



Diabetes Overview

- [What is Diabetes?](#)
- [Symptoms & Causes](#)
- [Risk Factors for Type 2 Diabetes](#)
- [Preventing Type 2 Diabetes](#)
- [Diabetes Tests & Diagnosis](#)
- [Managing Diabetes](#)
- [Insulin, Medicines, & Other Diabetes Treatments](#)
- [Diabetes Diet, Eating, & Physical Activity](#)
- [Preventing Diabetes Problems](#)

[Return to Overview Page](#) 

What is Diabetes?

Diabetes is a disease that occurs when your blood glucose, also called blood sugar, is too high. Blood glucose is your main source of energy and comes from the food you eat. [Insulin](#), a [hormone](#) made by the [pancreas](#), helps glucose from food get into your cells to be used for energy. Sometimes your body doesn't make enough—or any—insulin or doesn't use insulin well. Glucose then stays in your blood and doesn't reach your cells.

Over time, having too much glucose in your blood can cause [health problems](#). Although diabetes has no cure, you can take steps to [manage your diabetes](#) and stay healthy.

Sometimes people call diabetes “a touch of sugar” or “borderline diabetes.” These terms suggest that someone doesn't really have diabetes or has a less serious case, but every case of diabetes is serious.

What are the different types of diabetes?

The most common types of diabetes are type 1, type 2, and gestational diabetes.

Type 1 diabetes

If you have [type 1 diabetes](#), your body does not make insulin. Your [immune system](#) attacks and destroys the cells in your pancreas that make insulin. Type 1 diabetes is usually diagnosed in

children and young adults, although it can appear at any age. People with type 1 diabetes need to take insulin every day to stay alive.

Type 2 diabetes

If you have [type 2 diabetes](#), your body does not make or use insulin well. You can develop type 2 diabetes at any age, even during childhood. However, this type of diabetes occurs most often in middle-aged and older people. Type 2 is the most common type of diabetes.

Gestational diabetes

[Gestational diabetes](#) develops in some women when they are pregnant. Most of the time, this type of diabetes goes away after the baby is born. However, if you've had gestational diabetes, you have a greater chance of developing type 2 diabetes later in life. Sometimes diabetes diagnosed during pregnancy is actually type 2 diabetes.

Other types of diabetes

Less common types include [monogenic diabetes](#), which is an inherited form of diabetes, and [cystic fibrosis-related diabetes](#) [↗](#).

How common is diabetes?

As of 2015, 30.3 million people in the United States, or 9.4 percent of the population, had diabetes. More than 1 in 4 of them didn't know they had the disease. Diabetes affects 1 in 4 people over the age of 65. About 90–95 percent of cases in adults are type 2 diabetes.¹

Who is more likely to develop type 2 diabetes?

You are more likely to develop type 2 diabetes if you are age 45 or older, have a family history of diabetes, or are overweight. Physical inactivity, race, and certain health problems such as high blood pressure also affect your chance of developing type 2 diabetes. You are also more likely to develop type 2 diabetes if you have [prediabetes](#) or had gestational diabetes when you were pregnant. Learn more about [risk factors for type 2 diabetes](#).

What health problems can people with diabetes develop?


Over time, high blood glucose leads to problems such as

- heart disease
- stroke
- kidney disease

- eye problems
- dental disease
- nerve damage
- foot problems

You can take steps to lower your chances of developing these [diabetes-related health problems](#).

References

[1] Centers for Disease Control and Prevention. National diabetes statistics report, 2017. Centers for Disease Control and Prevention website. www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf (PDF, 1.3 MB) . Updated July, 18 2017. Accessed August 1, 2017.

Symptoms & Causes


What are the symptoms of diabetes?

Symptoms of [diabetes](#) include

- increased thirst and urination
- increased hunger
- fatigue
- blurred vision
- numbness or tingling in the feet or hands
- sores that do not heal
- unexplained weight loss

Symptoms of type 1 diabetes can start quickly, in a matter of weeks. Symptoms of type 2 diabetes often develop slowly—over the course of several years—and can be so mild that you might not even notice them. Many people with type 2 diabetes have no symptoms. Some people do not find out they have the disease until they have diabetes-related health problems, such as blurred vision or [heart trouble](#).

What causes type 1 diabetes?

[Type 1 diabetes](#) occurs when your immune system, the body's system for fighting infection, attacks and destroys the [insulin](#)-producing beta cells of the [pancreas](#). Scientists think type 1 diabetes is caused by [genes](#) and environmental factors, such as viruses, that might trigger the disease. Studies such as [TrialNet](#)  are working to pinpoint causes of type 1 diabetes and possible ways to prevent or slow the disease.

What causes type 2 diabetes?

Type 2 diabetes—the most common form of diabetes—is caused by several factors, including lifestyle factors and genes.

Overweight, obesity, and physical inactivity

You are more likely to develop type 2 diabetes if you are not physically active and are [overweight](#) or [obese](#). Extra weight sometimes causes [insulin resistance](#) and is common in people with type 2 diabetes. The location of body fat also makes a difference. Extra belly fat is linked to insulin resistance, type 2 diabetes, and [heart and blood vessel disease](#). To see if your weight puts you at risk for type 2 diabetes, check out these [Body Mass Index \(BMI\) charts](#).

Insulin resistance

Type 2 diabetes usually begins with [insulin resistance](#), a condition in which muscle, [liver](#), and fat cells do not use insulin well. As a result, your body needs more insulin to help [glucose](#) enter cells. At first, the pancreas makes more insulin to keep up with the added demand. Over time, the pancreas can't make enough insulin, and blood glucose levels rise.

