

TREATMENT OF DIABETICS

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
regular, also called short-acting	30 minutes	2 to 3 hours	3 to 6 hours

Insulin Type	How Fast It Starts to Work (onset)	When It Peaks	How Long It Lasts (duration)
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.

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.

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.

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 external link](#) 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 external link](#) 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.

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 External link (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 external link*—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 external link*.

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 external link*. 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.

Type 1 diabetes symptoms often start suddenly and are often the reason for checking blood sugar levels. Because symptoms of other types of diabetes and prediabetes come on more gradually or may not be easy to see, the American Diabetes Association (ADA) has developed screening guidelines. The ADA recommends that the following people be screened for diabetes: Anyone with a body mass index higher than 25 (23 for Asian Americans), regardless of age, who has additional risk factors. These factors include high blood pressure, non-typical cholesterol levels, an inactive lifestyle, a history of polycystic ovary syndrome or heart disease, and having a close relative with diabetes. Anyone older than age 35 is advised to get an initial blood sugar screening. If the results are normal, they should be screened every three years after that. Women who have had gestational diabetes are advised to be screened for diabetes every three years. Anyone who has been diagnosed with prediabetes is advised to be tested every year. Anyone who has HIV is advised to be tested.

Tests for type 1 and type 2 diabetes and prediabetes. A1C test. This blood test, which doesn't require not eating for a period of time (fasting), shows your average blood sugar level for the past 2 to 3 months. It measures the percentage of blood sugar attached to hemoglobin, the oxygen-carrying protein in red blood cells. It's also called a glycated hemoglobin test.

The higher your blood sugar levels, the more hemoglobin you'll have with sugar attached. An A1C level of 6.5% or higher on two separate tests means that you have diabetes. An A1C between 5.7% and 6.4% means that you have prediabetes. Below 5.7% is considered normal. Random blood sugar test. A blood sample will be taken at a random time. No matter when you last ate, a blood sugar level of 200 milligrams per deciliter (mg/dL) — 11.1 millimoles per liter (mmol/L) — or higher suggests diabetes. Fasting blood sugar test. A blood sample will be taken after you haven't eaten anything the night before (fast). A fasting blood sugar level less than 100 mg/dL (5.6 mmol/L) is normal. A fasting blood sugar level from 100 to 125 mg/dL (5.6 to 6.9 mmol/L) is considered prediabetes. If it's 126 mg/dL (7 mmol/L) or higher on two separate tests, you have diabetes. Glucose tolerance test. For this test, you fast overnight. Then, the fasting blood sugar level is measured. Then you drink a sugary liquid, and blood sugar levels are tested regularly for the next two hours.

A blood sugar level less than 140 mg/dL (7.8 mmol/L) is normal. A reading of more than 200 mg/dL (11.1 mmol/L) after two hours means you have diabetes. A reading between 140 and 199 mg/dL (7.8 mmol/L and 11.0 mmol/L) means you have prediabetes.

If your provider thinks you may have type 1 diabetes, they may test your urine to look for the presence of ketones. Ketones are a byproduct produced when muscle and fat are used for energy. Your provider will also probably run a test to see if you have the destructive immune system cells associated with type 1 diabetes called autoantibodies.

Your provider will likely see if you're at high risk for gestational diabetes early in your pregnancy. If you're at high risk, your provider may test for diabetes at your first prenatal visit. If you're at average risk, you'll probably be screened sometime during your second trimester.

Care at Mayo Clinic

Our caring team of Mayo Clinic experts can help you with your diabetes-related health concerns.[Start Here](#)

Treatment

Depending on what type of diabetes you have, blood sugar monitoring, insulin and oral drugs may be part of your treatment. Eating a healthy diet, staying at a healthy weight and getting regular physical activity also are important parts of managing diabetes.

Treatments for all types of diabetes

An important part of managing diabetes — as well as your overall health — is keeping a healthy weight through a healthy diet and exercise plan:
Healthy eating. Your diabetes diet is simply a healthy-eating plan that will help you control your blood sugar. You'll need to focus your diet on more fruits, vegetables, lean proteins and whole grains. These are foods that are high in nutrition and fiber and low in fat and calories. You'll also cut down on saturated fats, refined carbohydrates and sweets. In fact, it's the best eating plan for the entire family. Sugary foods are OK once in a while. They must be counted as part of your meal plan.

Understanding what and how much to eat can be a challenge. A registered dietitian can help you create a meal plan that fits your health goals, food preferences and lifestyle. This will likely include carbohydrate counting, especially if you have type 1 diabetes or use insulin as part of your treatment.
Physical activity. Everyone needs regular aerobic activity. This includes people who have diabetes. Physical activity lowers your blood sugar level by moving sugar into your cells, where it's used for energy. Physical activity also makes your body more sensitive to insulin. That means your body needs less insulin to transport sugar to your cells.

