



## How Diabetes Develops

Most of the food you eat is turned into glucose, or sugar, for your body to use for energy. The pancreas, an organ near the stomach, produces a hormone called insulin. This hormone is necessary for the body to be able to use sugar or glucose, the basic fuel for cells in the body. Insulin's role is to take sugar from the blood into the cells. When your body does not produce enough insulin and/or does not efficiently use the insulin it produces, sugar levels rise and build up in the bloodstream. When this happens, it can cause two problems:

1. Right away, the body's cells may be starved for energy.
2. Over time, high blood glucose levels may damage the eyes, kidneys, nerves or heart.

## Types of Diabetes

There are two main types of diabetes: type 1 diabetes and type 2 diabetes. Both types may be inherited in genes, so a family history of diabetes can significantly increase a person's risk of developing the condition.

### Type 1 Diabetes

Type 1 diabetes is a serious condition that occurs when the pancreas makes little or no insulin. Without insulin, the body is unable to take the glucose (blood sugar) it gets from food into cells to fuel the body. So without daily injections of insulin, people with type 1 diabetes won't survive. For that reason, this type of diabetes is also referred to as insulin-dependent diabetes.

Type 1 diabetes was previously known as juvenile diabetes because it's usually diagnosed in children and young adults. However, this chronic, lifelong disease can strike at any age, and those with a family history of it are particularly at risk.

### Health Risks for Type 1 Diabetes

During the development of type 1 diabetes, the body's immune system attacks certain cells (called beta cells) in the pancreas. Although the reasons this occurs are still unknown, the effects are clear. Once these cells are destroyed, the pancreas produces little or no insulin, so the glucose stays in the blood. When there's too much glucose in the blood, especially for prolonged periods, all the organ systems in the body suffer long-term damage. Learn more about the [health consequences](#) of diabetes and how to [treat it](#).

### Type 2 Diabetes

Type 2 diabetes is the most common form of diabetes. Historically, type 2 diabetes has been diagnosed primarily in middle-aged adults. Today, however, adolescents and young adults are developing type 2 diabetes at an alarming rate. This correlates with the increasing incidence of obesity and

physical inactivity in this population, both of which are risk factors for type 2 diabetes.

## Why are people with diabetes at increased risk for CVD?

Diabetes is treatable, but even when glucose levels are under control it greatly increases the risk of heart disease and stroke. That's because people with diabetes, particularly type 2 diabetes, often have the following conditions that contribute to their risk for developing cardiovascular disease.

- **High blood pressure (hypertension)**  
[High blood pressure](#) has long been recognized as a major risk factor for cardiovascular disease. Studies report a positive association between hypertension and insulin resistance. When patients have both hypertension and diabetes, which is a common combination, their risk for cardiovascular disease doubles.
- **Abnormal cholesterol and high triglycerides**  
Patients with diabetes often have unhealthy [cholesterol](#) levels including high LDL ("bad") cholesterol, low HDL ("good") cholesterol, and high triglycerides. This triad of poor lipid counts often occurs in patients with premature coronary heart disease. It is also characteristic of a lipid disorder associated with insulin resistance called atherogenic dyslipidemia, or diabetic dyslipidemia in those patients with diabetes. Learn more about [cholesterol abnormalities](#) as they relate to diabetes.
- **Obesity**  
Obesity is a major risk factor for cardiovascular disease and has been strongly associated with insulin resistance. [Weight loss](#) can improve cardiovascular risk, decrease insulin concentration and increase insulin sensitivity. Obesity and insulin resistance also have been associated with other risk factors, including high blood pressure.
- **Lack of physical activity**  
Physical inactivity is another modifiable major risk factor for insulin resistance and cardiovascular disease. Exercising and losing weight can prevent or delay the onset of type 2 diabetes, reduce blood pressure and help reduce the risk for heart attack and stroke. It's likely that any type of moderate and/or vigorous intensity, aerobic [physical activity](#)—whether sports, household work, gardening or work-related physical activity—is similarly beneficial.
- **Poorly controlled blood sugars (too high) or out of normal range**  
Diabetes can cause blood sugar to rise to dangerous levels. [Medications](#) may be needed to manage blood sugar.
- **Smoking**  
Smoking puts individuals, whether or not they have diabetes, at higher risk for heart disease and stroke. Learn how to [kick the habit](#).

## Prevention and treatment

### Insulin

There are many types of insulin on the market, all of which must be injected into the fat under the skin in order for it to reach the bloodstream. (Insulin is not available in pill form because it would be broken down during the digestive process.) Injections can be done using a:

- **Syringe:** A needle connected to a hollow tube that holds the insulin and a plunger that pushes the insulin down into and through the needle
- **Insulin pen:** A device that looks like a pen and holds insulin but has a needle for its tip
- **Insulin pump:** A small machine (worn on a belt or kept in a pocket) that holds insulin, pumps it through a small plastic tube and through a tiny needle inserted under the skin where it stays for several days

Insulin types differ by how they are made, how quickly they work, when they peak, how long they last, and how much they cost. They include:

- **Rapid-acting insulin**, which begins to work about five minutes after injection, peaks about an hour later, and continues to work for two to four hours
- **Regular or short-acting insulin**, which usually gets into the bloodstream within 30 minutes of injection, peaks two to three hours after injection, and is effective for about three to six hours
- **Intermediate-acting insulin**, which typically gets into the bloodstream two to four hours after injection, peaks four to 12 hours later, and works for around 12 to 18 hours
- **Long-acting insulin**, which gets into the bloodstream six to ten hours after injection and remains effective for about 20 to 24 hours.

Your doctor will work with you to determine the best type and dosage to manage your diabetes and fit your lifestyle.

### Oral Diabetes Medication

For people with type 2 diabetes or gestational diabetes (diabetes that develops during pregnancy), pills may be prescribed as a means of regulating blood glucose levels. There are ten classes of oral diabetes medications that lower blood glucose. They can be used with insulin or in combination with one another. Your healthcare provider will prescribe the type of medication or combination of medications that you will need to lower your blood glucose levels.

The antidiabetic agent metformin is generally recommended as first-line therapy to be initiated along with lifestyle modification, especially in obese diabetic patients.

Your health care provider will tell you how and when to take pills and/or insulin, including instructions on whether to take them with food.

### Healthy Living Tips

- **Choose a healthy lifestyle**  
By managing your weight through proper nutrition and regular physical activity, quitting smoking, and finding healthy ways to deal with stress, you can prevent or delay the onset of diabetes or minimize its impact on your body. A healthy lifestyle will also reduce your risk of developing a host of other medical conditions.
- **Know your health numbers**  
Through home monitoring and regular visits with your health care provider, you can keep track of your blood sugar, blood pressure, blood cholesterol, and weight. These critical health numbers provide insight into how well your treatment plan is working to manage your diabetes and safeguard your overall health, including that of your heart.
- **Work with your health care team**  
Since diabetes can have multiple health implications (effects on your vision, your feet and legs, and your heart) and since treating it can require special medications and a special diet, your health care team may include a number of medical professionals with various specialties. Your team can guide you to implement a comprehensive plan to treat diabetes and minimize its effects.