Genes and family history

As in type 1 diabetes, certain genes may make you more likely to develop type 2 diabetes. The disease tends to run in families and occurs more often in these racial/ethnic groups:

- African Americans
- Alaska Natives
- American Indians
- Asian Americans
- Hispanics/Latinos
- Native Hawaiians
- Pacific Islanders

Genes also can increase the risk of type 2 diabetes by increasing a person's tendency to become overweight or obese.

What causes gestational diabetes?

Scientists believe [gestational diabetes](#), a type of diabetes that develops during pregnancy, is caused by the hormonal changes of pregnancy along with genetic and lifestyle factors.

Insulin resistance

[Hormones](#) produced by the [placenta](#) [NIH](#) [NIH](#) contribute to insulin resistance, which occurs in all women during late pregnancy. Most pregnant women can produce enough insulin to overcome

insulin resistance, but some cannot. Gestational diabetes occurs when the pancreas can't make enough insulin.

As with type 2 diabetes, extra weight is linked to gestational diabetes. Women who are overweight or obese may already have insulin resistance when they become pregnant. Gaining too much weight during pregnancy may also be a factor.



Hormonal changes, extra weight, and family history can contribute to gestational diabetes.

Genes and family history

Having a family history of diabetes makes it more likely that a woman will develop gestational diabetes, which suggests that genes play a role. Genes may also explain why the disorder occurs more often in African Americans, American Indians, Asians, and Hispanics/Latinas.

What else can cause diabetes?

[Genetic mutations](#) [NIH](#) [↗](#), other diseases, damage to the pancreas, and certain medicines may also cause diabetes.

Genetic mutations

- **Monogenic diabetes** is caused by mutations, or changes, in a single gene. These changes are usually passed through families, but sometimes the gene mutation happens on its own. Most of these gene mutations cause diabetes by making the pancreas less able to make insulin. The most common types of monogenic diabetes are neonatal diabetes and maturity-onset diabetes of the young (MODY). Neonatal diabetes occurs in the first 6 months of life. Doctors usually diagnose MODY during adolescence or early adulthood, but sometimes the disease is not diagnosed until later in life.
- **Cystic fibrosis** [NIH](#) produces thick mucus that causes scarring in the pancreas. This scarring can prevent the pancreas from making enough insulin.
- **Hemochromatosis** causes the body to store too much iron. If the disease is not treated, iron can build up in and damage the pancreas and other organs.

Hormonal diseases

Some hormonal diseases cause the body to produce too much of certain hormones, which sometimes cause insulin resistance and diabetes.

- **Cushing's syndrome** occurs when the body produces too much [cortisol](#)—often called the “stress hormone.”
- **Acromegaly** occurs when the body produces too much growth hormone.
- **Hyperthyroidism** occurs when the thyroid gland produces too much thyroid hormone.

Damage to or removal of the pancreas

Pancreatitis, pancreatic cancer, and trauma can all harm the beta cells or make them less able to produce insulin, resulting in diabetes. If the damaged pancreas is removed, diabetes will occur due to the loss of the beta cells.

Medicines

Sometimes certain medicines can harm beta cells or disrupt the way insulin works. These include

- niacin, a type of vitamin B3
- certain types of diuretics, also called water pills
- anti-seizure drugs
- psychiatric drugs
- drugs to treat human immunodeficiency virus ([HIV](#) [NIH](#))
- pentamidine, a drug used to treat [a type of pneumonia](#)
- glucocorticoids—medicines used to treat inflammatory illnesses such as [rheumatoid arthritis](#) [NIH](#), [asthma](#) [NIH](#), [lupus](#) [NIH](#), and [ulcerative colitis](#)
- anti-rejection medicines, used to help stop the body from rejecting a transplanted organ

Statins, which are medicines to reduce LDL (“bad”) cholesterol levels, can slightly increase the chance that you’ll develop diabetes. However, statins help protect you from heart disease and

stroke. For this reason, the strong benefits of taking statins outweigh the small chance that you could develop diabetes.

If you take any of these medicines and are concerned about their side effects, talk with your doctor.

Risk Factors for Type 2 Diabetes

Your chances of developing [type 2 diabetes](#) depend on a combination of risk factors such as your genes and lifestyle. Although you can't change risk factors such as family history, age, or ethnicity, you can change lifestyle risk factors around eating, physical activity, and weight. These lifestyle changes can affect your chances of developing type 2 diabetes.

Read about risk factors for type 2 diabetes below and see which ones apply to you. Taking action on the factors you can change can help you delay or prevent type 2 diabetes.

You are more likely to develop type 2 diabetes if you

- are [overweight](#) or [obese](#)
- are age 45 or older
- have a family history of diabetes
- are African American, Alaska Native, American Indian, Asian American, Hispanic/Latino, Native Hawaiian, or Pacific Islander
- have high blood pressure
- have a low level of [HDL](#) (“good”) [cholesterol](#), or a high level of [triglycerides](#)
- have a history of [gestational diabetes](#) or gave birth to a baby weighing 9 pounds or more
- are not physically active
- have a history of [heart disease](#) or [stroke](#)
- have [depression](#) [NIH](#) [↗](#)
- have [polycystic ovary syndrome](#) [NIH](#) [↗](#), also called PCOS
- have [acanthosis nigricans](#)—dark, thick, and velvety skin around your neck or armpits

You can also take the [Diabetes Risk Test](#) to learn about your risk for type 2 diabetes.

To see if your weight puts you at risk for type 2 diabetes, find your height in the [Body Mass Index \(BMI\)](#) charts below. If your weight is equal to or more than the weight listed, you have a greater chance of developing the disease.

