

# Your Care Clinics, LLC

5985 49<sup>th</sup> St. No. St. Petersburg, FL 33709 (727) 528-8997  
1258 W. Bay Dr. , Unit #F, Largo, FL 33770 (727) 588-7600

## Type 2 Diabetes

### **Introduction**

Type 2 diabetes, once known s adult-onset or noninsulin-dependent diabetes, is a chronic condition that affects the way your body metabolizes sugar (glucose), your body's main source of fuel. Type 2 diabetes is often preventable, but the condition is on the rise – fueled largely by the current obesity epidemic.

When you have type 2 diabetes, your body is resistant to the effects of insulin – a hormone that regulates the absorption of sugar into your cells – or your body produces some, but not enough, insulin to maintain a normal glucose level. Left uncontrolled, the consequences of type 2 diabetes can be life-threatening.

Type 1 diabetes is a similar, although much less common, condition in which the pancreas produces little or no insulin.

There's no cure for type 2 diabetes, but there's plenty you can do to manage – or prevent – the condition. Start by eating healthy foods, including physical activity in your daily routine and maintaining a healthy weight. If diet and exercise aren't enough, you may need diabetes medications or insulin therapy to manage your blood sugar.

### **Signs and symptoms**

Type 2 diabetes symptoms may seem harmless at first. In fact, you can have type 2 diabetes for years and not even know it. Look for:

- **Increased thirst and frequent urination.** As excess sugar builds up in your bloodstream, fluid is pulled from you tissues. This may leave you thirsty. As a result, you may drink – and urinate – more than usual.
- **Extreme hunger.** Without enough insulin to move sugar into your cells, you muscles and organs become depleted of energy. This triggers intense hunger that may persist even after you eat.
- **Weight loss.** Despite eating more than usual to relieve your constant hunger, you may lose weight. Without the energy sugar supplies, your muscle tissues and fat stores may simply shrink.
- **Fatigue.** If your cells are deprived of sugar, you may become tired and irritable.

- **Blurred vision.** If your blood sugar level is too high, fluid may be pulled from your tissues – including the lenses of your eyes. This may affect your ability to focus.
- **Slow healing sores or frequent infections.** Type 2 diabetes affects your ability to heal and fight infections. Bladder and vaginal infections can be a particular problem for women.

Some people who have type 2 diabetes have patches of dark, velvety skin in the folds and creases of their bodies – usually in the armpits and neck. This condition, called acanthosis nigricans, is a sign of insulin resistance.

## Causes

To understand type 2 diabetes, first you must understand how glucose is normally processed in the body.

Glucose is a main source of energy for the cells that make up your muscles and other tissues. Glucose comes from two major sources: the food you eat and your liver. During digestion, sugar is absorbed into the bloodstream. Normally, sugar then enters cells with the help of insulin.

The hormone insulin comes from the pancreas, a gland located just behind the stomach. When you eat, your pancreas secretes insulin into your bloodstream. As insulin circulates, it acts like a key by unlocking microscopic doors that allow sugar to enter your cells. Insulin lowers the amount of sugar in your bloodstream. As your blood sugar level drops, so does the secretion of insulin from your pancreas.

Your liver acts as a glucose storage and manufacturing center. When your insulin levels are low – when you haven't eaten in a while, for example – your liver releases the stored glucose to keep your glucose level within a normal range.

In type 2 diabetes, this process works improperly. Instead of moving into your cells, sugar builds up in your bloodstream. This occurs when your pancreas doesn't make enough insulin or your cells become resistant to the action of insulin. Exactly why this happens is uncertain, although excess fat – especially abdominal fat – and inactivity seem to be important factors.

## Risk Factors

Researchers don't fully understand why some people develop type 2 diabetes and others don't. It's clear that certain factors increase the risk, however, including:

- **Weight.** Being overweight is a primary risk factor for type 2 diabetes. The more fatty tissue you have, the more resistant your cells become to insulin.
- **Inactivity.** The less active you are, the greater your risk of type 2 diabetes. Physical activity helps you control your weight, uses up glucose as energy and makes your cells more sensitive to insulin.
- **Family history.** The risk of type 2 diabetes increases if a parent or sibling has type 2 diabetes.
- **Race.** Although it's unclear why, people of certain races – including blacks, Hispanics, American Indians and Asian Americans – are more likely to develop type 2 diabetes.
- **Age.** The risk of type 2 diabetes increases as you get older, especially after age 45. Often, that's because people tend to exercise less, lose muscle mass and gain weight as they age. But type 2 diabetes is increasing dramatically among children, adolescents and younger adults.
- **Prediabetes.** Prediabetes is a condition in which your blood sugar level is higher than normal, but not high enough to be classified as type 2 diabetes. Left untreated, prediabetes often progresses to type 2 diabetes.
- **Gestational diabetes.** If you developed gestational diabetes when you were pregnant, your risk of developing type 2 diabetes later increases. If you gave birth to a baby weighing more than 9 pounds, you're also at risk of type 2 diabetes.

### **When to seek medical advice**

Consult your doctor if you're concerned about diabetes or if you notice any type 2 diabetes symptoms – increased thirst and frequent urination, extreme hunger, weight loss, blurred vision, fatigue, slow-healing sores or frequent infections. Also ask your doctor about routine diabetes screening, especially if you've gained weight and are inactive.

If you're diagnosed with type 2 diabetes, you'll need close medical follow-up until your blood sugar level stabilizes. Once your blood sugar is under control, the doctor may recommend checkups every few months. A thorough yearly exam and regular foot and eye exams also are important – especially if your diabetes isn't well controlled, if you have high blood pressure or kidney disease, or if you're pregnant.

## Screening and diagnosis

Various blood tests can be used to screen for diabetes, including:

- **Random blood sugar test.** A blood sample will be taken at a random time. Regardless of when you last ate, a random blood sugar level of 200 milligrams per deciliter (mg/dL) or higher suggests diabetes.
- **Fasting blood sugar test.** A blood sample will be taken after an overnight fast. A fasting blood sugar level between 70 and 100 mg/dL is normal. A fasting blood sugar level from 100 to 125 mg/dL is considered prediabetes, which indicates a high risk of developing diabetes. If it's 126 mg/dL or higher on two separate tests, you'll be diagnosed with diabetes.

The American Diabetes Association recommends routine screening for type 2 diabetes beginning at the age 45, especially if you're overweight. If the results are normal, repeat the test every three years. If the results are borderline, repeat the test every year.

If you're diagnosed with diabetes, your doctor may do other tests to distinguish between type 1 and type 2 diabetes – which may require different treatment strategies. Your doctor may also recommend a glycated hemoglobin (A1C) test. This blood test indicates your average blood sugar level for the past two to three months. It works by measuring the percentage of blood sugar attached to hemoglobin, the oxygen-carrying protein in red blood cells. The higher your blood sugar levels, the more hemoglobin you'll have with sugar attached. Generally, a target A1C result is 7 percent or less.

## Complications

Type 2 diabetes can be easy to ignore, especially in the early stages when you're feeling fine. But diabetes affects many major organs, including your heart, blood vessels, nerves, eyes and kidneys. Keeping your blood sugar level close to normal most of the time can dramatically reduce the risk of these complications.

### Short term complications

Short-term complications of type 2 diabetes require immediate care. Left untreated, these conditions can cause seizures and loss of consciousness (coma).

- **High blood sugar (hyperglycemia)** Your blood sugar level can rise for many reasons, including eating too much, being sick or not taking enough glucose-lowering medication. Check your blood sugar often, and watch for signs and symptoms of high blood sugar – frequent urination, increased thirst, dry mouth, blurred vision, fatigue and nausea. If you have hyperglycemia, you'll need to adjust your meal plan, medications or both. If your blood sugar level is persistently above 250 mg/dL, consult your doctor right away or seek emergency

- care. You might have diabetic hyperosmolar syndrome, a life-threatening condition in which sky-high blood sugar causes blood to become thick and syrupy.
- **Increased ketones in your urine (diabetic ketoacidosis).** If your cells are starved for energy, your body may begin to break down fat. This produces toxic acids known as ketones. Watch for loss of appetite, nausea, vomiting, fever, stomach pain and a sweet, fruity smell on your breath – especially if your blood sugar level has been consistently higher than 250 mg/dL. You can check your urine for excess ketones with an over-the-counter ketones test kit. If you have excess ketones in your urine, consult your doctor right away or seek emergency care.
  - **Low blood sugar (hypoglycemia).** If your blood sugar level drops below your target range, it's known as low blood sugar. Your blood sugar level can drop for many reasons, including skipping a meal and getting more physical activity than normal. However, low blood sugar is most likely if you take glucose-lowering medications that promote the secretion of insulin or if you're on insulin therapy. Check your blood sugar level regularly, and watch for early signs and symptoms of low blood sugar – sweating, shakiness, weakness, hunger, dizziness and nausea. Later signs and symptoms include slurred speech, drowsiness and confusion.

