National Institute of Diabetes and Digestive and Kidney Diseases

Insulin, Medicines, & Other Diabetes Treatments

On this page:

Taking insulin or other diabetes medicines is often part of treating diabetes. In addition to making healthy food and beverage choices, getting physical activity, getting enough sleep, and managing stress, medicines can help you manage the disease. Some other treatment options are also available.

What medicines might I take for diabetes?

The medicine you take depends on the type of diabetes you have and how well the medicine controls your blood glucose levels, also called blood sugar levels. Other factors, such as any other health conditions you may have, medication costs, your insurance coverage and copays, access to care, and your lifestyle, may affect what diabetes medicine you take.

What type of diabetes do I have?

Type 1 diabetes

If you have type 1 diabetes, you must take insulin because your pancreas does not make it. You will need to take insulin several times during the day, including when you eat and drink, to control your blood glucose level.

There are different ways to take insulin. You can use a needle and syringe, an insulin pen, or an insulin pump. An artificial pancreas—also called an automated insulin delivery system—may be another option for some people.

Type 2 diabetes

Some people with type 2 diabetes can control their blood glucose level by making lifestyle changes. These lifestyle changes include consuming healthy meals and beverages, limiting calories if they have overweight or obesity, and getting physical activity.

Many people with type 2 diabetes need to take diabetes medicines as well. These medicines may include diabetes pills or medicines you inject, such as insulin. Over time, you may need more than one diabetes medicine to control your blood glucose level. Even if you do not take insulin, you may need it at special times, such as if you are pregnant or if you are in the hospital for treatment.

Gestational diabetes

If you have gestational diabetes, you can manage your blood glucose level by following a healthy eating plan and doing a moderate-intensity physical activity, such as brisk walking for 150 minutes, each week. If consuming healthy food and beverages and getting regular physical activity aren't enough to keep your blood glucose level in your target range, a doctor will work with you and may recommend you take insulin. Insulin is safe to take while you are pregnant.

No matter what type of diabetes you have, taking diabetes medicines every day can feel like a burden sometimes. New medications and improved delivery systems can help make it easier to manage your blood glucose levels. Talk with your doctor to find out which medications and delivery systems will work best for you and fit into your lifestyle.

What are the different types of insulin?

Several types of insulin are available. Each type starts to work at a different speed, known as "onset," and its effects last a different length of time, known as "duration." Most types of insulin reach a peak, which is when they have the strongest effect. After the peak, the effects of the insulin wear off over the next few hours or so. Table 1 lists the different types of insulin, how fast they start to work, when they peak, and how long they last.

Table 1. Types of insulin and how they work[1,2]

Insulin Type	How Fast It Starts to Work (onset)	When It Peaks	How Long It Lasts (duration)
rapid-acting/ ultra rapid-acting	15 minutes	1 hour	2 to 4 hours (rapid) 5 to 7 hours (ultra)
rapid-acting, inhaled	10 to 15 minutes	30 minutes	3 hours

Insulin Type	How Fast It Starts to Work (onset)	When It Peaks	How Long It Lasts (duration)
regular, also called short-acting	30 minutes	2 to 3 hours	3 to 6 hours
intermediate-acting	2 to 4 hours	4 to 12 hours	12 to 18 hours
long-acting	2 hours	does not peak	24 hours
ultra long-acting	6 hours	does not peak	36 hours or longer

Another type of insulin, called premixed insulin, is a combination of insulins listed in Table 1. Premixed insulin starts to work in 15 to 60 minutes and can last from 10 to 16 hours. The peak time varies depending on which insulins are mixed.

Your doctor will work with you to review your medication options. Talk with your doctor about your activity level, what you eat and drink, how well you manage your blood glucose levels, your age and lifestyle, and how long your body takes to absorb insulin.

Follow your doctor's advice on when and how to take your insulin. If you're worried about the cost, talk with your doctor. Some types of insulin cost more than others. You can also find resources to get financial help for diabetes care.

What are the different ways to take insulin?

The way you take insulin may depend on your lifestyle, insurance plan, and preferences. Talk with your doctor about the options and which one is best for you. Most people with diabetes take insulin using a needle and syringe, insulin pen, or insulin pump. Inhalers and insulin jet injectors are less common ways to take insulin. Artificial pancreas systems are now approved by the U.S. Food and Drug Administration (FDA). Talk with your doctor to see if an artificial pancreas is an option for you.