If you are not Asian American or Pacific Islander		If you are Asian American		If you are Pacific Islander	
At-risk BMI ≥ 25		At-risk BMI ≥ 23		At-risk BMI ≥ 26	
Height	Weight	Height	Weight	Height	Weight
4'10"	119	4'10"	110	4'10"	124

If you are not Asian American or Pacific Islander		If you are Asian American		If you are Pacific Islander	
At-risk BMI \geq 25		At-risk BMI \geq 23		At-risk BMI \geq 26	
Height	Weight	Height	Weight	Height	Weight
4'11"	124	4'11"	114	4'11"	128
5'0"	128	5'0"	118	5'0"	133
5'1"	132	5'1"	122	5'1"	137
5'2"	136	5'2"	126	5'2"	142
5'3"	141	5'3"	130	5'3"	146
5'4"	145	5'4"	134	5'4"	151
5'5"	150	5'5"	138	5'5"	156
5'6"	155	5'6"	142	5'6"	161
5'7"	159	5'7"	146	5'7"	166
5'8"	164	5'8"	151	5'8"	171
5'9"	169	5'9"	155	5'9"	176
5'10"	174	5'10"	160	5'10"	181
5'11"	179	5'11"	165	5'11"	186
6'0"	184	6'0"	169	6'0"	191
6'1"	189	6'1"	174	6'1"	197
6'2"	194	6'2"	179	6'2"	202
6'3"	200	6'3"	184	6'3"	208
6'4"	205	6'4"	189	6'4"	213

What can I do to prevent type 2 diabetes?

You can take steps to help [prevent or delay type 2 diabetes](#) by losing weight if you are overweight, eating fewer calories, and being more physically active. Talk with your health care professional about any of the health conditions listed above that may require medical treatment. Managing these health problems may help reduce your chances of developing type 2 diabetes. Also, ask your health care professional about any medicines you take that might increase your risk.

Preventing Type 2 Diabetes

Perhaps you have learned that you have a high chance of developing [type 2 diabetes](#), the most common type of diabetes. You might be [overweight](#) or have a parent, brother, or sister with type 2 diabetes. Maybe you had gestational diabetes, which is diabetes that develops during pregnancy. These are just a few examples of [factors that can raise your chances of developing type 2 diabetes](#).

Diabetes can cause serious [health problems](#), such as heart disease, stroke, and eye and foot problems. [Prediabetes](#) also can cause health problems. The good news is that type 2 diabetes can be delayed or even prevented. The longer you have diabetes, the more likely you are to develop health problems, so delaying diabetes by even a few years will benefit your health. **You can help prevent or delay type 2 diabetes by losing a modest amount of weight by following a reduced-calorie eating plan and being physically active most days of the week.** Ask your doctor if you should take the diabetes drug [metformin](#) [NIH](#) to help prevent or delay type 2 diabetes.¹

How can I lower my chances of developing type 2 diabetes?

Research such as the [Diabetes Prevention Program](#) shows that you can do a lot to reduce your chances of developing type 2 diabetes. Here are some things you can change to lower your risk:

- **Lose weight and keep it off.** You may be able to prevent or delay diabetes by losing 5 to 7 percent of your starting weight.¹ For instance, if you weigh 200 pounds, your goal would be to lose about 10 to 14 pounds.
- **Move more.** Get at least 30 minutes of physical activity 5 days a week. If you have not been active, talk with your health care professional about which activities are best. Start slowly to build up to your goal.
- **Eat healthy foods most of the time.** Eat smaller portions to reduce the amount of calories you eat each day and help you lose weight. Choosing foods with less fat is another way to reduce calories. Drink water instead of sweetened beverages.

Ask your health care professional about what other changes you can make to prevent or delay type 2 diabetes.

Most often, your best chance for preventing type 2 diabetes is to make lifestyle changes that work for you long term. Get started with [Your Game Plan to Prevent Type 2 Diabetes](#).



Losing weight through healthy eating and regular physical activity can help you prevent type 2 diabetes.

What should I do if my health care professional told me I have prediabetes?

Prediabetes is when your [blood glucose](#), also called blood sugar, levels are higher than normal, but not high enough to be called diabetes. Having prediabetes is serious because it raises your chance of developing type 2 diabetes. Many of the same factors that raise your chance of developing type 2 diabetes put you at risk for prediabetes.

Other names for prediabetes include impaired fasting glucose or impaired glucose tolerance. Some people call prediabetes “borderline diabetes.”

About 1 in 3 Americans has prediabetes, according to recent [diabetes statistics](#) [↗](#) from the Centers for Disease Control and Prevention. You won’t know if you have prediabetes unless you are tested.

If you have prediabetes, you can lower your chance of developing type 2 diabetes. Lose weight if you need to, become more physically active, and follow a reduced-calorie eating plan.

Get started with [Your Game Plan to Prevent Type 2 Diabetes](#). For more support, you can find a lifestyle change program near you through the [National Diabetes Prevention Program](#) [↗](#).



Being physically active is one way to help prevent prediabetes from progressing to type 2 diabetes.

If I had gestational diabetes when I was pregnant, how can I lower my chances of developing type 2 diabetes?

[Gestational diabetes](#) is a type of diabetes that develops during pregnancy. Most of the time, gestational diabetes goes away after your baby is born. Even if your gestational diabetes goes

away, you still have a greater chance of developing type 2 diabetes within 5 to 10 years. Your child may also be more likely to become [obese](#) and develop type 2 diabetes later in life. Making healthy choices helps the whole family and may protect your child from becoming obese or developing diabetes.



Being physically active together is a great way to lower your own and your child's chance of developing type 2 diabetes.

