heart disease. When you have diabetes, you are more than twice as likely as people without diabetes to have heart disease or a stroke.

If you have diabetes, your risk of a heart attack is the same as someone who has already had a heart attack. Both women and men with diabetes are at risk. You may not even have the typical signs of a heart attack.

You can reduce your risk of developing heart disease by controlling your blood pressure and blood fat levels. If you smoke, talk with your doctor about quitting. Remember that every step toward your goals helps!

See pages 32 to 48 to learn how you can try to prevent or delay long-term problems. The best way to take care of your health is to work with your health care team to keep your blood glucose, blood pressure, and cholesterol in your target range.

What's a desirable blood glucose level?

Everyone's blood has some glucose in it. In people who don't have diabetes, the normal range is about 70 to 120. Blood glucose goes up after eating but 1 or 2 hours later returns to the normal range.

Ask your health care team when you should check your blood glucose with a meter. Talk about whether the blood glucose targets listed below are best for you. Then write in your own targets.

Blood Glucose Targets for Most People with Diabetes		
When	Target Levels	My Target Levels
Before meals	70 to 130	_____ to _____
1 to 2 hours after the start of a meal	below 180	below _____

It may be hard to reach your target range all of the time. But the closer you get to your goal, the more you will reduce your risk of diabetes-related problems and the better you will feel. Every step helps.

Taking Care of Your Diabetes Every Day

Do four things every day to take care of your diabetes:

- Follow your meal plan.
- Be physically active.
- Take your diabetes medicines.
- Check your blood glucose.

Experts say most people with diabetes should try to keep their blood glucose level as close as possible to the level of someone who doesn't have diabetes. The closer to normal your blood glucose is, the lower your chances are of developing serious health problems.

Check with your doctor about the right range for you. The chart on page 8 shows target blood glucose ranges.

Your health care team will help you learn how to reach your target blood glucose range. Your team may include a doctor, a nurse, a dietitian, and others.



When you see your health care provider, ask lots of questions. Before you leave, be sure you understand everything you need to know about taking care of your diabetes.

A diabetes educator is a health care worker who teaches people how to manage their diabetes. Your educator may also be a nurse, a dietitian, or other kind of health care worker.

A dietitian is someone who's specially trained to help people plan their meals. For more information about these health care providers, and for help in finding them, see pages 61 to 62.

Follow Your Meal Plan

You should have your own meal plan. Ask your doctor to give you the name of a dietitian who can work with you to develop a meal plan. Your dietitian can help you plan meals that include foods that you and your family like to eat and that are good for you too. Ask your dietitian to include foods that are heart-healthy to reduce your risk of heart disease.

Your diabetes meal plan will include breads, cereals, rice, and grains; fruits and vegetables; meat and meat substitutes; dairy products; and fats. People with diabetes don't need to eat special foods. The foods on your meal plan are good for everyone in your family! Making wise food choices will help you

- reach and stay at a weight that's good for your body
- keep your blood glucose, blood pressure, and cholesterol under control
- prevent heart and blood vessel disease

Action Steps If You Use Insulin
<ul style="list-style-type: none">• Follow your meal plan.• Don't skip meals, especially if you've already taken your insulin, because your blood glucose may go too low. See page 28 for information about how to handle low blood glucose, also called hypoglycemia.

Action Steps
If You Don't Use Insulin

- Follow your meal plan.
- Don't skip meals, especially if you take diabetes medicines, because your blood glucose may go too low. Eat several small meals during the day instead of one or two big meals.

Be Physically Active

Physical activity helps you stay healthy. Try walking, swimming, dancing, riding a bicycle, playing baseball, or bowling. You can even get exercise when you clean your house or work in your yard. Physical activity is especially good for people with diabetes because it

- helps keep weight down
- helps insulin work better to lower blood glucose
- is good for your heart and lungs
- gives you more energy

Before you begin exercising, talk with your doctor. Your doctor may check your heart and your feet to be sure you have no special problems. If you have high blood pressure or eye problems, some exercises like weightlifting may not be safe. Your health care team can help you find safe exercises.



Being active helps you stay healthy.

Try to be active almost every day for a total of about 30 minutes. If you haven't been very active lately, begin slowly. Start with 5 to 10 minutes, and then add more time. Or exercise for 10 minutes, three times a day.

If you use insulin or take diabetes pills that help your body make insulin, you may need to eat a snack before you exercise. Check your blood glucose before you exercise. If your blood glucose is below 100, have a snack before you exercise.

Action Steps
If You Use Insulin

- See your doctor before starting a physical activity program.
- Check your blood glucose before, during, and after exercising. Don't exercise when your blood glucose is high and you have ketones in your blood or urine. See page 21 for information about ketones.
- Don't exercise right before you go to sleep because it could cause low blood glucose during the night.

Action Steps
If You Don't Use Insulin

- See your doctor before starting a physical activity program.
- Ask your doctor about whether you need to eat before you exercise.

When you exercise, carry glucose tablets or a **carbohydrate** snack with you in case you have low blood glucose. Wear or carry an identification tag or card that says you have diabetes.

