

Control Type II Diabetes

Reduce Your Chance of Having a Stroke

Because you have type 2 diabetes you should

Check your blood sugar often.

Know your blood glucose (sugar) levels.

Follow your doctor's plan for your diabetes care.

Keep your doctor's appointments.

Managing your diabetes

Diabetes can cause major health problems if you do not keep your blood sugar in check. Living with diabetes will be easier if you:

- choose foods wisely
- exercise regularly
- keep a normal weight
- reduce your stress level
- make other modest lifestyle changes

HbA1c Blood Levels	Your Level	What the Range Means
Less than 7%		Good level for people who have diabetes
Above 7%		This level and above can cause complications

(Page 3 has more about the HbA1c test.)

Questions or concerns

If you have any questions or concerns about any symptoms you have or your medicines, talk with your health care provider immediately.

More about Type 2 Diabetes

Type 2 diabetes is the most common type of diabetes. Over 90% of the 21 million people with diabetes have type 2. Sometimes it is called non-insulin dependent diabetes. For people with type 2 diabetes, their body does make insulin. However, either the pancreas does not make enough insulin or the body cannot use the insulin well enough. (This is **insulin resistance**.)

If your body cannot use insulin as it should, glucose (sugar) cannot get into the body's cells. When glucose builds up in the blood instead of going into cells, the cells cannot work properly. Problems that a build-up of blood glucose can cause are:



- **Dehydration** The build-up of sugar in the blood can cause people to urinate (pass water) more. When the kidneys lose the glucose through the urine, a large amount of water is also lost, causing dehydration.
- **Diabetic Coma** When a person with type 2 diabetes becomes badly dehydrated and is not able to drink enough fluids to make up for this, they may develop this life-threatening problem.
- **Damage to the body** Over time, high glucose levels hurt the nerves and small blood vessels of the eyes, kidneys and heart. This may mean a person is more likely to develop **atherosclerosis** (hardening) of the arteries. This can cause heart attack and stroke.



Causes of Type 2 diabetes

The causes of type 2 diabetes are not well understood. There are likely many causes and not a single problem. Type 2 diabetes can run in families. How people inherit diabetes is not known. Researchers are trying to learn more about the causes.

Problems from type 2 diabetes

There are serious or life-threatening problems you may have if your type 2 diabetes is not well controlled:

- **Retinopathy** People with type 2 diabetes may have eye problems from when they developed diabetes. Over time, more people who did not have problems at first will develop some form of eye problem. It is important to control not only blood sugars but also blood pressure and cholesterol to prevent eye disease as long as possible.
- **Kidney damage** The longer you have diabetes, the greater your risk of kidney disease. This complication carries a huge risk of serious illness such as kidney failure and heart disease. Your doctor may give you a special diet to help protect your kidneys. Most order regular tests to see how their patients' kidneys are working.
- **Nerve damage and poor blood circulation** Nerve damage and hardening of the arteries leads to less feeling and blood flow in the feet. This can lead to more infections and a bigger risk of ulcers (sores) that do not heal. This significantly raises the risk of amputation. Nerve damage may also lead to digestive problems such as nausea, vomiting, and diarrhea.

Hemoglobin A1c Test

The Hemoglobin A1c test (also called the glycosylated hemoglobin test or **HbA1c**) is an important diabetes blood test used to see how well your diabetes is being controlled. It gives a 6-12 week average of your blood sugar control. This test, along with home blood sugar checks, is used to make changes in your diabetes medicines. For people without diabetes, the normal range for the HbA1c is between 4% and 6%. The goal for people with diabetes is a hemoglobin A1c below 7%. The higher your HbA1c is, the higher your risks are for having complications from diabetes.

People with diabetes should have the HbA1c test every three (3) months to find out if their blood sugars are at the target control level. If your diabetes is under good control, you may be able to wait longer between tests, but checking at least two (2) times a year is best. The HbA1c test does not replace daily self-testing of blood glucose.

What you can do

Checking your blood sugar at home

Everyone with diabetes should test his or her blood sugar (glucose) levels regularly, usually several times each day. Knowing your blood sugar levels will help you keep track of how you are doing with managing your diabetes.

