

Type 2 Diabetes Mellitus, Adult

Type 2 diabetes mellitus, often simply referred to as type 2 diabetes, is a long-lasting (*chronic*) disease. In type 2 diabetes, the pancreas does not make enough insulin (a hormone), the cells are less responsive to the insulin that is made (*insulin resistance*), or both. Normally, insulin moves sugars from food into the tissue cells. The tissue cells use the sugars for energy. The lack of insulin or the lack of normal response to insulin causes excess sugars to build up in the blood instead of going into the tissue cells. As a result, high blood sugar (*hyperglycemia*) develops. The effect of high sugar (*glucose*) levels can cause many complications.

Type 2 diabetes was also previously called adult-onset diabetes, but it can occur at any age.

RISK FACTORS

A person is predisposed to developing type 2 diabetes if someone in the family has the disease and also has one or more of the following primary risk factors:

- Weight gain, or being overweight or obese.
- An inactive lifestyle.
- A history of consistently eating high-calorie foods.

Maintaining a normal weight and regular physical activity can reduce the chance of developing type 2 diabetes.

SYMPTOMS

A person with type 2 diabetes may not show symptoms initially. The symptoms of type 2 diabetes appear slowly. The symptoms include:

- Increased thirst (*polydipsia*).
- Increased urination (*polyuria*).
- Increased urination during the night (*nocturia*).
- Sudden or unexplained weight changes.
- Frequent, recurring infections.
- Tiredness (*fatigue*).
- Weakness.
- Vision changes, such as blurred vision.
- Fruity smell to your breath.
- Abdominal pain.
- Nausea or vomiting.
- Cuts or bruises which are slow to heal.
- Tingling or numbness in the hands or feet.
- An open skin wound (*ulcer*).

DIAGNOSIS

Type 2 diabetes is frequently not diagnosed until complications of diabetes are present. Type 2 diabetes is diagnosed when symptoms or complications are present and when blood glucose levels are increased. Your blood glucose level may be checked by one or more of the following blood tests:

- A fasting blood glucose test. You will not be allowed to eat for at least 8 hours before a blood sample is taken.
- A random blood glucose test. Your blood glucose is checked at any time of the day regardless of when you ate.
- A hemoglobin A1c blood glucose test. A hemoglobin A1c test provides information about blood glucose control over the previous 3 months.
- An oral glucose tolerance test (OGTT). Your blood glucose is measured after you have not eaten (*fasted*) for 2 hours and then after you drink a glucose-containing beverage.

TREATMENT

- You may need to take insulin or diabetes medicine daily to keep blood glucose levels in the desired range.
- If you use insulin, you may need to adjust the dosage depending on the carbohydrates that you eat with each meal or snack.
- Lifestyle changes are recommended as part of your treatment. These may include:
 - Following an individualized diet plan developed by a nutritionist or dietitian.
 - Exercising daily.

Your health care providers will set individualized treatment goals for you based on your age, your medicines, how long you have had diabetes, and any other medical conditions you have. Generally, the goal of treatment is to maintain the following blood glucose levels:

- Before meals (*preprandial*): 80–130 mg/dL.
- After meals (*postprandial*): below 180 mg/dL.
- A1c: less than 6.5–7%.

HOME CARE INSTRUCTIONS

- Have your hemoglobin A1c level checked twice a year.
- Perform daily blood glucose monitoring as directed by your health care provider.
- Monitor urine ketones when you are ill and as directed by your health care provider.
- Take your diabetes medicine or insulin as directed by your health care provider to maintain your blood glucose levels in the desired range.
 - Never run out of diabetes medicine or insulin. It is needed every day.
 - If you are using insulin, you may need to adjust the amount of insulin given based on your intake of carbohydrates. Carbohydrates can raise blood glucose levels but need to be included in your diet. Carbohydrates provide vitamins, minerals, and fiber which are an essential part of a healthy diet. Carbohydrates are found in fruits, vegetables, whole grains, dairy products, legumes, and foods containing added sugars.
- Eat healthy foods. You should make an appointment to see a registered dietitian to help you create an eating plan that is right for you.