The groups listed on pages 63 and 64 have more information about diabetes and physical activity.

Take Your Diabetes Medicines Every Day

Three kinds of diabetes medicines can help you reach your blood glucose targets: pills, insulin, and other **injectable** medicines.



Many people with type 2 diabetes take pills to help keep blood glucose in their target range.

If You Take Diabetes Pills

If your body makes insulin but the insulin doesn't lower your blood glucose enough, you may need diabetes pills. Some pills are taken once a day, and others are taken more often. Ask your health care team when you should take your pills. Be sure to tell your doctor if your pills make you feel sick or if you have any other problems.

Sometimes, people who take diabetes pills may need insulin for a while. If you get sick or have surgery, the diabetes pills may no longer work to lower your blood glucose.

You may be able to stop taking diabetes pills if you lose weight. Always check with your doctor before you stop taking your diabetes pills. Losing 10 or 15 pounds can help you reach your target blood glucose levels.

If You Use Insulin

You need insulin if your body has stopped making insulin or if it doesn't make enough. Everyone with type 1 diabetes needs insulin, and many people with type 2 diabetes do too. Some women with gestational diabetes also need to take insulin.



You may need insulin to control your blood glucose.

Your doctor can tell you which of these ways to take insulin is best for you.

- Taking shots, also called **injections**. You'll use a needle attached to a **syringe**—a hollow tube with a plunger—that you fill with a dose of insulin. Some people use an insulin pen, a pen-like device with a needle and a cartridge of insulin.

- Using an insulin pump. A pump is a small device, worn on a belt or in a pocket, that holds insulin. The pump connects to a small plastic tube and a very small needle. The needle is inserted under the skin and stays in for several days.
- Using an insulin jet injector. This device sends a fine spray of insulin through the skin with high-pressure air instead of a needle.
- Using an insulin infuser. A small tube is inserted just beneath the skin and remains in place for several days. Insulin is injected into the end of the tube instead of through the skin.

If You Use Other Injectable Medicines

Some people with diabetes use other injectable medicines to reach their blood glucose targets. These medicines are not substitutes for insulin.

If You Don't Use Pills, Insulin, or Other Injectable Medicines

Many people with type 2 diabetes don't need diabetes medicines. They can take care of their diabetes by using a meal plan and exercising regularly.

Check Your Blood Glucose as Recommended

You'll want to know how well you're taking care of your diabetes. One way to find out is to check your blood to see how much glucose is in it. If your blood has too much or too little glucose, you may need a change in your meal plan, physical activity plan, or medicines.



Checking your blood glucose will help you see if your diabetes treatment plan is working.

Ask your doctor how often you should check your blood glucose. Some people check their blood glucose once a day. Others do it three or four times a day. You may check before and after eating, before bed, and sometimes in the middle of the night.

Your doctor or diabetes educator will show you how to check your blood using a blood glucose meter. Your health insurance or Medicare may pay for the supplies and equipment you need.

Your health care team should also check your blood glucose levels with a lab test called the **A1C** test. See page 22 for more information about the A1C test.

Take Other Tests for Your Diabetes

Tests for Ketones

You may need to check your blood or urine for **ketones** if you're sick or if your blood glucose is above 240. Your body makes ketones when you burn fat instead of glucose for energy. Ketones can make you very sick. If you have ketones, you are at risk for having a serious condition called **ketoacidosis**. If ketoacidosis isn't treated, it can cause death. Signs of ketoacidosis are vomiting, weakness, fast breathing, and a sweet smell on the breath. Ketoacidosis is more likely to develop in people with type 1 diabetes.

Your doctor or diabetes educator will show you how to test for ketones.

The A1C Test

Another test for blood glucose, the A1C, also called the **hemoglobin A1C** test, shows what your average blood glucose was for the past 2 to 3 months. The doctor does this test to see what your blood glucose is most of the time. Have this test done at least twice a year.

Ask your doctor what your A1C test showed. A result of below 7 usually means that your diabetes treatment is working well and your blood glucose is under control. If your A1C is higher, your blood glucose may be too high. You'll then have a greater risk of having diabetes problems, like kidney damage. You may need a change in your meal plan, physical activity plan, or diabetes medicines.

Talk with your doctor about what your target should be. Your personal target may be lower or higher than the target shown below. Even if your A1C is higher than your target, remember that every step toward your goal helps reduce your risk of diabetes problems.

A1C Results

Target for most people with diabetes	below 7
Time to change my diabetes care plan	8 or above
My last result	_____
My target	below _____

Keep Daily Records

Make copies of the daily diabetes record on page 26. Then write down the results of your blood glucose checks every day. You may also want to write down what you ate, how you felt, and whether you exercised.

By keeping daily records of your blood glucose checks, you can tell how well you're taking care of your diabetes. Show your blood glucose records to your health care team. They can use your records to see whether you need changes in your diabetes medicines or your meal plan. If you don't know what your results mean, ask your health care team.