The usual way to test your blood sugar is pricking your finger with a lancet (a small, sharp needle), putting a drop of blood on a test strip and then placing the strip into a meter that shows your blood sugar level. Your doctor, diabetes educator, or pharmacist can tell you about which meter is best for you. Meters have many features – readability, portability, speed, size, and cost. Blood sugar meters and testing strips are available at your local pharmacy.

When to test my blood sugar at home

Usually you should test blood sugar before meals, after meals and at bedtime. How many times and when you test each day is based on your individual needs. Your health care provider will tell you when and how often. Daily blood sugar checks are especially important for people taking insulin or the sulfonylureas group of anti-diabetes drugs.



Eating right

There is no "diabetes diet." The foods recommended for people with diabetes to control blood sugar are good for everyone. This means that you and your family can eat the same healthy foods at mealtime. Your dietitian can help you find the right serving sizes, depending on if you need to maintain, gain, or lose weight and if you have high or low blood sugar levels. People with diabetes need to keep an eye on the total amounts of carbohydrates they eat each day. Out of all the parts of our foods (carbohydrates, fats, and proteins), carbohydrates have the greatest effect on blood sugar levels. Most people with diabetes also need to keep track of how much fat and protein they eat. Too many calories can mean too much fat in your diet and make you gain weight.

If you have diabetes, it is important to eat right every day to keep your blood sugar levels even and to stay healthy. Here are some easy tips:

- Be sure to eat a wide variety of foods. Having a colorful plate is the best way to be sure that you are eating plenty of fruits, vegetables, meats, and other proteins such as nuts, dairy products, and grains/cereals.
- Eat the right amount of calories to maintain your healthy weight.
- Choose foods high in fiber such as whole grain breads, fruit, and cereal. They contain important vitamins and minerals. You need 25 to 35 grams of fiber per day. Studies suggest that people with type 2 diabetes who eat a high fiber diet can improve blood sugar and cholesterol levels.
- Keeping track of the total amount of carbohydrates (rather than the source of the sugar) will help you manage what you eat and your diabetes.



Alcohol

Be careful drinking alcohol if you have diabetes. The body deals with alcohol nearly the same way it handles fat. Alcohol has almost as many calories as fat. If you choose to drink alcohol, drink **only** once in awhile and **only** when your blood sugar level is well controlled. Check first with your doctor to be sure drinking alcohol is okay.

Losing weight

In people with type 2 diabetes, excess body fat means less sensitivity to insulin. If you are overweight, dropping pounds lowers your blood sugar, improves your health and helps you feel better. Before you start a weight loss plan, work closely with your doctor and/or diabetes educator. While you are dieting, your blood sugar, insulin and/or medicines will need special attention.



Medicines for diabetes

People with type 2 diabetes can have two different problems:

1. Their body does not make enough insulin to move glucose (sugar) into cells where it belongs.
2. Their body's cells become "resistant" to insulin (insulin resistance). This means the cells do not take in glucose as well as they should.

People with type 2 diabetes may use oral medicines (pills or tablets that you swallow), insulin, or a combination of both. Your doctor will work with you to find the medicines best for you. In time, some people with type 2 diabetes may have **beta-cell failure**. This is when the cells in the pancreas (beta cells) that make insulin can no longer do so. At that point, these people will need insulin injections to manage their diabetes.

Insulin

People with type 1 diabetes must always take insulin because their body no longer makes it. There are different types of insulin (long-acting, regular and short-acting). Most people use



a combination. Insulin is taken as an injection (a “shot”). The amount taken is based on a person’s current blood sugar, the type of insulin used, and when and what they will eat.