Needle and syringe

You can give yourself insulin shots using a needle and syringe. You draw up your dose of insulin from the vial—or bottle—through the needle into the syringe. Insulin works fastest when you inject it in your belly, but your doctor may recommend alternating the spot where you inject it. Injecting insulin in the same spot repeatedly could cause the tissue to harden, making it harder to take shots in that area over time. Other spots you can inject insulin include your thigh, buttocks, or upper arm, but it may take longer for the insulin to work from those areas. Some people with diabetes who take insulin need 2 to 4 shots a day to reach their blood glucose targets. Others can take a single shot. Injection aids can help you give yourself the shots.

Insulin shots involve drawing insulin from a vial into a syringe and then injecting it.

Pen

An insulin pen looks like a writing pen but has a needle for its point. Some insulin pens come filled with insulin and are disposable. Others have room for an insulin cartridge that you insert and replace after use. Many people find insulin pens easier to use, but they cost more than needles and syringes. You may want to consider using an insulin pen if you find it hard to fill the syringe while holding the vial or cannot read the markings on the syringe. Different pen types have features that can help with your injections. Some reusable pens have a memory function, which can recall dose amounts and timing. Other types of "connected" insulin pens can be programmed to calculate insulin doses and provide downloadable data reports, which can help you and your doctor adjust your insulin doses.

An insulin pen is a convenient way to take insulin.

Pump

An insulin pump is a small machine that gives you steady doses of insulin throughout the day. You wear one type of pump outside your body on a belt or in a pocket or pouch. The insulin pump connects to a small plastic tube and a very small needle. You insert the plastic tube with a needle under your skin, then take out the needle. The plastic tube will stay inserted for several days while attached to the insulin pump. The machine pumps insulin through the tube into your body 24 hours a day and can be programmed to give you more or less insulin based on your needs. You can also give yourself doses of insulin through the pump at mealtimes.

Another type of pump has no tubes. This pump attaches directly to your skin with a self-adhesive pad and is controlled by a hand-held device. The plastic tube and pump device are changed every several days.

Insulin pumps can be programmed to deliver insulin directly into your body, 24 hours a day or at certain times.

Inhaler

Another way to take insulin is by breathing powdered insulin into your mouth from an inhaler device. The insulin goes into your lungs and moves quickly into your blood. You may want to use an insulin inhaler NIH to avoid using needles. Inhaled insulin is only for adults with type 1 or type 2 diabetes. Taking insulin with an inhaler is less common than using a needle and syringe.

Jet injector

A jet injector is a device that sends a fine spray of insulin into the skin at high pressure instead of using a needle to deliver the insulin. It is used less commonly than a needle and syringe or a pen.

Artificial pancreas

An artificial pancreas is a system of three devices that work together to mimic how a healthy pancreas controls blood glucose in the body. A continuous glucose monitor (CGM) tracks blood glucose levels every few minutes using a small sensor inserted under the skin that is held in place with an adhesive pad. The CGM wirelessly sends the information to a program on a smartphone or an insulin infusion pump. The program calculates how much insulin you need. The insulin infusion pump will adjust how much insulin is given from minute to minute to help keep your blood glucose level in your target range. An artificial pancreas is mainly used to help people with type 1 diabetes.

What oral medicines treat type 2 diabetes?

You may need to take medicines to manage your type 2 diabetes, in addition to consuming healthy foods and beverages and being physically active. You can take many diabetes medicines by mouth. These medicines are called oral medicines.

Most people with type 2 diabetes start with metformin NIH pills. Metformin also comes as a liquid. Metformin helps your liver make less glucose and helps your body use insulin better. This drug may help you lose a small amount of weight.

Other oral medicines act in different ways to lower blood glucose levels. Combining two or three kinds of diabetes medicines can lower blood glucose levels better than taking just one medicine.

Read about different kinds of diabetes medicines (PDF, 2.8 MB) from the FDA.

What other injectable medicines treat diabetes?

Type 1 diabetes

If you have type 1 diabetes, your doctor may recommend you take other medicines, in addition to insulin, to help control your blood glucose. Some of these medicines work to slow how fast food and beverages move through your stomach. These medicines also slow down how quickly and how high your blood glucose levels rise after eating. Other medicines work to block certain hormones in your digestive system that raise blood glucose levels after meals or help the kidneys to remove more glucose from your blood.