Action Steps If You Use Insulin

Keep a daily record of

- your blood glucose numbers
- the times of the day you took insulin
- the amount and type of insulin you took
- whether you had ketones in your blood or urine

Things to write down every day in your record book are

- results of your blood glucose checks
- your diabetes medicines: times and amounts taken
- if your blood glucose was very low—see page 28
- if you ate more or less food than you usually do
- if you were sick
- if you found ketones in your blood or urine
- what kind of physical activity you did and for how long

Action Steps
If You Don't Use Insulin

Keep a daily record of

- your blood glucose numbers
- the times of the day you took your diabetes medicines
- your physical activity

Daily Diabetes Record Page

Week Starting
July 18, 2011

	Other blood glucose	Breakfast blood glucose	Medicine	Lunch blood glucose	Medicine	Dinner blood glucose	Medicine	Bedtime blood glucose	Medicine	Notes: (Special events, sick days, physical activity)
Monday		109				122		115		
Tuesday				106				152*		*Missed evening walk
Wednesday		126		121		131		120		
Thursday		113		128		179		241*		*Sick with flu
Friday		159		147		162		150		
Saturday		127				152*				*Had extra-big snack in afternoon
Sunday		119		121				140		

Sample of a record page for a person who doesn't use diabetes medicines.

**Week
Starting**

Daily Diabetes Record Page

	Other blood glucose	Breakfast blood glucose	Medicine	Lunch blood glucose	Medicine	Dinner blood glucose	Medicine	Bedtime blood glucose	Medicine	Notes: (Special events, sick days, physical activity)
Monday										
Tuesday										
Wednesday										
Thursday										
Friday										
Saturday										
Sunday										

When Your Blood Glucose Is Too High or Too Low

Sometimes, no matter how hard you try to keep your blood glucose in your target range, it will be too high or too low. Blood glucose that's too high or too low can make you feel sick. Learn how to handle these emergencies.

What You Need to Know about High Blood Glucose

If your blood glucose stays above 180, it may be too high. See the chart on page 8. High blood glucose means you don't have enough insulin in your body. High blood glucose, also called **hyperglycemia**, can happen if you miss taking your diabetes medicines, eat too much, or don't get enough exercise. Sometimes, the medicines you take for other problems cause high blood glucose. Be sure to tell your doctor about other medicines you take.

Having an infection, being sick, or being under stress can also make your blood glucose too high. When you're sick, be sure to check your blood glucose and keep taking your diabetes medicines. For more about how to take care of yourself when you're sick, see page 50.

If you're very thirsty and tired, have blurry vision, and have to go to the bathroom often, your blood glucose may be too high. Very high blood glucose may also make you feel sick to your stomach.

If your blood glucose is high much of the time, or if you have symptoms of high blood glucose, call your doctor. You may need a change in your diabetes medicines or your meal plan.

What You Need to Know about Low Blood Glucose

Low blood glucose, also called **hypoglycemia**, happens if your blood glucose drops too low. It can come on fast. Low blood glucose can be caused by taking too much diabetes medicine, missing a meal, delaying a meal, exercising more than usual, or drinking alcoholic beverages. Sometimes, medicines you take for other health problems can cause blood glucose to drop.

Low blood glucose can make you feel weak, confused, irritable, hungry, or tired. You may sweat a lot or get a headache. You may feel shaky. If your blood glucose drops lower, you could pass out or have a seizure.

If you have any of these symptoms, check your blood glucose. If the level is below 70, have one of the following right away:

- 3 or 4 glucose tablets
- 1 serving of glucose gel—the amount equal to 15 grams of carbohydrate
- 1/2 cup, or 4 ounces, of any fruit juice
- 1/2 cup, or 4 ounces, of a regular—not diet—soft drink
- 1 cup, or 8 ounces, of milk
- 5 or 6 pieces of hard candy
- 1 tablespoon of sugar or honey

After 15 minutes, check your blood glucose again to make sure your level is 70 or above. Repeat these steps until your blood glucose level is 70 or above. Once your blood glucose is stable, if it will be at least an hour before your next meal, have a snack.



Have one of these “quick fix” foods when your blood glucose is low.

If you take diabetes medicines that can cause low blood glucose, always carry food for emergencies. You should also wear a medical identification bracelet or necklace.

If you take insulin, keep a **glucagon** kit at home and at other places where you often go. Glucagon is given as an injection with a syringe and quickly raises blood glucose. Show your family, friends, and co-workers how to give you a glucagon injection if you pass out because of low blood glucose.

Action Steps If You Use Insulin
<ul style="list-style-type: none">• Tell your doctor if you have low blood glucose often, especially at the same time of the day or night several times in a row.• Tell your doctor if you've passed out from low blood glucose.• Ask your doctor about glucagon. Glucagon is a medicine that raises blood glucose. If you pass out from low blood glucose, someone should call 911 and give you a glucagon shot.



When you have low blood glucose, have a snack to bring your blood glucose back to normal.