Oral diabetes medicines

Diabetes tablets or capsules help control blood sugar levels in people whose bodies still produce some insulin. This is most people with type 2 diabetes. Usually the medicines are prescribed along with advice about making specific dietary changes and getting regular exercise. These drugs may be used together to get the best blood sugar control. There are several groups of oral diabetes medicines. Each works differently:

- **Sulfonylureas** These diabetes pills lower blood sugar by getting the pancreas to let out more insulin. The first of this type that were developed – Dymelor (acetohexamide), Diabinese (chlorpropamide), Orinase (tolbutamide), and Tolinase (tolazamide) – are not as widely used now since they may be less strong and are shorter-acting than the newer ones. The newer medicines include Glucotrol (glipizide), Glucotrol XL (extended release), DiaBeta (glyburide), Micronase (glyburide), Glynase PresTab (glyburide), and Amaryl (glimepiride). These medicines can decrease the hemoglobin A1c (HbA1c) up to 1%-2%. Because these cause an increase in insulin release, regardless of glucose levels, they can lead to hypoglycemia.
- **Biguanides** This group of medicines improves the insulin's ability to move sugar into cells, especially into muscle cells. They also prevent the liver from releasing stored sugar. People who have kidney damage or heart failure should not use biguanides because there is a risk that they will cause a severe build up of acid (called lactic acidosis). Biguanides can decrease the HbA1c about 1%-2%. An example of this medicine is metformin (Glucophage, Glucophage XR, Riomet, Fortamet, and Glumetza).
- **Thiazolidinediones** These diabetes pills make insulin have a better effect in muscle and fat tissue. They lower the amount of sugar released by the liver and make fat cells more sensitive to the insulin, improving insulin resistance. Actos (pioglitazone) and Avandia (rosiglitazone) are the two drugs of this type. These medicines can decrease the HbA1c about 1%-2%. They may take a few weeks before they begin to have their effect. These two medicines should be used with great caution in people with heart failure. The FDA has restricted Avandia to be used by new patients only if they cannot control their blood sugar on any other medications and cannot take Actos. Current users can continue Avandia if they choose to. All patients using Avandia must look at and fully understand the serious cardiovascular risks.
- **Alpha-glucosidase inhibitors** These medicines block enzymes that help digest starches, slowing the rise in blood sugar. These diabetes pills may cause diarrhea or gas. They can lower hemoglobin A1c by 0.5%-1% and include Precose (acarbose) and Glyset (miglitol).
- **Meglitinides** This group of medicines lowers blood sugar by stimulating the pancreas to release more insulin. Two meglitinides are Prandin (repaglinide) and Starlix (nateglinide). The effects of these diabetes pills depend on the level of glucose, so they are “glucose dependent.” High sugars make this class of diabetes medicines release insulin. This is unlike the sulfonylureas that cause an increase in insulin release, regardless of glucose levels, and can lead to hypoglycemia.

- **Dipeptidyl peptidase IV (DPP-IV) inhibitors** work to lower blood sugar in patients with type 2 diabetes in two ways. They increase the pancreas' insulin secretion and reduce sugar production. These medicines increase insulin secretion when blood sugars are high. They also tell the liver to stop making excess amounts of sugar. DPP-IV inhibitors control sugar without causing weight gain. The DPP-IV inhibitors include Januvia (sitagliptin) and Onglyza (saxagliptin). The medication may be taken alone or with other medications such as metformin.
- **Combination therapy** Several diabetes medicines combine two medicines into one pill or tablet. One example of this is Glucovance that combines glyburide (a sulfonylurea) and metformin. Others include Metaglip that combines glipizide (a sulfonylurea) and metformin, and Avandia that has metformin and rosiglitazone (Avandia) in one pill.

Diabetes and health care providers

Diabetes is a lifelong, chronic disease. With the right health care team, you can manage your diabetes and prevent future problems from high blood sugar. There are two main goals when choosing your diabetes health care team:

- finding diabetes specialists to help you manage your blood glucose and keep it at safe levels and who can help you prevent or cope with diabetes complications
- having a primary care physician who can work with you and the specialists to help you take care of your diabetes.



Finally

Controlling your diabetes is an important step in keeping up good health. Your health will be better when you manage your diabetes as well as you possibly can. The stress of diabetes on your body will be less, and this will help prevent the damage to your blood vessels that can cause heart attacks and strokes.

Resources used for this information include: US National Library of Medicine – ncbi.nlm.nih.gov/pubmedhealth/PMH0001356; American Diabetes Association – diabetes.org/diabetes-basics/type-2/; mayoclinic.com/health/type2diabetes; *In Control: A Survival Guide for Diabetes Care*, Diabetes Care Center, Wake Forest Baptist Health © 2011