Get your provider'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 or more of moderate physical activity most days of the week, or at least 150 minutes of moderate physical activity a week. Bouts of activity can be a few minutes during the day. If you haven't been active for a while, start slowly and build up slowly. Also avoid sitting for too long. Try to get up and move if you've been sitting for more than 30 minutes.

Treatments for type 1 and type 2 diabetes

Treatment for type 1 diabetes involves insulin injections or the use of an insulin pump, frequent blood sugar checks, and carbohydrate counting. For some people with type 1 diabetes, pancreas transplant or islet cell transplant may be an option.

Treatment of type 2 diabetes mostly involves lifestyle changes, monitoring of your blood sugar, along with oral diabetes drugs, insulin or both.

Monitoring your blood sugar

Depending on your treatment plan, you may check and record your blood sugar as many as four times a day or more often if you're taking insulin. Careful blood sugar testing is the only way to

make sure that your blood sugar level remains within your target range. People with type 2 diabetes who aren't taking insulin generally check their blood sugar much less often.

People who receive insulin therapy also may choose to monitor their blood sugar levels with a continuous glucose monitor. Although this technology hasn't yet completely replaced the glucose meter, it can lower the number of fingersticks necessary to check blood sugar and provide important information about trends in blood sugar levels.

Even with careful management, blood sugar levels can sometimes change unpredictably. With help from your diabetes treatment team, you'll learn how your blood sugar level changes in response to food, physical activity, medications, illness, alcohol and stress. For women, you'll learn how your blood sugar level changes in response to changes in hormone levels.

Besides daily blood sugar monitoring, your provider will likely recommend regular A1C testing to measure your average blood sugar level for the past 2 to 3 months.

Compared with repeated daily blood sugar tests, A1C testing shows better how well your diabetes treatment plan is working overall. A higher A1C level may signal the need for a change in your oral drugs, insulin regimen or meal plan.

Your target A1C goal may vary depending on your age and various other factors, such as other medical conditions you may have or your ability to feel when your blood sugar is low. However, for most people with diabetes, the American Diabetes Association recommends an A1C of below 7%. Ask your provider what your A1C target is.

Insulin

People with type 1 diabetes must use insulin to manage blood sugar to survive. Many people with type 2 diabetes or gestational diabetes also need insulin therapy.

Many types of insulin are available, including short-acting (regular insulin), rapid-acting insulin, long-acting insulin and intermediate options. Depending on your needs, your provider may prescribe a mixture of insulin types to use during the day and night.

Insulin can't be taken orally to lower blood sugar because stomach enzymes interfere with insulin's action. Insulin is often injected using a fine needle and syringe or an insulin pen — a device that looks like a large ink pen.

An insulin pump also may be an option. The pump is a device about the size of a small cellphone worn on the outside of your body. A tube connects the reservoir of insulin to a tube (catheter) that's inserted under the skin of your abdomen.

A continuous glucose monitor, on the left, is a device that measures blood sugar every few minutes using a sensor inserted under the skin. An insulin pump, attached to the pocket, is a device that's worn outside of the body with a tube that connects the reservoir of insulin to a catheter inserted under the skin of the abdomen. Insulin pumps are programmed to deliver specific amounts of insulin continuously and with food.

A tubeless pump that works wirelessly is also now available. You program an insulin pump to dispense specific amounts of insulin. It can be adjusted to give out more or less insulin depending on meals, activity level and blood sugar level.

A closed loop system is a device implanted in the body that links a continuous glucose monitor to an insulin pump. The monitor checks blood sugar levels regularly. The device automatically delivers the right amount of insulin when the monitor shows that it's needed.

The Food and Drug Administration has approved several hybrid closed loop systems for type 1 diabetes. They are called "hybrid" because these systems require some input from the user. For example, you may have to tell the device how many carbohydrates are eaten, or confirm blood sugar levels from time to time.

A closed loop system that doesn't need any user input isn't available yet. But more of these systems currently are in clinical trials.

Oral or other drugs

Sometimes your provider may prescribe other oral or injected drugs as well. Some diabetes drugs help your pancreas to release more insulin. Others prevent the production and release of glucose from your liver, which means you need less insulin to move sugar into your cells.

Still others block the action of stomach or intestinal enzymes that break down carbohydrates, slowing their absorption, or make your tissues more sensitive to insulin. Metformin (Glumetza, Fortamet, others) is generally the first drug prescribed for type 2 diabetes.