You can prevent low blood glucose by eating regular meals, taking your diabetes medicines, and checking your blood glucose often. Checking will tell you whether your glucose level is going down. You can then take steps, like drinking fruit juice, to raise your blood glucose.

Action Steps

If You Don't Use Insulin

- Tell your doctor if you have low blood glucose often, especially at the same time of the day or night several times in a row.
- Be sure to tell your doctor about other medicines you are taking.
- Some diabetes pills can cause low blood glucose. Ask your doctor whether your pills can cause low blood glucose.

Why Taking Care of Your Diabetes Is Important

Taking care of your diabetes every day will help keep your blood glucose, blood pressure, and cholesterol in your target range and help prevent other health problems that diabetes can cause over the years. You can do a lot to prevent diabetes problems.

- Follow your meal plan every day.



- Take your diabetes medicines every day.



- Be physically active every day.



- Check your blood glucose as recommended.



Diabetes and Your Heart and Blood Vessels

The biggest problem for people with diabetes is heart and blood vessel disease. Heart and blood vessel disease can lead to heart attacks and strokes. It also causes poor blood flow, also called **circulation**, in the legs and feet.

To check for heart and blood vessel disease, your health care team will do some tests. At least once a year, have a blood test to see how much cholesterol is in your blood. Your health care provider should take your blood pressure at every visit. Your provider may also check the circulation in your legs, feet, and neck.

The best way to prevent heart and blood vessel disease is to take good care of yourself and your diabetes.

- Eat foods that are low in sodium. Check the amount of sodium by looking at the Nutrition Facts on food packages. Limit the amount of salt you use when you cook and at the table. Choose foods naturally low in sodium, such as vegetables, fruits, dry beans and peas, and unprocessed meats, poultry, and fish.
- Limit how much you have of these kinds of fat:
 - saturated fat, such as bacon, butter, cream, lard, and high-fat dairy products such as whole milk
 - trans fat, found in processed foods with partially hydrogenated or hydrogenated oil
 - cholesterol, found in high-fat dairy products, high-fat meats and poultry, egg yolks, and liver
- Keep your blood glucose on track. Know your A1C. The target for most people is below 7.
- Keep your blood pressure on track. The target for most people is below 130/80. If needed, take medicine to control your blood pressure.
- Keep your cholesterol level on track. The target for LDL cholesterol for most people is below 100. If needed, take medicine to control your blood fat levels.

- If you smoke, quit.
- Be physically active.
- Lose weight if you need to.
- Ask your health care team whether you should take an aspirin every day.

What's a desirable blood pressure level?

Blood pressure levels tell how hard your blood is pushing against the walls of your blood vessels. Your pressure is given as two numbers: The first is the pressure as your heart pushes blood out into your blood vessels and the second is the pressure as your heart rests. If your blood pressure is higher than your target, talk with your health care team about changing your meal plan, exercising, or taking medicine.

Blood Pressure Results

Target for most people
with diabetes

below 130/80

My last result

My target

below _____

What are desirable blood fat levels?

Cholesterol, a fat found in the body, appears in several forms. If your LDL cholesterol, also called “bad” cholesterol, is 100 or above, you are at increased risk of heart disease and may need treatment. A high level of total cholesterol also means a greater risk of heart disease. But HDL cholesterol, also called “good” cholesterol, protects you from heart disease, so the higher it is, the better. You should keep your **triglyceride**—another type of fat—levels below 150. All of these target numbers are important for preventing heart disease. But the most important target to reach first is for your LDL cholesterol.

Target Blood Fat Levels for People with Diabetes

	My Last Result	My Target
Total cholesterol below 200	_____	below _____
LDL cholesterol below 100	_____	below _____
HDL cholesterol above 40 (men)	_____	above _____
above 50 (women)	_____	above _____
Triglycerides below 150	_____	below _____



Rose is 55 years old and teaches at a high school on an American Indian reservation in New Mexico. Rose has had type 2 diabetes for almost 10 years. When she first found out she had diabetes, she weighed too much and didn't get much exercise. After talking it over with her doctor, Rose began an exercise program. She lost weight, and her blood glucose began to come down. She felt better too. Now Rose teaches an exercise class in her spare time.