Type 2 diabetes

Besides insulin, other types of injected medicines (PDF, 2.8 MB) are available that will keep your blood glucose level from rising too high after you eat or drink. These medicines, known as glucagon-like peptide-1 (GLP-1) receptor agonists,[3] may make you feel less hungry and help you lose some weight. GLP-1 medicines are not substitutes for insulin.

What should I know about side effects of diabetes medicines?

Side effects are problems that result from taking a medicine. Some diabetes medicines can cause hypoglycemia, also called low blood glucose, if you don't balance your medicines with food and activity.

Ask your doctor whether your diabetes medicine can cause hypoglycemia or other side effects, such as upset stomach and weight gain. Aim to take your diabetes medicines as your doctor instructs you, to help prevent side effects and diabetes problems.

What questions should I ask about my diabetes medicines?

Ask your doctor these questions when you get a prescription for a medicine. You may want to make copies of this list and fill it out for each of your medicines.

1. What are the names of my medicine?
   Brand name:_____
   Generic name:_____
2. What does my medicine do?
3. When should I start this medicine?
4. This medicine is prescribed by:_____
5. How long will this medicine take to work?
6. What is the strength (for example, how many milligrams, written as mg)?
7. How much should I take for each dose?
8. How many times a day should I take my medicine?
9. At what times should I take my medicine?
10. Should I take it before, with, or after a meal?
11. Should I avoid any foods or medicines when I take it?
12. Should I avoid alcoholic beverages when I take it?
13. Are there any times when I should change the amount of medicine I take?
14. What should I do if I forget to take it?
15. If I'm sick and can't keep food down, should I still take my medicine?
16. Can my diabetes medicine cause low blood glucose?
17. What should I do if my blood glucose is too low?
18. What side effects can this medicine cause?
19. What should I do if I have side effects?
20. How should I store this medicine?

Do I have other treatment options for my diabetes?

If medicines and lifestyle changes are not enough to manage your diabetes, there are other treatments that might help you. These treatments include weight-loss (bariatric) surgery for certain people with type 1 or type 2 diabetes, or pancreatic islet transplantation for some people with type 1 diabetes.

Weight-loss surgery

Weight-loss surgery are operations that help you lose weight by making changes to your digestive system. Weight-loss surgery is also called bariatric or metabolic surgery.

This type of surgery may help some people who have obesity and type 2 diabetes lose a large amount of weight and bring their blood glucose levels back to a healthy range. How long the improved response lasts can vary by patient, type of weight-loss surgery, and the amount of weight the person lost. Other factors include how long a person had diabetes and whether the person used insulin. Some people with type 2 diabetes may no longer need to use diabetes medicines after weight-loss surgery.[4]

Researchers are studying whether weight-loss surgery can help control blood glucose levels in people with type 1 diabetes who have obesity.[5]

Pancreatic islet transplantation

Pancreatic islet transplantation is a treatment for type 1 diabetes in people who struggle to manage their blood glucose levels. Pancreatic islets are clusters of cells in the pancreas that make the hormone insulin. In type 1 diabetes, the body's immune system attacks these cells. A pancreatic islet transplantation replaces destroyed islets with new islets from a deceased donor. The new islets make and release insulin.

Clinical Trials for Insulin, Medicines, & Other Diabetes Treatments

The NIDDK conducts and supports clinical trials in many diseases and conditions, including diabetes. The trials look to find new ways to prevent, detect, or treat disease and improve quality of life.

What are clinical trials for insulin, medicines, and other diabetes treatments?

Clinical trials—and other types of clinical studies NIH—are part of medical research and involve people like you. When you volunteer to take part in a clinical study, you help health care professionals and researchers learn more about disease and improve health care for people in the future.

Find out if clinical trials are right for you NIH.

Researchers are studying many aspects of diabetes medicines, including

- new types of insulin
- the most effective times to take diabetes medicines
- new types of monitoring devices and delivery systems

Watch a video of NIDDK Director Dr. Griffin P. Rodgers explaining the importance of participating in clinical trials.

What clinical trials for insulin, medicines, and other diabetes treatments are looking for participants?

You can view a filtered list of clinical studies on insulin, medicines, and other diabetes treatments covered in this health topic that are federally funded, open, and recruiting at ClinicalTrials.gov NIH. You can expand or narrow the list to include clinical studies from industry, universities, and individuals; however, the National Institutes of Health does not review these studies and cannot ensure they are safe. Always talk with your health care provider before you participate in a clinical study.

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