

Must Know Health Info

Health Information from the Experts at Johns Hopkins Medicine



Diabetes Mellitus Type 2

What is it?

Diabetes is a common health problem in the U.S. and the world. In diabetes, the body does not use the food it digests well. It is hard for the body to use carbohydrates and fats. The main marker of diabetes is high blood sugar (“glucose”). Your blood sugar is kept in check by insulin. Insulin is a hormone that is made in the pancreas. When you get diabetes, it is related to two things:

- The amount of insulin your body makes
- How well your body’s cells use insulin.

There are two different types of diabetes: type 1 and type 2. Only about 5% of people have type 1. Type 1 used to be called other names (“juvenile diabetes”, “insulin-dependent diabetes”). In type 1, the pancreas does not make insulin. It usually starts as a child or teen. Type 2 often starts after age 40. Type 2 used to be called other names too (“adult-onset diabetes”). Obese teens can also get type 2. In type 2, your pancreas makes insulin. But, it does not make enough insulin. Or, your body cannot use the insulin as well. This often happens when you are obese. At first, your body will make more insulin to try to keep up. But, when the body can no longer keep up, diabetes comes on. Type 2 often runs in families.

Symptoms

Symptoms of type 2 come from high blood sugar. They include:

- Frequent urination
- Extreme thirst and hunger
- Weight loss
- More likely to get skin and vaginal infections
- Infections or cuts that heal very slowly or not at all.

Blood sugar that is not in control can lead to coma. There are two types of comas:

- The form that happens in type 1 diabetes (called “ketoacidosis”)
- The form that happens in type 2 diabetes (called “hyperosmolar”)

You may take insulin or pills to make your blood sugar go down. If your blood sugar drops too far you will get low blood sugar (called “hypoglycemia”). Low blood sugar has symptoms. They include:

- Sweating
- Trembling
- Dizziness
- Hunger
- Confusion
- Seizures
- Loss of consciousness.

Blood sugar that stays high leads to long term problems from diabetes. You may not notice these problems for years. These are some:

- Damage to the eyes (called “retinopathy”) can cause blindness.
- Damage to the nerves (called “neuropathy”) can cause numbness, tingling and pain in your feet, legs, and arms. Usually people feel it in the feet first.
- Damage to the kidneys (called “nephropathy”) can cause your kidneys to stop working. You need your kidneys to get rid of waste products.

You are also more likely to get heart disease. Your heart has arteries that carry blood to the rest of your body. The trouble comes on when your arteries get narrow (called “atherosclerosis”). Then, blood does not flow well to parts of the body. This can happen in different parts of the body: heart, brain, legs. And, it leads to different problems:

- Coronary heart disease (heart)
- Cerebrovascular disease (brain)
- Peripheral artery disease (legs)

Symptoms include:

- Chest pain
- Heart attack
- Heart failure
- Stroke
- Leg pain when you walk or exercise that feels better when you rest.

You may have trouble getting blood to your legs and feet. This can cause foot ulcers and infections. The ulcers and infection can cause tissue to die (called “gangrene”). This in turn may lead to amputation.

What your doctor looks for

Your doctor will look for signs of diabetes.

- Obesity, especially around the middle (“abdominal obesity”). This is a waist that is more than 40 inches around in men or 35 inches around in women.
- High blood pressure
- Signs of eye disease on eye examination
- Decreased feeling and reflexes in the legs
- Poor pulses in the feet
- Blisters, ulcers or infections of the feet
- Abnormal heart rhythm

Your doctor will also do lab tests.

- Fasting blood sugar (This tests your blood sugar before you have had anything to eat or drink.)
- Hemoglobin A1c (This test measures your average blood sugar level over the past 2 to 3 months.)
- Lipid profile (This measures cholesterol, triglycerides, HDL and LDL cholesterol. It tells how likely it is that your arteries are narrowed.)
- Blood creatinine and urine microalbumin (These tests look for signs of kidney disease.)

Your doctor may also do an eye exam. He/she will look for early signs of eye disease. Your doctor may also do a foot and ankle exam. He/she will

touch your foot with a small wire. This tests whether you can feel the wire on your feet and ankles.

Diagnosis

Your doctor will use your fasting blood tests to see if you have diabetes. Your blood sugar should not be more than 126 mg/dl on this test. You have diabetes if:

- Your blood sugar is more than 126, and
- Your number stays high on more than one fasting test.

Expected duration

There is no cure for diabetes. It lasts your whole life. Type 2 can get much better in some obese people who lose weight and keep it off.