Diabetes and Your Eyes

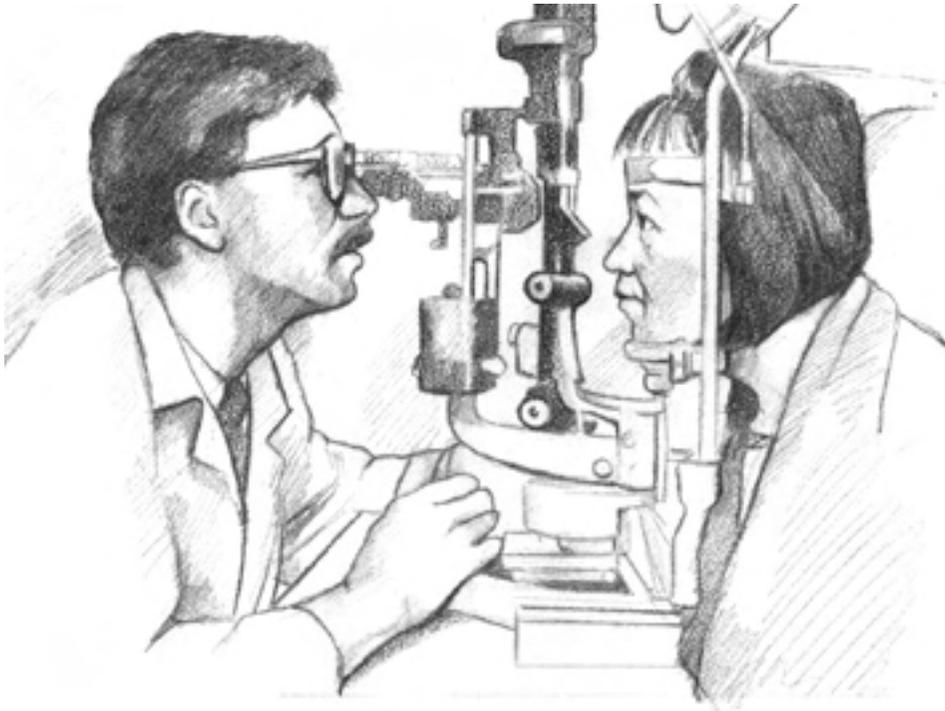
Have your eyes checked once a year. You could have eye problems that you haven't noticed yet. Yearly exams may catch eye problems early so problems can be treated. Treating eye problems early can help prevent blindness.

High blood glucose can make the blood vessels in the eyes bleed. This bleeding can lead to blindness. You can help prevent eye damage by keeping your blood glucose and blood pressure as close to normal as possible. If you already have eye problems, your eye doctor may be able to suggest treatments that can help.

The best way to prevent eye disease is to have a yearly eye exam. In this exam, the eye doctor puts drops in your eyes to dilate your pupils. When the pupils are dilated, or big, the doctor can see into the back of the eye. This type of exam is called a dilated eye exam and it doesn't hurt. If you've never had this kind of eye exam before, you should have one now, even if you haven't had any trouble with your eyes. Be sure to tell your eye doctor that you have diabetes.

Follow these tips to take care of your eyes:

- For adults and adolescents—10 years old and older—
with type 1 diabetes: Have your eyes examined within
5 years of being diagnosed with diabetes. Then have an
exam every year.
- For people with type 2 diabetes: Have an eye exam every
year.



See your eye doctor for a dilated eye exam every year. Early treatment of eye problems can help save your sight.

- Have an eye exam before becoming pregnant or as soon as possible after becoming pregnant.
- If you smoke, quit.
- Keep your blood glucose and blood pressure as close to normal as possible.

Tell your eye doctor right away if you have any problems like blurry vision or seeing dark spots, flashing lights, or rings around lights.

Diabetes and Your Kidneys

Your kidneys help clean waste products from your blood. They also work to keep the right balance of sodium and fluid in your body.

Too much glucose in your blood is hard on your kidneys. After a number of years, high blood glucose can cause the kidneys to stop working, a condition called kidney failure. If your kidneys stop working, you'll need **dialysis**—a treatment that does some of the work your kidneys used to do—or a kidney transplant.

Make sure you have the following tests at least once a year to make sure your kidneys are working well:

- a urine test for protein, called the **microalbumin** test
- a blood test for **creatinine**, a waste product made by your body

Some types of blood pressure medicines can help prevent kidney damage. Ask your doctor whether these medicines could help you. You can also help prevent kidney problems by

- taking your medicine if you have high blood pressure
- asking your doctor or your dietitian whether you should eat less high-protein foods, such as meat, poultry, cheese, milk, fish, and eggs

- keeping your blood glucose and blood pressure as close to normal as possible
- quitting smoking

You should see your doctor right away if you get a bladder or kidney infection. Signs of bladder or kidney infections are cloudy or bloody urine, pain or burning when you urinate, and having to urinate often or in a hurry. Back pain, chills, and fever are also signs of kidney infection.



Mike is a migrant farm worker with type 2 diabetes and high blood pressure. Mike, 47, is married, and he and his wife have three children. The family is often on the move, depending on where the work is. Mike has his blood pressure and kidneys checked at clinics in migrant worker camps. Some of the clinics also offer diabetes classes. Whenever they can, Mike and his wife attend these classes. They especially like the cooking classes because they learn how to prepare low-cost, healthy meals for the whole family.

Diabetes and Your Nerves

Over time, high blood glucose can harm the nerves in your body. Nerve damage can cause you to lose the feeling in your feet or to have painful, burning feet. You may not feel pain from injuries or sore spots on your feet. If you have poor circulation because of blood vessel problems in your legs, the sores on your feet can't heal and might become infected. If the infection isn't treated, it could lead to amputation.

Nerve damage can also cause pain in your legs, arms, or hands or cause problems with digesting food, going to the bathroom, or having sex.

Nerve damage can happen slowly. You may not even realize you have nerve problems. Your doctor should check the nerves in your feet at least once a year. Your doctor should check your sense of feeling and the pulses in your feet.