If you develop hypoglycemia during the night, you might wake with sweat-soaked pajamas or headache. Thanks to natural rebound effect, nighttime hypoglycemia might cause an unusually high blood sugar reading first thing in the morning.

If you have signs or symptoms of low blood sugar, eat or drink something that will quickly raise your blood sugar level – fruit juice, glucose tablets, hard candy, regular (not diet) soda or another source of sugar. If you lose consciousness, a family member or close contact may need to give you an emergency injection of glucagon, a hormone that stimulates the release of sugar into the blood.

## Long-term complications

Long-term complications of diabetes develop gradually. The earlier you develop type 2 diabetes – and the less controlled your blood sugar the higher risk of complications. Eventually, diabetes complications may be disabling or even life-threatening.

- **Heart and blood vessel disease.** Diabetes dramatically increases the risk of various cardiovascular problems, including coronary artery disease with chest pain (angina), heart attack, stroke, narrowing of the arteries (atherosclerosis) and high blood pressure. In fact, about 75 percent of people who have diabetes die of some type of heart or blood vessel disease, according to the American Heart Association.
- **Nerve damage (neuropathy).** Excess sugar can injure the walls of the tiny blood vessels (capillaries) that nourish your nerves, especially in the legs. This can

cause tingling, numbness, burning or pain that usually begins at the tips of the toes or fingers and over a period of months or years gradually spreads upward. Left untreated, you could lose all sense of feeling in the affected limbs. Damage to the nerves that control digestion can cause problems with nausea, vomiting, diarrhea or constipation. For men, erectile dysfunction may be an issue.

- **Kidney damage (nephropathy).** The kidneys contain millions of tiny blood vessel clusters that filter waste from your blood. Diabetes can damage this delicate filtering system. Severe damage can lead to kidney failure or irreversible end-stage kidney disease, requiring dialysis or a kidney transplant.
- **Eye damage.** Diabetes can damage the blood vessels of the retina (diabetic retinopathy), potentially leading to blindness. Diabetes also increases the risk of other serious vision conditions, such as cataracts and glaucoma.
- **Foot damage.** Nerve damage in the feet or poor blood flow to the feet increases the risk of various foot complications. Left untreated, cuts and blisters can become serious infections. Severe damage might require toe, foot or even leg amputation.
- **Skin and mouth conditions.** Diabetes may leave you more susceptible to skin problems, including bacterial infections, fungal infections and itching. Gum infections also may be a concern, especially if you have a history of poor dental hygiene.
- **Osteoporosis.** Diabetes may lead to lower than normal bone mineral density, increasing your risk of osteoporosis.
- **Alzheimer's disease.** Type 2 diabetes may increase the risk of Alzheimer's disease. The poorer your blood sugar control, the greater the risk. So what connects the two conditions? One theory is that cardiovascular problems caused by diabetes could contribute to dementia by blocking blood flow to the brain or causing strokes. Other possibilities are that too much insulin in the blood leads to brain-damaging inflammation, or lack of insulin in the brain deprives brain cells of glucose.

## Treatment

Treatment for type 2 diabetes is a lifelong commitment of blood sugar monitoring, healthy eating, regular exercise and, sometimes, diabetes medications or insulin therapy. The goal is to keep your blood sugar level as close to normal as possible to delay or prevent complications. In fact, tight control of blood sugar levels can reduce the risk of diabetes-related heart attacks and strokes by more than 50 percent.

If managing your diabetes seems overwhelming, take it one day at a time. And remember that you're not in it alone. You'll work closely with your diabetes treatment team – doctor, diabetes educator and registered dietitian – to keep your blood sugar level as close to normal as possible.

## **Monitoring your blood sugar**

Depending on your treatment plan, you may check and record your blood sugar level once a day or several times a week. Careful monitoring is the only way to make sure that your blood sugar level remains within your target range.