Prevention

You can help prevent type 2 diabetes. You should keep your body weight within the normal range for your height. This is key if diabetes runs in your family. If you already have diabetes, it's not too late. You can delay or stop later problems (retinopathy, neuropathy, nephropathy). Be sure to keep tight control of your blood sugar. There are ways to lower your risk of heart problems. You should not smoke. Here are risk factors you can help control:

- High blood pressure
- High blood fats (cholesterol and triglycerides)
- Obesity

Treatment and management

In most people who have type 2 diabetes, treatment starts with weight. Diet and exercise are used for weight loss. The diet is like ones used to lower bad fats and stop risk of heart disease. Most people who have type 2 can control their blood sugar with pills at first. These include ones in the table. You may use pills for many years. But, over time, you may need insulin. Or, you may need insulin right away. You should talk to your doctor about which medicine is right for you. Metformin is suggested as the first one to try.

Medicine Class	Medicine Name	How it Works
Sulfonylureas	Repaglinide (Prandin) Nateglinide (Starlix)	Increases the amount of insulin released by your pancreas
Biguanide	Metformin (Glucophage)	Lowers the amount of sugar produced by the liver, Helps your body use insulin better
Thiazolidinediones**	Rosiglitazone (Avandia) Pioglitazone (Actos)	Helps your body use insulin better
Alpha-Glucosidase Inhibitors	Acarbose (Precose)	Delays the absorption of sugars from the intestine

The pills used to treat type 2 diabetes can have many side effects. See the table for the major ones.

Medicine	Side Effects
Sulfonylureas	Low Blood Sugar (Hypoglycemia) Weight Gain
Metformin + Insulin or Sulfonylureas	Low Blood Sugar (Hypoglycemia)
Thiazolidinedione + Insulin or Sulfonylureas	Low Blood Sugar (Hypoglycemia)
Metformin	Nausea and Diarrhea (less common if you take the medicine with a meal) Life threatening problems for people who already have liver or kidney disease

Thiazolidinediones	Can affect your liver so you need to have routine blood tests
Acarbose	Extreme gas and bloating

You should treat high “bad” cholesterol (LDL). Medicines that work to lower this are in the table.

Type of Medicine	Medicine
Statins to lower LDL cholesterol	Lovastatin, pravastatin, simvastatin, fluvastatin, atorvastatin, rosuvastatin
Bile acid sequestrants to lower LDL cholesterol	Cholestyramine (Questran), colestipol (Colestid), colesevelam (Welchol)
New medicine to lower LDL cholesterol	Ezetimibe (Zetia)
Medicines to lower triglycerides	Gemfibrozil, fenofibrate

To control diabetes you should watch your diet, keep fit, and take your pills. If this is not enough, you may need to take insulin each day. You may also need to stick to a meal plan and eat meals at regular times. This will lessen your chances of having low blood sugar.

Test your blood sugar each day. This is a key part of managing your diabetes. This is true no matter which medicines you take. You will use a tiny needle (called a “lancet”) to get a small bit of blood. The fingertip is usually the place that is used. The testing meter will tell you how much sugar is in your blood. You should know the “target ranges” for your blood sugar.

- 90 – 120 mg/dl before you have had anything to eat or drink
- 120 – 180 mg/dl after meals

If you know your blood sugar level you can choose types and amounts of food. You can also choose how to keep active. If your blood sugar is always

in the target range, you are not “cured”. It means that you are doing a good job of managing your diabetes. You will have a better chance at a good quality of life. It is less likely that you will have long term problems from diabetes.

When to call your doctor

With diabetes, you are at higher risk for loss of body fluids (“dehydration”). Call the doctor if you have nausea or vomiting that lasts. Follow the testing schedule your doctor gives you for sick days. This should tell you how often to test:

- Your blood sugar
- Your urine for ketones.

Call your doctor right away if:

- You have blood sugars that are very high (more than 400 – 500 mg/dl). Your doctor may want you to call before it gets that high.
- You have large amounts of ketones in your urine.

Have your family call the doctor right away if you show these signs:

- Dehydration
- Dry skin
- Nausea
- Vomiting
- Confusion
- Coma

These are signs of severe high blood sugar problems (“ketoacidosis” and “hyperosmolar coma”).

Prognosis

Type 2 diabetes can have a good outcome. There are things you must do to help. Control your blood sugar. Maintain a normal weight. Reduce your risk factors for heart disease.

Additional information

For more information about diabetes, you can contact:

National Diabetes Information Clearinghouse
1 Information Way
Bethesda, MD 20892-3560
<http://diabetes.niddk.nih.gov/>

American Diabetes Association (ADA)
225 Broadway
San Diego, CA 92101
1-800-DIABETES (1-888-342-2383)
www.diabetes.org

****IMPORTANT NOTICE about the entire thiazolidinedione class of antidiabetic drugs, including rosiglitazone (Avandia) and pioglitazone (Actos).** Read the complete MedWatch 2007 safety summary including a link to [FDA press release](#) at:

http://www.fda.gov/Safety/MedWatch/SafetyInformation/SafetyAlertsforHumanMedicalProducts/default.htm#rosi_pio

****Authored by Johns Hopkins University and Johns Hopkins Health System****