Tell the doctor about any problems with your feet, legs, hands, or arms. Also, tell the doctor if you have trouble digesting food, going to the bathroom, or having sex, or if you sometimes feel dizzy.

Ask your doctor whether you already have nerve damage in your feet. If you do, you should take good care of your feet. To help prevent complications from nerve damage, check your feet every day. See Foot Care Tips on pages 46 to 47.

You can prevent nerve problems by

- keeping your blood glucose and blood pressure as close to normal as possible
- limiting the amount of alcohol you drink
- checking your feet every day
- quitting smoking



Joe is a 65-year-old retired letter carrier with type 2 diabetes. Every time he visits his doctor, he takes his shoes and socks off so the doctor can check his feet for sores, ulcers, and wounds. The doctor also checks the sense of feeling in Joe's feet. Joe and his doctor talk about ways to prevent foot and nerve problems. Since Joe has lost some feeling in his toes, the doctor also talks with him about the importance of good foot care and keeping his blood glucose in a good range.

Foot Care Tips

You can do a lot to prevent problems with your feet. Keep your blood glucose in your target range and follow these tips to take care of your feet and help protect them.

- Check your bare feet every day. Look for cuts, sores, bumps, or red spots. Use a mirror or ask a family member for help if you have trouble seeing the bottoms of your feet.
- Wash your feet in warm—not hot—water every day, but don't soak them. Use mild soap. Dry your feet with a soft towel, and dry carefully between your toes.
- After washing your feet, cover them with lotion before putting your shoes and socks on. Don't put lotion or cream between your toes.
- File your toenails straight across with an emery board. Don't leave sharp edges that could cut into your toe.
- Don't try to cut calluses or corns off with a razor blade or knife, and don't use wart removers on your feet. If you have warts or painful corns or calluses, see a **podiatrist**, a doctor who treats foot problems.

- Wear thick, soft socks. Don't wear mended socks or socks with holes or seams that might rub against your feet.
- Check your shoes before you put them on to be sure they have no sharp edges or objects in them.
- Wear shoes that fit well and let your toes move. Break new shoes in slowly. Don't wear flip-flops, shoes with pointed toes, or plastic shoes. Never go barefoot.
- Wear socks if your feet get cold at night. Don't use heating pads or hot water bottles on your feet.
- Have your doctor check your feet at every visit. Take your shoes and socks off when you go into the examining room to remind the doctor to check your feet.
- See a podiatrist for help if you can't take care of your feet yourself.

Diabetes and Your Gums and Teeth

Diabetes can lead to infections in your gums and the bones that hold your teeth in place. Like all infections, gum infections can cause blood glucose to rise. Without treatment, teeth may become loose and fall out.

Help prevent damage to your gums and teeth by

- seeing your dentist twice a year
- brushing and flossing your teeth at least twice a day
- quitting smoking
- keeping your blood glucose as close to normal as possible
- having regular checkups with your dentist

Be sure to tell your dentist that you have diabetes.



James runs a bookstore in California. He's 35 years old and has had type 1 diabetes for 15 years. James takes good care of his teeth and sees his dentist twice a year. He makes his appointments in the morning, after breakfast, so he won't get low blood glucose while at the dentist. He always carries glucose tablets for treatment of low blood glucose and wears a medical identification bracelet.

Taking Care of Your Diabetes at Special Times

Diabetes is part of your life. You can learn how to take care of yourself and your diabetes when you're sick, when you're at work or school, when you travel, when you're thinking about having a baby or are pregnant, or when there's an emergency or natural disaster.

When You're Sick

Having a cold, the flu, or an infection can raise your blood glucose levels. You can have serious health problems leading to a coma if your blood glucose levels are very high.

Be prepared for illness. Make a plan ahead of time for sick days. Ask your health care team

- how often to check your blood glucose levels
- whether you should check for ketones in your blood or urine
- whether you should change your usual dose of your diabetes medicines
- what to eat and drink
- when to call your health care provider

Action Steps If You Use Insulin
<ul style="list-style-type: none">• Take your insulin, even if you are sick and have been throwing up. Ask your doctor about how to adjust your insulin dose based on your blood glucose test results.

Your health care team may recommend the following:

- Check your blood glucose level at least four times a day and write down the results in your record book. Keep your results handy so you can report results to your health care team.
- Keep taking your diabetes medicines, even if you're not able to eat.
- Drink at least 1 cup, or 8 ounces, of water or other calorie-free, caffeine-free liquid every hour while you're awake.
- If you can't eat your usual food, try eating or drinking any of the following:
 - juice
 - saltine crackers
 - dry toast
 - soup
 - broth or bouillon
 - popsicles or sherbet
 - regular—not sugar-free—gelatin
 - milk
 - yogurt
 - regular—not sugar-free—soda

Action Steps
If You Don't Use Insulin

- Take your diabetes medicines, even if you are sick and have been throwing up.