Even if you eat on a rigid schedule, the amount of sugar in your blood can change unpredictably. With help from our diabetes treatment team, you'll learn how your blood sugar level changes in response to:

- **Food.** What and how much you eat will affect your blood sugar level. Blood sugar is typically highest one to two hours after a meal
- **Physical activity.** Physical activity moves sugar from your blood into your cells. The more active you are, the lower your blood sugar level.
- **Medication.** Any medications you take may affect your blood sugar level, sometimes requiring changes in your diabetes treatment plan.
- **Illness.** During a cold or other illness, your body will produce hormones that raise your blood sugar level.
- **Alcohol.** Alcohol can cause either high or low blood sugar, depending on how much you drink and if you eat at the same time.
- **Stress.** The hormones your body may produce in response to prolonged stress may prevent insulin from working properly.
- **For women, fluctuations in hormone levels.** As your hormone levels fluctuate during your menstrual cycle, so can your blood sugar level – particularly in the week before your period. Menopause may trigger fluctuations in your blood sugar level as well

In addition to daily blood sugar monitoring, your doctor may recommend regular A1C testing to measure your average blood sugar level for the past two to three months. Compared with repeated daily blood sugar tests, A1C testing better indicates how well your diabetes treatment plan is working overall. An elevated A1C level may signal the need for a change in your insulin regimen or meal plan.

## **Healthy eating**

Contrary to popular perception, there's no diabetes diet. You won't be restricted to a lifetime of boring, bland foods. Instead, you'll need plenty of fruits, vegetables and whole grains – foods that are high in nutrition and low in fat and calories – and fewer animal products and sweets. In fact, it's the best eating plan for the entire family. Even sugary foods are OK once in a while, as long as they're included in your meal plan.

Yet understanding what and how much to eat can be a challenge. A registered dietitian can help you put together a meal plan that fits your health goals, food preferences and lifestyle. Once you've covered the basics, remember the importance of consistency. To keep your blood sugar on an even keel, try to eat the same amount of food with the same proportion of carbohydrates, proteins and fats at the same time every day.

## **Physical activity**

Everyone needs regular aerobic exercise, and people who have type 2 diabetes are no exception. Get your doctor's OK to exercise. Then choose activities you enjoy, such as walking, swimming or biking. What's most important is making physical activity part of your daily routine. Aim for at least 30 minutes of aerobic exercise most days of the week. Stretching and strength training exercises are important, too. If you haven't been active for a while, start slowly and build up gradually.

Remember that physical activity lowers blood sugar. Check your blood sugar level before any activity. You might need to eat a snack before exercising to help prevent low blood sugar.

## **Diabetes medications and insulin therapy**

Some people who have type 2 diabetes can manage their blood sugar with diet and exercise alone, but many need diabetes medications or insulin therapy.

Many oral or injected medications can be used to treat type 2 diabetes. Some diabetes medications stimulate your pancreas to produce and release more insulin. Others inhibit the production and release of glucose from your liver, which means you need less insulin to transport sugar into your cells. Still others block the action of stomach enzymes that break down carbohydrates or make your tissues more sensitive to insulin.

In addition to diabetes medications, your doctor might prescribe low-dose aspirin therapy to help prevent heart and blood vessel disease. Some people who have type 2 diabetes need insulin therapy as well. Because stomach enzymes interfere with insulin taken by mouth, insulin must be injected. Often, insulin is injected using a fine needle and syringe

or an insulin pen injector – a device that looks like an ink pen, except the cartridge is filled with insulin.

An insulin pump also may be an option. The pump is a device about the size of a cell phone worn on the outside of your body. A tube connects the reservoir or insulin to a catheter that's inserted under the skin of your abdomen. The pump is programmed to dispense specific amounts of insulin automatically. It can be adjusted to deliver more or less insulin depending on meals, activity level and blood sugar level.

Many types of insulin are available, including rapid-acting insulin, long-acting insulin and intermediate options. Examples include insulin lispro (Humalog), insulin aspart (NovoLog) and insulin glargine (Lantus). Depending on your needs, your doctor may prescribe a mixture of insulin types to use throughout the day and night. Inhaled insulin (Exubera) is now available as well. Inhaled insulin is a powdered form of insulin absorbed by the lungs through the use of a hand-held inhaler. Inhaled insulin is rapid acting, usually taken before a meal. It replaces only short-acting forms of injectable insulin – not the longer acting (basal) insulin that may be required as part of a diabetes treatment plan.