- Lose weight if you are overweight.
- Carry a medical alert card or wear your medical alert jewelry.
- Carry a 15-gram carbohydrate snack with you at all times to treat low blood glucose (*hypoglycemia*). Some examples of 15-gram carbohydrate snacks include:
 - Glucose tablets, 3 or 4.
 - Glucose gel, 15-gram tube.
 - Raisins, 2 tablespoons (24 grams).
 - Jelly beans, 6.
 - Animal crackers, 8.
 - Regular pop, 4 ounces (120 mL).
 - Gummy treats, 9.
- Recognize hypoglycemia. Hypoglycemia occurs with blood glucose levels of 70 mg/dL and below. The risk for hypoglycemia increases when fasting or skipping meals, during or after intense exercise, and during sleep. Hypoglycemia symptoms can include:
 - Tremors or shakes.
 - Decreased ability to concentrate.
 - Sweating.
 - Increased heart rate.
 - Headache.
 - Dry mouth.
 - Hunger.
 - Irritability.
 - Anxiety.
 - Restless sleep.
 - Altered speech or coordination.
 - Confusion.
- Treat hypoglycemia promptly. If you are alert and able to safely swallow, follow the 15:15 rule:
 - Take 15–20 grams of rapid-acting glucose or carbohydrate. Rapid-acting options include glucose gel, glucose tablets, or 4 ounces (120 mL) of fruit juice, regular soda, or low-fat milk.
 - Check your blood glucose level 15 minutes after taking the glucose.
 - Take 15–20 grams more of glucose if the repeat blood glucose level is still 70 mg/dL or below.
 - Eat a meal or snack within 1 hour once blood glucose levels return to normal.
- Be alert to feeling very thirsty and urinating more frequently than usual, which are early signs of hyperglycemia. An early awareness of hyperglycemia allows for prompt treatment. Treat hyperglycemia as directed by your health care provider.
- Engage in at least 150 minutes of moderate-intensity physical activity a week, spread over at least 3 days of the week or as directed by your health care provider. In addition, you should engage in resistance exercise at least 2 times a week or as directed by your health care provider. Try to spend no more than 90 minutes at one time inactive.
- Adjust your medicine and food intake as needed if you start a new exercise or sport.
- Follow your sick-day plan anytime you are unable to eat or drink as usual.

- **Do not** use any tobacco products including cigarettes, chewing tobacco, or electronic cigarettes. If you need help quitting, ask your health care provider.
- Limit alcohol intake to no more than 1 drink per day for nonpregnant women and 2 drinks per day for men. You should drink alcohol only when you are also eating food. Talk with your health care provider whether alcohol is safe for you. Tell your health care provider if you drink alcohol several times a week.
- Keep all follow-up visits as directed by your health care provider. This is important.
- Schedule an eye exam soon after the diagnosis of type 2 diabetes and then annually.
- Perform daily skin and foot care. Examine your skin and feet daily for cuts, bruises, redness, nail problems, bleeding, blisters, or sores. A foot exam by a health care provider should be done annually.
- Brush your teeth and gums at least twice a day and floss at least once a day. Follow up with your dentist regularly.
- Share your diabetes management plan with your workplace or school.
- Keep your immunizations up to date. It is recommended that you receive a flu (*influenza*) vaccine every year. It is also recommended that you receive a pneumonia (*pneumococcal*) vaccine. If you are 65 years of age or older and have never received a pneumonia vaccine, this vaccine may be given as a series of two separate shots. Ask your health care provider which additional vaccines may be recommended.
- Learn to manage stress.
- Obtain ongoing diabetes education and support as needed.
- Participate in or seek rehabilitation as needed to maintain or improve independence and quality of life. Request a physical or occupational therapy referral if you are having foot or hand numbness, or difficulties with grooming, dressing, eating, or physical activity.

SEEK MEDICAL CARE IF:

- You are unable to eat food or drink fluids for more than 6 hours.
- You have nausea and vomiting for more than 6 hours.
- Your blood glucose level is over 240 mg/dL.
- There is a change in mental status.
- You develop an additional serious illness.
- You have diarrhea for more than 6 hours.
- You have been sick or have had a fever for a couple of days and are not getting better.
- You have pain during any physical activity.

SEEK IMMEDIATE MEDICAL CARE IF:

- You have difficulty breathing.
- You have moderate to large ketone levels.

This information is not intended to replace advice given to you by your health care provider. Make sure you discuss any questions you have with your health care provider.