Here are steps you should take for yourself and your child if you had gestational diabetes:

- Get tested for diabetes 6 to 12 weeks after your baby is born. If your blood glucose is still high, you may have type 2 diabetes. If your blood glucose is normal, you should get tested every 3 years to see if you have developed type 2 diabetes.
- Be more active and make healthy food choices to get back to a healthy weight.
- Breastfeed your baby. Breastfeeding gives your baby the right balance of nutrients and helps you burn calories.
- Ask your doctor if you should take the diabetes drug metformin to help prevent type 2 diabetes.¹

References

[1] Diabetes Prevention Program Research Group. Long-term effects of lifestyle intervention or metformin on diabetes development and microvascular complications over 15-year follow-up: the Diabetes Prevention Program Outcomes Study. *The Lancet Diabetes & Endocrinology*. 2015;3(11):866–875. You can find more information about this study at the [Diabetes Prevention Program Outcomes Study website](#).

Diabetes Tests & Diagnosis

Your health care professional can diagnose diabetes, [prediabetes](#), and [gestational diabetes](#) through blood tests. The blood tests show if your [blood glucose](#), also called blood sugar, is too high.

Do not try to diagnose yourself if you think you might have diabetes. Testing equipment that you can buy over the counter, such as a [blood glucose meter](#), cannot diagnose diabetes.

Who should be tested for diabetes?

Anyone who has [symptoms of diabetes](#) should be tested for the disease. Some people will not have any symptoms but may have [risk factors for diabetes](#) and need to be tested. Testing allows health care professionals to find diabetes sooner and work with their patients to manage diabetes and prevent [complications](#).

Testing also allows health care professionals to find prediabetes. Making lifestyle changes to lose a modest amount of weight if you are overweight may help you delay or [prevent type 2 diabetes](#).



Blood tests help health care professionals diagnose diabetes and prediabetes.

Type 1 diabetes

Most often, testing for occurs in people with diabetes symptoms. Doctors usually diagnose [type 1 diabetes](#) in children and young adults. Because type 1 diabetes can run in families, a study called TrialNet offers free [testing to family members](#) [↗](#) of people with the disease, even if they don't have symptoms.

Type 2 diabetes

Experts recommend routine testing for [type 2 diabetes](#) if you

- are age 45 or older
- are between the ages of 19 and 44, are [overweight](#) or [obese](#), and have one or more other diabetes risk factors
- are a woman who had gestational diabetes¹

Medicare covers the cost of diabetes tests for people with certain risk factors for diabetes. If you have Medicare, [find out if you qualify for coverage](#) . If you have different insurance, ask your insurance company if it covers diabetes tests.

Though type 2 diabetes most often develops in adults, children also can develop type 2 diabetes. Experts recommend testing children between the ages of 10 and 18 who are overweight or obese and have at least two other risk factors for developing diabetes.¹

- low birthweight
- a mother who had diabetes while pregnant with them
- any risk factor mentioned in [Risk Factors for Type 2 Diabetes](#)

Gestational diabetes

All pregnant women who do not have a prior diabetes diagnosis should be tested for [gestational diabetes](#). If you are pregnant, you will take a [glucose challenge test](#) between 24 and 28 weeks of pregnancy.¹

What tests are used to diagnose diabetes and prediabetes?

Health care professionals most often use the fasting plasma glucose (FPG) test or the A1C test to diagnose diabetes. In some cases, they may use a random plasma glucose (RPG) test.

Fasting plasma glucose (FPG) test

The FPG blood test measures your blood glucose level at a single point in time. For the most reliable results, it is best to have this test in the morning, after you fast for at least 8 hours. Fasting means having nothing to eat or drink except sips of water.

A1C test

The [A1C test](#) is a blood test that provides your average levels of blood glucose over the past 3 months. Other names for the A1C test are hemoglobin A1C, HbA1C, glycated hemoglobin, and

glycosylated hemoglobin test. You can eat and drink before this test. When it comes to using the A1C to diagnose diabetes, your doctor will consider factors such as your age and whether you have [anemia](#) [NIH](#) or another problem with your blood.¹ The A1C test is not accurate in people with anemia.

If you're of [African, Mediterranean, or Southeast Asian descent](#), your A1C test results may be [falsely high or low](#). Your health care professional may need to order a different type of A1C test.

Your health care professional will report your A1C test result as a percentage, such as an A1C of 7 percent. The higher the percentage, the higher your average blood glucose levels.

People with diabetes also use information from the A1C test to help [manage their diabetes](#).

Random plasma glucose (RPG) test

Sometimes health care professionals use the RPG test to diagnose diabetes when diabetes symptoms are present and they do not want to wait until you have fasted. You do not need to fast overnight for the RPG test. You may have this blood test at any time.

What tests are used to diagnose gestational diabetes?

Pregnant women may have the glucose challenge test, the oral glucose tolerance test, or both. These tests show how well your body handles glucose.

Glucose challenge test

If you are pregnant and a health care professional is checking you for gestational diabetes, you may first receive the glucose challenge test. Another name for this test is the glucose screening test. In this test, a health care professional will draw your blood 1 hour after you drink a sweet liquid containing glucose. You do not need to fast for this test. If your blood glucose is too high—135 to 140 or more—you may need to return for an oral glucose tolerance test while fasting.

Oral glucose tolerance test (OGTT)

The OGTT measures blood glucose after you fast for at least 8 hours. First, a health care professional will draw your blood. Then you will drink the liquid containing glucose. For diagnosing gestational diabetes, you will need your blood drawn every hour for 2 to 3 hours.

High blood glucose levels at any two or more blood test times during the OGTT—fasting, 1 hour, 2 hours, or 3 hours—mean you have gestational diabetes. Your health care team will explain what your OGTT results mean.