Another class of medication called SGLT2 inhibitors may be used. They work by preventing the kidneys from reabsorbing filtered sugar into the blood. Instead, the sugar is eliminated in the urine.

Transplantation

In some people who have type 1 diabetes, a pancreas transplant may be an option. Islet transplants are being studied as well. With a successful pancreas transplant, you would no longer need insulin therapy.

But transplants aren't always successful. And these procedures pose serious risks. You need a lifetime of immune-suppressing drugs to prevent organ rejection. These drugs can have serious side effects. Because of this, transplants are usually reserved for people whose diabetes can't be controlled or those who also need a kidney transplant.

Bariatric surgery

Some people with type 2 diabetes who are obese and have a body mass index higher than 35 may be helped by some types of bariatric surgery. People who've had gastric bypass have seen major improvements in their blood sugar levels. But this procedure's long-term risks and benefits for type 2 diabetes aren't yet known.

Treatment for gestational diabetes

Controlling your blood sugar level is essential to keeping your baby healthy. It can also keep you from having complications during delivery. In addition to having a healthy diet and exercising regularly, your treatment plan for gestational diabetes may include monitoring your blood sugar. In some cases, you may also use insulin or oral drugs.

Your provider will monitor your blood sugar level during labor. If your blood sugar rises, your baby may release high levels of insulin. This can lead to low blood sugar right after birth.

Treatment for prediabetes

Treatment for prediabetes usually involves healthy lifestyle choices. These habits can help bring your blood sugar level back to normal. Or it could keep it from rising toward the levels seen in type 2 diabetes. Keeping a healthy weight through exercise and healthy eating can help. Exercising at least 150 minutes a week and losing about 7% of your body weight may prevent or delay type 2 diabetes.

Drugs — such as metformin, statins and high blood pressure medications — may be an option for some people with prediabetes and other conditions such as heart disease.

Signs of trouble in any type of diabetes

Many factors can affect your blood sugar. Problems may sometimes come up that need care right away.

High blood sugar

High blood sugar (hyperglycemia in diabetes) can occur for many reasons, including eating too much, being sick or not taking enough glucose-lowering medication. Check your blood sugar level as directed by your provider. And watch for symptoms of high blood sugar, including:Urinating often,Feeling thirstier than usual,Blurred vision,Tiredness (fatigue),Headache,Irritability

If you have hyperglycemia, you'll need to adjust your meal plan, drugs or both.

Increased ketones in your urine

Diabetic ketoacidosis is a serious complication of diabetes. If your cells are starved for energy, your body may begin to break down fat. This makes toxic acids known as ketones, which can build up in the blood. Watch for the following symptoms:Nausea,Vomiting,Stomach (abdominal) pain,A sweet, fruity smell on your breath,Shortness of breath,Dry mouth,Weakness,Confusion,Coma

You can check your urine for excess ketones with a ketones test kit that you can get without a prescription. If you have excess ketones in your urine, talk with your provider right away or seek emergency care. This condition is more common in people with type 1 diabetes.

Hyperglycemic hyperosmolar nonketotic syndrome

Hyperosmolar syndrome is caused by very high blood sugar that turns blood thick and syrupy.

Symptoms of this life-threatening condition include:A blood sugar reading over 600 mg/dL (33.3 mmol/L),Dry mouth,Extreme thirst,Fever,Drowsiness,Confusion,Vision loss,Hallucinations

This condition is seen in people with type 2 diabetes. It often happens after an illness. Call your provider or seek medical care right away if you have symptoms of this condition.Low blood sugar (hypoglycemia)If your blood sugar level drops below your target range, it's known as low blood sugar (diabetic hypoglycemia). If you're taking drugs that lower your blood sugar, including insulin, your blood sugar level can drop for many reasons. These include skipping a meal and getting more physical activity than normal. Low blood sugar also occurs if you take too much insulin or too much of a glucose-lowering medication that causes the pancreas to hold insulin.

Check your blood sugar level regularly and watch for symptoms of low blood sugar, including:

Sweating, Shakiness, Weakness, Hunger, Dizziness, Headache, Blurred vision, Heart palpitations, Irritability, Slurred speech, Drowsiness, Confusion, Fainting, Seizures

Low blood sugar is best treated with carbohydrates that your body can absorb quickly, such as fruit juice or glucose tablets

Lifestyle and home remedies

Diabetes is a serious disease. Following your diabetes treatment plan takes total commitment. Careful management of diabetes can lower your risk of serious or life-threatening complications. Commit to managing your diabetes. Learn all you can about diabetes. Build a relationship with a diabetes educator. Ask your diabetes treatment team for help when you need it. Choose healthy foods and stay at a healthy weight. If you're overweight, losing just 7% of your body weight can make a difference in your blood sugar control if you have prediabetes or type 2 diabetes. A healthy diet is one with plenty of fruits, vegetables, lean proteins, whole grains and legumes. And limit how much food with saturated fat you eat. Make physical activity part of your daily routine. Regular physical activity can help prevent prediabetes and type 2 diabetes. It can also help those who already have diabetes to maintain better blood sugar control. A minimum of 30 minutes of moderate physical activity — such as brisk walking — most days of the week is recommended. Aim for at least 150 minutes of moderate aerobic physical activity a week.