The decision about which medications are best depends on many factors, including your blood sugar level and the presence of any other health problems. Your doctor might even combine drugs from different classes to help you control your blood sugar in several different ways.

## **Prevention**

Healthy lifestyle choices can help you prevent type 2 diabetes. Even if diabetes runs in your family, diet and exercise can help you prevent the disease. And if you've already been diagnosed with diabetes, the same healthy lifestyle choices can help you prevent potentially serious complications.

- **Eat healthy foods.** Choose foods low in fat and calories. Focus on fruits, vegetables and whole grains. Strive for variety to prevent boredom.
- **Get more physical activity.** Aim for 30 minutes of moderate physical activity a day. Take a brisk daily walk. Ride your bike. Swim laps. If you can't fit in a long workout, break it up into smaller sessions spread throughout the day.
- **Lose excess pounds.** If you're overweight, losing even 10 pounds can reduce the risk of diabetes. To keep your weight in a healthy range, focus on permanent changes to your eating and exercise habits. Motivate yourself by remembering the benefits of losing weight, such as a healthier heart, more energy and improved self-esteem.

Sometimes medication is an option as well. Oral diabetes drugs such as metformin (Glucophage) and rosiglitazone (Avandia) may reduce the risk of type 2 diabetes – but healthy lifestyle choices remain essential.

## Self-care

Type 2 diabetes is a serious disease. Following your diabetes treatment plan takes round-the-clock commitment. But your efforts are worthwhile. Careful management of type 2 diabetes can reduce your risk of serious – even life-threatening – complications.

Consider these 10 tips:

1. **Make a commitment to managing your diabetes.** Learn all you can about type 2 diabetes. Make healthy eating and physical activity part of your daily routine. Establish a relationship with a diabetes educator, and ask your diabetes treatment team for help when you need it.
2. **Identify yourself.** Wear a tag or bracelet that says you have diabetes. Keep a glucagon kit nearby in case of a low blood sugar emergency – and make sure your friends and loved ones know how to use it.
3. **Schedule a yearly physical and regular eye exams.** Your regular diabetes check ups aren't meant to replace yearly physicals or routine eye exams. During the physical, your doctor will look for any diabetes-related complications, as well as screen for other medical problems. Your eye care specialist will check for signs of retinal damage, cataracts and glaucoma.
4. **Keep immunizations up-to-date.** High blood sugar can weaken your immune system. Get a flu shot every year, and get a tetanus booster shot every 10 years. Your doctor may recommend the pneumonia vaccine or other immunizations as well.
5. **Take care of your teeth.** Diabetes may leave you prone to gum infections. Brush your teeth at least twice a day, floss your teeth once a day and schedule dental exams at least twice a year. Consult your dentist right away if your gums bleed or look red or swollen.
6. **Pay attention to your feet.** Wash your feet daily in lukewarm water. Dry them gently, especially between the toes, and moisturize with lotion. Check your feet every day for blisters, cuts, sores, redness or swelling. Consult your doctor if you have a sore or other foot problem that doesn't start to heal within a few days.
7. **Keep your blood pressure and cholesterol under control.** Eating healthy foods and exercising regularly can go a long way toward controlling high blood pressure and cholesterol. Medication may be needed, too.

8. **If you smoke or use other types of tobacco, ask your doctor to help you quit.** Smoking increases your risk of various diabetes complications, including heart attack, stroke, nerve damage kidney disease. In fact, smokers who have diabetes are three times more likely to die of cardiovascular disease than are nonsmokers who have diabetes, according to the American Diabetes Association. Talk to your doctor about ways to stop smoking or to stop using other types of tobacco.
9. **If you drink alcohol, do so responsibly.** Alcohol can cause either high or low blood sugar, depending on how much you drink and if you eat at the same time. If you choose to drink, do so only in moderation and always with a meal. Remember to include the calories from any alcohol you drink in your daily calorie count.
10. **Take stress seriously.** If you're stressed, it's easy to abandon your usual diabetes management routine. The hormones your body may produce in response to prolonged stress may prevent insulin from working properly, which only makes matters worse. To take control, set limits. Prioritize your tasks. Learn relaxation techniques. Get plenty of sleep.

Above all stay positive. Diabetes is a serious disease, but it can be controlled. If you're willing to do your part, you can enjoy an active healthy life with type 2 diabetes.