Health care professionals also can use the OGTT to diagnose type 2 diabetes and prediabetes in people who are not pregnant. The OGTT helps health care professionals detect type 2 diabetes and

prediabetes better than the FPG test. However, the OGTT is a more expensive test and is not as easy to give. To diagnose type 2 diabetes and prediabetes, a health care professional will need to draw your blood 1 hour after you drink the liquid containing glucose and again after 2 hours.

What test numbers tell me if I have diabetes or prediabetes?

Each test to detect diabetes and prediabetes uses a different measurement. Usually, the same test method needs to be repeated on a second day to diagnose diabetes. Your doctor may also use a second test method to confirm that you have diabetes.

The following table helps you understand what your test numbers mean if you are not pregnant.

Diagnosis	A1C (percent)	Fasting plasma glucose (FPG) ^a	Oral glucose tolerance test (OGTT) ^{ab}	Random plasma glucose test (RPG) ^a
Normal	below 5.7	99 or below	139 or below	
Prediabetes	5.7 to 6.4	100 to 125	140 to 199	
Diabetes	6.5 or above	126 or above	200 or above	200 or above

^aGlucose values are in milligrams per deciliter, or mg/dL.

^bAt 2 hours after drinking 75 grams of glucose. To diagnose gestational diabetes, health care professionals give more glucose to drink and use different numbers as cutoffs.

Source: Adapted from American Diabetes Association. Classification and diagnosis of diabetes. *Diabetes Care*. 2016;39(1):S14–S20, tables 2.1, 2.3.

Which tests help my health care professional know what kind of diabetes I have?

Even though the tests described here can confirm that you have diabetes, they can't identify what type you have. Sometimes health care professionals are unsure if diabetes is type 1 or type 2. A rare type of diabetes that can occur in babies, called [monogenic diabetes](#), can also be mistaken for type 1 diabetes. Treatment depends on the type of diabetes, so knowing which type you have is important.

To find out if your diabetes is type 1, your health care professional may look for certain autoantibodies. Autoantibodies are [antibodies](#) that mistakenly attack your healthy tissues and cells. The presence of one or more of several types of autoantibodies specific to diabetes is common in type 1 diabetes, but not in type 2 or monogenic diabetes. A health care professional will have to draw your blood for this test.

If you had diabetes while you were pregnant, you should get tested 6 to 12 weeks after your baby is born to see if you have type 2 diabetes.

References

¹American Diabetes Association. Classification and diagnosis of diabetes. *Diabetes Care*. 2016;39(Suppl. 1):S13–S22.

Managing Diabetes

You can manage your diabetes and live a long and healthy life by taking care of yourself each day.

Diabetes can affect almost every part of your body. Therefore, you will need to manage your [blood glucose](#) levels, also called blood sugar. Managing your blood glucose, as well as your [blood pressure](#) and [cholesterol](#), can help prevent the health problems that can occur when you have diabetes.

How can I manage my diabetes?

With the help of your health care team, you can create a diabetes self-care plan to manage your diabetes. Your self-care plan may include these steps:

Ways to manage your diabetes

- [Manage your diabetes ABCs.](#)
- [Follow your diabetes meal plan.](#)
- [Make physical activity part of your routine.](#)
- [Take your medicine.](#)
- [Check your blood glucose levels.](#)
- [Work with your health care team.](#)
- [Cope with your diabetes in healthy ways.](#)

Manage your diabetes ABCs

Knowing your diabetes ABCs will help you manage your blood glucose, blood pressure, and cholesterol. Stopping smoking if you smoke will also help you manage your diabetes. Working toward your ABC goals can help lower your chances of having a heart attack, stroke, or other [diabetes problems](#).

A for the A1C test

The [A1C test](#) shows your average blood glucose level over the past 3 months. The A1C goal for many people with diabetes is below 7 percent. Ask your health care team what your goal should be.

B for Blood pressure

The blood pressure goal for most people with diabetes is below 140/90 mm Hg. Ask what your goal should be.

C for Cholesterol

You have two kinds of cholesterol in your blood: LDL and HDL. LDL or “bad” cholesterol can build up and clog your blood vessels. Too much bad cholesterol can cause a heart attack or stroke. HDL or “good” cholesterol helps remove the “bad” cholesterol from your blood vessels.


Ask your health care team what your cholesterol numbers should be. If you are over 40 years of age, you may need to take a statin drug for heart health.


S for Stop smoking

Not smoking is especially important for people with diabetes because both smoking and diabetes narrow blood vessels. Blood vessel narrowing makes your heart work harder. E-cigarettes aren't a safe option either.

If you quit smoking

- you will lower your risk for heart attack, stroke, nerve disease, kidney disease, diabetic eye disease, and amputation
- your cholesterol and blood pressure levels may improve
- your blood circulation will improve
- you may have an easier time being physically active

If you smoke or use other tobacco products, stop. Ask for help so you don't have to do it alone. You can start by calling the national quitline at 1-800-QUITNOW or 1-800-784-8669. For tips on quitting, go to [SmokeFree.gov](https://www.smokefree.gov) .

Keeping your A1C, blood pressure, and cholesterol levels close to your goals and stopping smoking may help prevent the long-term harmful effects of diabetes. These health problems include heart disease, stroke, kidney disease, nerve damage, and eye disease. You can keep track of your ABCs with a [diabetes care record](#) (PDF, 568 KB) . Take it with you on your health care visits. Talk about your goals and how you are doing, and whether you need to make any changes in your diabetes care plan.

Follow your diabetes meal plan

Make a diabetes meal plan with help from your health care team. Following a meal plan will help you manage your blood glucose, blood pressure, and cholesterol.

Choose fruits and vegetables, beans, whole grains, chicken or turkey without the skin, fish, lean meats, and nonfat or low-fat milk and cheese. Drink water instead of sugar-sweetened beverages. Choose foods that are lower in calories, [saturated fat](#), [trans fat](#), sugar, and salt. Learn more about [eating, diet, and nutrition with diabetes](#).