Getting regular aerobic exercise along with getting at least two days a week of strength training exercises can help control blood sugar more effectively than does either type of exercise alone. Aerobic exercises can include walking, biking or dancing. Resistance training can include weight training and body weight exercises.

Also try to spend less time sitting still. Try to get up and move around for a few minutes at least every 30 minutes or so when you're awake.

Lifestyle recommendations for type 1 and type 2 diabetes

Also, if you have type 1 or type 2 diabetes: 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. Make sure your friends and loved ones know how to use it. Schedule a yearly physical and regular eye exams. Your regular diabetes checkups aren't meant to replace yearly physicals or routine eye exams. During the physical, your provider will look for any diabetes-related complications and screen for other medical problems. Your eye care specialist will check for signs of eye damage, including retinal damage (retinopathy), cataracts and glaucoma. Keep your vaccinations up to date. High blood sugar can weaken your immune system. Get a flu shot every year. Your provider may recommend the pneumonia and COVID-19 vaccines, as well.

The Centers for Disease Control and Prevention (CDC) also currently recommends hepatitis B vaccination if you haven't previously had it and you're an adult ages 19 to 59 with type 1 or type 2 diabetes. The most recent CDC guidelines suggest vaccination as soon as possible after diagnosis with type 1 or type 2 diabetes. If you are age 60 or older, have been diagnosed with diabetes, and haven't previously received the vaccine, talk to your provider about whether it's right for you. Pay attention to your feet. Wash your feet daily in lukewarm water. Dry them gently, especially between the toes. Moisturize with lotion, but not between the toes. Check your feet every day for blisters, cuts, sores, redness or swelling. Talk to your provider if you have a sore or other foot problem that doesn't heal quickly on its own. Control your blood pressure and

cholesterol. Eating healthy foods and exercising regularly can help control high blood pressure and cholesterol. Drugs may be needed, too. Take care of your teeth. Diabetes may leave you prone to more-serious gum infections. Brush and floss your teeth at least twice a day. And if you have type 1 or type 2 diabetes, schedule regular dental exams. Talk to your dentist right away if your gums bleed or look red or swollen. If you smoke or use other types of tobacco, ask your provider to help you quit. Smoking increases your risk of many diabetes complications. Smokers who have diabetes are more likely to die of cardiovascular disease than are nonsmokers who have diabetes. Talk to your provider about ways to stop smoking or to stop using other types of tobacco. If you drink alcohol, do so responsibly. Alcohol can cause either high or low blood sugar. This depends on how much you drink and if you eat at the same time. If you choose to drink, do so only in moderation — one drink a day for women and up to two drinks a day for men — and always with food.

Remember to include the carbohydrates from any alcohol you drink in your daily carbohydrate count. And check your blood sugar levels before going to bed. Take stress seriously. The hormones your body may make in response to long-term stress may prevent insulin from working properly. This will raise your blood sugar and stress you even more. Set limits for yourself and prioritize your tasks. Learn relaxation techniques. And get plenty of sleep.

Alternative medicine

Many substances have been shown to improve the body's ability to process insulin in some studies. Other studies fail to find any benefit for blood sugar control or in lowering A1C levels. Because of the conflicting findings, there aren't any alternative therapies that are currently recommended to help everyone to manage blood sugar. If you decide to try any type of alternative therapy, don't stop taking the drugs that your provider has prescribed. Be sure to discuss the use of any of these therapies with your provider. Make sure that they won't cause bad reactions or interact with your current therapy. Also, no treatments — alternative or conventional — can cure diabetes. If you're using insulin therapy for diabetes, never stop using insulin unless directed to do so by your provider.

You can do a lot to manage your gestational diabetes. Go to all your prenatal appointments and follow your treatment plan, including:

- Checking your blood sugar to make sure your levels stay in a healthy range.
- Being active lowers your blood sugar and makes you more sensitive to insulin.
- Eating healthy food in the right amounts at the right times.

If healthy eating and being active aren't enough to manage your blood sugar, your doctor may prescribe insulin, metformin, or other medication.