Your health care provider may say you should call right away if

- your blood glucose levels are above 240 even though you've taken your diabetes medicines
- your urine or blood ketone levels are above normal
- you vomit more than once
- you have diarrhea for more than 6 hours
- you have trouble breathing
- you have a high fever
- you can't think clearly or you feel sleepier than usual

You should call your health care provider if you have questions about taking care of yourself.

When You're at School or Work

Take care of your diabetes when you're at school or at work:

- Follow your meal plan.
- Take your medicines and check your blood glucose as usual.
- Tell your teachers, friends, or close co-workers about the signs of low blood glucose. You may need their help if your blood glucose drops too low.
- Keep snacks nearby and carry some with you at all times to treat low blood glucose.
- Tell your company nurse or school nurse that you have diabetes.



Sally, a 12-year-old girl with type 1 diabetes, loves her gymnastics class. She practices every day for an hour. Before Sally exercises, she checks her blood glucose to make sure it's okay to start her workout. If her blood glucose is too low, she eats a snack before beginning to practice. Sally has told her coach that she has diabetes. Sally's coach knows that if Sally has a problem with low blood glucose, Sally is prepared to take care of it.

When You're Away from Home

These tips can help you take care of yourself when you're away from home:

- Follow your meal plan as much as possible when you eat out. Always carry a snack with you in case you have to wait to be served.
- Limit your drinking of beer, wine, or other alcoholic beverages. Ask your diabetes educator how much alcohol you can safely drink. Eat something when you drink to prevent low blood glucose.
- If you're taking a long trip by car, check your blood glucose before driving. Stop and check your blood glucose every 2 hours. Always carry snacks like fruit, crackers, juice, or soft drinks in the car in case your blood glucose drops too low.
- Bring food for meals and snacks with you if you're traveling by plane.
- Carry your diabetes medicines and your blood testing supplies with you. Never put them in your checked baggage.
- Ask your health care team how to adjust your medicines, especially your insulin, if you're traveling across time zones.
- Take comfortable, well-fitting shoes on vacation. You'll probably be walking more than usual, so you should take good care of your feet.



When traveling by plane, bring food for meals and snacks.

- If you're going to be away for a long time, ask your doctor for a written prescription for your diabetes medicines and the name of a doctor in the place you're going to visit.
- Don't count on buying extra supplies when you're traveling, especially if you're going to another country. Different countries use different kinds of diabetes medicines.

Action Steps If You Use Insulin

When you travel,

- take a special insulated bag to carry your insulin to keep it from freezing or getting too hot
- bring extra supplies for taking insulin and testing your blood glucose in case of loss or breakage
- ask your doctor for a letter saying that you have diabetes and need to carry supplies for taking insulin and testing blood glucose

When There's an Emergency or Natural Disaster

Everyone with diabetes should be prepared for emergencies and natural disasters, such as power outages or hurricanes. Always have your disaster kit ready. Include everything you need to take care of your diabetes, such as

- a blood glucose meter, lancets, and testing strips
- your diabetes medicines
- a list of your prescription numbers
- if you take insulin—some insulin, syringes, and an insulated bag to keep insulin cool
- if you take insulin or if recommended by your doctor—a glucagon kit
- glucose tablets and other foods or drinks to treat low blood glucose
- antibiotic cream or ointment
- a copy of your medical information, including a list of your conditions, medicines, and recent lab test results
- phone numbers for the American Red Cross and other disaster relief organizations

You also might want to include some nonperishable food, such as canned or dried food, along with bottled water.

Check and update your kit at least twice a year.

When You're Planning a Pregnancy

Keeping your blood glucose near normal before and during pregnancy helps protect both you and your baby. Even before you become pregnant, your blood glucose should be close to the normal range.

Your health care team can work with you to get your blood glucose under control before you try to get pregnant. If you're already pregnant, see your doctor right away. It's not too late to bring your blood glucose close to normal so that you'll stay healthy during the rest of your pregnancy.

Your insulin needs may change when you're pregnant. Your doctor may want you to take more insulin and check your blood glucose more often. If you take diabetes pills, you'll take insulin instead when you're pregnant.

The National Diabetes Information Clearinghouse offers a free booklet called *For Women with Diabetes: Your Guide to Pregnancy*. Read it online at www.diabetes.niddk.nih.gov/dm/pubs/pregnancy or call 1-800-860-8747 to request a printed copy.

If you plan to have a baby,

- work with your health care team to get your blood glucose as close to the normal range as possible before you get pregnant
- see a doctor who has experience in taking care of pregnant women with diabetes
- don't smoke, drink alcohol, or use harmful drugs
- follow the meal plan you get from your dietitian or diabetes educator to make sure you and your unborn baby have a healthy diet

Be sure to have your eyes, heart and blood vessels, blood pressure, and kidneys checked. Your doctor should also check for nerve damage. Pregnancy can make some health problems worse.



Maria, a 25-year-old woman with type 1 diabetes, wanted children. Her doctor told Maria and her husband that before she got pregnant, her blood glucose should be close to normal. Her doctor also recommended a checkup. Maria began to watch her diabetes very carefully. She checked her blood glucose level often, ate healthy meals, and began to walk a lot.