Make physical activity part of your daily routine

Set a goal to be more physically active. Try to work up to 30 minutes or more of physical activity on most days of the week.

Brisk walking and swimming are good ways to move more. If you are not active now, ask your health care team about the types and amounts of physical activity that are right for you. Learn more about [being physically active with diabetes](#).



Swimming or water walking is a good way to move more.

Following your meal plan and being more active can help you stay at or get to a healthy weight. If you are overweight or obese, work with your health care team to create a weight-loss plan that is right for you.

Take your medicine

Take your medicines for diabetes and any other health problems, even when you feel good or have reached your blood glucose, blood pressure, and cholesterol goals. These medicines help you manage your ABCs. Ask your doctor if you need to take aspirin to prevent a heart attack or stroke. Tell your health care professional if you cannot afford your medicines or if you have any side effects from your medicines. Learn more about [insulin and other diabetes medicines](#).


Check your blood glucose levels

For many people with diabetes, checking their blood glucose level each day is an important way to manage their diabetes. Monitoring your blood glucose level is most important if you take insulin. The results of blood glucose monitoring can help you make decisions about food, physical activity, and medicines.



Checking and recording your blood glucose level is an important part of managing diabetes.

The most common way to check your blood glucose level at home is with a [blood glucose meter](#). You get a drop of blood by pricking the side of your fingertip with a [lancet](#). Then you apply the blood to a test strip. The meter will show you how much glucose is in your blood at the moment.

Ask your health care team how often you should check your blood glucose levels. Make sure to keep a record of your blood glucose self-checks. You can print copies of this [glucose self-check chart](#) (PDF, 2 MB) . Take these records with you when you visit your health care team.

What is continuous glucose monitoring?

[Continuous glucose monitoring](#) (CGM) is another way to check your glucose levels. Most CGM systems use a tiny sensor that you insert under your skin. The sensor measures glucose levels in the fluids between your body's cells every few minutes and can show changes in your glucose level throughout the day and night. If the CGM system shows that your glucose is too high or too low, you should check your glucose with a blood glucose meter before making any changes to your

eating plan, physical activity, or medicines. A CGM system is especially useful for people who use insulin and have problems with low blood glucose.

What are the recommended targets for blood glucose levels?

Many people with diabetes aim to keep their blood glucose at these normal levels:

- Before a meal: 80 to 130 mg/dL
- About 2 hours after a meal starts: less than 180 mg/dL

Talk with your health care team about the best target range for you. Be sure to tell your health care professional if your glucose levels often go above or below your target range.

What happens if my blood glucose level becomes too low?

Sometimes blood glucose levels drop below where they should be, which is called hypoglycemia. For most people with diabetes, the blood glucose level is too low when it is below 70 mg/dL.

Hypoglycemia can be life threatening and needs to be treated right away. [Learn more about how to recognize and treat hypoglycemia.](#)

What happens if my blood glucose level becomes too high?

Doctors call high blood glucose hyperglycemia.

Symptoms that your blood glucose levels may be too high include

- feeling thirsty
- feeling tired or weak
- headaches
- urinating often
- blurred vision

If you often have high blood glucose levels or symptoms of high blood glucose, talk with your health care team. You may need a change in your diabetes meal plan, physical activity plan, or medicines.

Know when to check for ketones

Your doctor may want you to [check your urine](#) [NIH](#) for [ketones](#) if you have symptoms of [diabetic ketoacidosis](#) [NIH](#). When ketone levels get too high, you can develop this life-threatening condition. Symptoms include

- trouble breathing
- nausea or vomiting

- pain in your [abdomen](#)
- confusion
- feeling very tired or sleepy


Ketoacidosis most often is a problem for people with [type 1 diabetes](#).

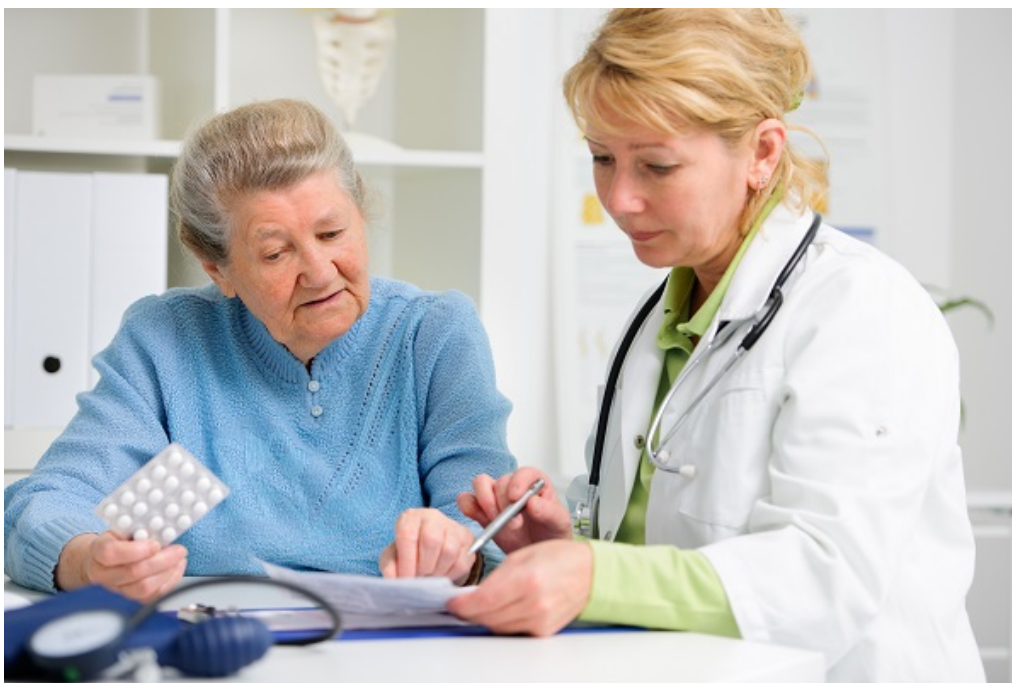
Work with your health care team

Most people with diabetes get health care from a primary care professional. Primary care professionals include internists, family physicians, and pediatricians. Sometimes physician assistants and nurses with extra training, called nurse practitioners, provide primary care. You also will need to see other care professionals from time to time. A team of health care professionals can help you improve your diabetes self-care. Remember, you are the most important member of your health care team.

Besides a primary care professional, your health care team may include


- an [endocrinologist](#) for more specialized diabetes care
- a registered [dietitian](#), also called a nutritionist
- a nurse
- a certified [diabetes educator](#)
- a [pharmacist](#)
- a dentist
- an eye doctor
- a [podiatrist](#), or foot doctor, for foot care
- a social worker, who can help you find financial aid for treatment and community resources
- a counselor or other mental health care professional

When you see members of your health care team, ask questions. Write a list of questions you have before your visit so you don't forget what you want to ask. [Watch a video to help you get ready for your diabetes care visit.](#) 





When you see your doctor, review your diabetes self-care plan and blood glucose chart.

You should see your health care team at least twice a year, and more often if you are having problems or are having trouble reaching your blood glucose, blood pressure, or cholesterol goals. At each visit, be sure you have a blood pressure check, foot check, and weight check; and review your self-care plan. Talk with your health care team about your medicines and whether you need to adjust them. Routine health care will help you find and treat any health problems early, or may be able to help prevent them.

Talk with your doctor about [what vaccines you should get](#)  to keep from getting sick, such as a flu shot and pneumonia shot. Preventing illness is an important part of taking care of your diabetes. Your blood glucose levels are more likely to go up when you're sick or have an infection. Learn more about [taking care of your diabetes when you're sick and during other special times, such as when you're traveling](#).

Cope with your diabetes in healthy ways

Feeling stressed, sad, or angry is common when you live with diabetes. Stress can raise your blood glucose levels, but you can learn ways to lower your stress. Try deep breathing, gardening, taking a walk, doing yoga, meditating, doing a hobby, or listening to your favorite music. Consider taking part in a diabetes education program or support group that teaches you techniques for managing stress. Learn more about [healthy ways to cope with stress](#) .

[Depression is common among people with a chronic, or long-term, illness](#) . Depression can get in the way of your efforts to manage your diabetes. Ask for help if you feel down. A mental

health counselor, support group, clergy member, friend, or family member who will listen to your feelings may help you feel better.

Try to get 7 to 8 hours of sleep each night. Getting enough sleep can help improve your mood and energy level. You can take steps to [improve your sleep habits](#) [NIH](#) [↗](#). If you often feel sleepy during the day, you may have [obstructive sleep apnea](#) [NIH](#) [↗](#), a condition in which your breathing briefly stops many times during the night. Sleep apnea is common in people who have diabetes. Talk with your health care team if you think you have a sleep problem.

Remember, managing diabetes isn't easy, but it's worth it.

Insulin, Medicines, & Other Diabetes Treatments

Taking [insulin](#) or other diabetes medicines is often part of treating diabetes. Along with healthy food choices and physical activity, medicine can help you manage the disease. Some other treatment options are also available.

What medicines might I take for diabetes?

The medicine you take will vary by your type of diabetes and how well the medicine controls your blood glucose levels, also called blood sugar. Other factors, such as your other health conditions, medication costs, and your daily schedule may play a role in what diabetes medicine you take.

Type 1 diabetes

If you have [type 1 diabetes](#), you must take insulin because your body no longer makes this [hormone](#). You will need to take insulin several times during the day, including with meals. You also could use an [insulin pump](#), which gives you small, steady doses throughout the day.

Type 2 diabetes

Some people with [type 2 diabetes](#) can manage their disease by making healthy food choices and being more physically active. Many people with type 2 diabetes need diabetes medicines as well. These medicines may include diabetes pills or medicines you inject under your skin, such as insulin. In time, you may need more than one diabetes medicine to control your blood glucose. Even if you do not take insulin, you may need it at special times, such as during pregnancy or if you are in the hospital.

Gestational diabetes

If you have [gestational diabetes](#), you should first try to control your blood glucose level by making healthy food choices and getting regular physical activity. If you can't reach your blood glucose target, your health care team will talk with you about diabetes medicines, such as insulin or the diabetes pill metformin, that may be safe for you to take during pregnancy. Your health care team may start you on diabetes medicines right away if your blood glucose is very high.

No matter what type of diabetes you have, taking diabetes medicines every day can feel like a burden sometimes. You may also need medicines for other health problems, such as high blood pressure or high cholesterol, as part of your diabetes care plan. [View resources that may help you manage your medication plan.](#)

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. Then the effects of the insulin wear off over the next few hours or so.

Types of Insulin and How They Work			
Insulin type	How fast it starts to work (onset)	When it peaks	How long it lasts (duration)
Rapid-acting	About 15 minutes after injection	1 hour	2 to 4 hours
Short-acting, also called regular	Within 30 minutes after injection	2 to 3 hours	3 to 6 hours
Intermediate-acting	2 to 4 hours after injection	4 to 12 hours	12 to 18 hours
Long-acting	Several hours after injection	Does not peak	24 hours; some last longer

Source: Insulin basics. [American Diabetes Association website](#). [↗](#) Last edited 2015. Accessed August 25, 2016.