Once Maria became pregnant, she spent a lot of time taking care of her diabetes. Her hard work paid off. She gave birth to a healthy baby boy.

Where to Get More Help with Your Diabetes

People Who Can Help You

- Your doctor. You may see your regular doctor for diabetes care or someone who has special training in caring for people with diabetes. A doctor with special training in diabetes is called an **endocrinologist** or **diabetologist**.

You'll talk with your doctor about what kind of medicines you need and how much you should take. You'll also agree on a target blood glucose range and blood pressure and cholesterol targets. Your doctor will do tests to be sure your blood glucose, blood pressure, and cholesterol are staying on track and you're staying healthy. Ask your doctor if you should take aspirin every day to help prevent heart disease.

- Your diabetes educator. A diabetes educator may be a nurse, a dietitian, or another kind of health care worker. Diabetes educators teach you about meal planning, diabetes medicines, physical activity, how to check your blood glucose, and how to fit diabetes care into your everyday life. Be sure to ask questions if you don't understand something.
- Your family and friends. Taking care of your diabetes is a daily job. You may need help or support from your family or friends. You may want to bring a family member or close friend with you when you visit your doctor or diabetes educator. Taking good care of your diabetes can be a family affair!

- A counselor or mental health worker. You might feel sad about having diabetes or get tired of taking care of yourself. Or you might be having problems because of work, school, or family. If diabetes makes you feel sad or angry, or if you have other problems that worry you, you can talk with a counselor or mental health worker. Your doctor or diabetes educator can help you find a counselor.

Organizations That Can Help You

How to Find a Diabetes Educator

To find a diabetes educator near you, call the American Association of Diabetes Educators toll-free at 1-800-832-6874, or go to www.diabeteseducator.org and see the “Find a Diabetes Educator” section.

How to Find a Dietitian

To find a dietitian near you, call the American Dietetic Association toll-free at 1-800-877-1600, or go to www.eatright.org and see the “Find a Nutrition Professional” section.



How to Find Programs about Diabetes

To find programs about diabetes or for additional information, contact

American Diabetes Association

1701 North Beauregard Street

Alexandria, VA 22311

Phone: 1-800-DIABETES (342-2383)

Email: AskADA@diabetes.org

Internet: www.diabetes.org

Juvenile Diabetes Research Foundation International

120 Wall Street

New York, NY 10005

Phone: 1-800-533-CURE (2873)

Email: info@jdrf.org

Internet: www.jdrf.org

Both of these organizations have magazines and other information for people with diabetes. They also have local groups in many places where you can meet other people who have diabetes.

How to Get More Information about Diabetes

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

TTY: 1-866-569-1162

Fax: 703-738-4929

Email: ndic@info.niddk.nih.gov

Internet: www.diabetes.niddk.nih.gov

National Diabetes Education Program

1 Diabetes Way

Bethesda, MD 20814-9692

Phone: 1-888-693-NDEP (6337)

TTY: 1-866-569-1162

Fax: 703-738-4929

Email: ndep@mail.nih.gov

Internet: www.ndep.nih.gov

Pronunciation Guide

A1C (AY-WUHN-SEE)

beta cells (BAY-tuh) (selz)

carbohydrate (KAR-boh-HY-drayt)

cholesterol (koh-LESS-tur-ol)

circulation (SUR-kyoo-LAY-shuhn)

creatinine (kree-AT-ih-need)

diabetologist (DY-uh-beh-TOL-uh-jist)

dialysis (dy-AL-ih-siss)

endocrinologist (EN-doh-krih-NOL-uh-jist)

gestational (jess-TAY-shuhn-uhl)

glucagon (GLOO-kuh-gon)

glucose (GLOO-kohss)

hemoglobin (HEE-moh-GLOH-bin)

hyperglycemia (HY-pur-gly-SEE-mee-uh)

hypoglycemia (HY-poh-gly-SEE-mee-uh)

immune (ih-MYOON)

injectable (in-JEKT-uh-buhl)

injection (in-JEK-shuhn)

insulin (IN-suh-lin)

ketoacidosis (KEE-toh-ASS-ih-DOH-siss)

ketones (KEE-tohnz)

microalbumin (MY-kroh-al-BYOO-min)

pancreas (PAN-kree-uhss)

podiatrist (poh-DY-uh-trist)

syringe (suh-RINJ)

triglyceride (try-GLISS-ur-eyed)

National Diabetes Information Clearinghouse

1 Information Way
Bethesda, MD 20892-3560
Phone: 1-800-860-8747
TTY: 1-866-569-1162
Fax: 703-738-4929
Email: ndic@info.niddk.nih.gov
Internet: 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 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. 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.

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

This publication may contain information about medications. When prepared, this publication included the most current information available. For updates or for questions about any medications, contact the U.S. Food and Drug Administration toll-free at 1-888-INFO-FDA (463-6332) or visit www.fda.gov. Consult your doctor for more information.



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