The chart above gives averages. Follow your doctor's advice on when and how to take your insulin. Your doctor might also recommend premixed insulin, which is a mix of two types of insulin. Some types of insulin cost more than others, so talk with your doctor about your options if you're concerned about cost. Read about [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. You may decide that needles are not for you and prefer a different method. Talk with your doctor about the

options and which is best for you. Most people with diabetes use a needle and syringe, pen, or insulin pump. Inhalers, injection ports, and jet injectors are less common.

Needle and syringe

You'll give yourself insulin shots using a needle and [syringe](#). You will draw up your dose of insulin from the vial, or bottle, into the syringe. Insulin works fastest when you inject it in your belly, but you should rotate spots where you inject insulin. Other injection spots include your thigh, buttocks, or upper arm. Some people with diabetes who take insulin need two to four shots a day to reach their blood glucose targets. Others can take a single shot.



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

Pen

An insulin pen looks like a 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 then replace after use. Insulin pens cost more than needles and syringes but many people find them easier to use.



An insulin pen is a convenient way to take insulin

Pump

An insulin pump is a small machine that gives you small, 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 needle under your skin and it stays in place for several days. Insulin then pumps from the machine through the tube into your body 24 hours a day. You also can give yourself doses of insulin through the pump at mealtimes. Another type of pump has no tubes and attaches directly to your skin, such as a self-adhesive pod.



Insulin pumps deliver insulin 24 hours a day.

Inhaler

Another way to take insulin is by breathing powdered insulin from an inhaler device into your mouth. The insulin goes into your lungs and moves quickly into your blood. Inhaled insulin is only for adults with type 1 or type 2 diabetes.

Injection port

An injection port has a short tube that you insert into the tissue beneath your skin. On the skin's surface, an adhesive patch or dressing holds the port in place. You inject insulin through the port with a needle and syringe or an insulin pen. The port stays in place for a few days, and then you replace the port. With an injection port, you no longer puncture your skin for each shot—only when you apply a new port.

Jet injector

This device sends a fine spray of insulin into the skin at high pressure instead of using a needle to deliver the insulin.

What oral medicines treat type 2 diabetes?

You may need medicines along with healthy eating and physical activity habits to manage your type 2 diabetes. You can take many diabetes medicines by mouth. These medicines are called oral medicines.

Most people with type 2 diabetes start medical treatment with [metformin](#) [NIH](#) [↗](#) pills. Metformin also comes as a liquid. Metformin lowers the amount of glucose that your liver makes 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. You may need to add another diabetes medicine after a while or use a combination treatment. Combining two or three kinds of diabetes medicines can lower blood glucose levels more than taking just one.

Read about different kinds of [diabetes medicines](#) [↗](#) from the Food and Drug Administration (FDA).

What other injectable medicines treat type 2 diabetes?

Besides insulin, other types of injected medicines are available. These medicines help keep your blood glucose level from going too high after you eat. They may make you feel less hungry and help you lose some weight. Other injectable medicines are not substitutes for insulin. Learn more about [noninsulin injectable medicines](#) [↗](#).

What should I know about side effects of diabetes medicines?

Side effects are problems that result from 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. Take your diabetes medicines as your health care professional has instructed you, to help prevent side effects and diabetes problems.

Do I have other treatment options for my diabetes?

When medicines and lifestyle changes are not enough to manage your diabetes, a less common treatment may be an option. Other treatments include bariatric surgery for certain people with type 1 or type 2 diabetes, and an "artificial pancreas" and pancreatic islet transplantation for some people with type 1 diabetes.

Bariatric surgery

Also called weight-loss surgery or metabolic surgery, [bariatric surgery](#) may help some people with obesity and type 2 diabetes lose a large amount of weight and regain normal blood glucose levels. Some people with diabetes may no longer need their diabetes medicine after bariatric surgery. Whether and for how long blood glucose levels improve seems to vary by the patient, type of weight-loss surgery, and amount of weight the person loses. Other factors include how long someone has had diabetes and whether or not the person uses insulin.¹

Recent research suggests that weight-loss surgery also may help improve blood glucose control in people with type 1 diabetes who are obese.²

Researchers are studying the long-term results of bariatric surgery in people with type 1 and type 2 diabetes.

Artificial Pancreas

The NIDDK has played an important role in developing "artificial pancreas" technology. An artificial pancreas replaces manual blood glucose testing and the use of insulin shots or a pump. A single system monitors blood glucose levels around the clock and provides insulin or a combination of insulin and a second hormone, glucagon, automatically. The system can also be monitored remotely, for example by parents or medical staff.


In 2016, the FDA approved a type of artificial pancreas system called a hybrid closed-loop system. This system tests your glucose level every 5 minutes throughout the day and night, and automatically gives you the right amount of insulin.

You still need to manually adjust the amount of insulin the pump delivers at mealtimes. But, the artificial pancreas may free you from some of the daily tasks needed to keep your blood glucose stable—or help you sleep through the night without the need to wake and test your glucose or take medicine.

The hybrid closed-loop system is expected to be available in the U.S. in 2017. Talk with your health care provider about whether this system might be right for you.

The NIDDK has funded several important studies on different types of artificial pancreas devices to better help people with type 1 diabetes manage their disease. The devices may also help people with type 2 diabetes and gestational diabetes.

Pancreatic islet transplantation

[Pancreatic islet transplantation](#) is an experimental treatment for poorly controlled type 1 diabetes. 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 transplant replaces destroyed islets with new ones that make and release insulin. This procedure takes islets from the pancreas of an organ donor and transfers them to a person with type 1 diabetes. Because researchers are still studying pancreatic islet transplantation, the procedure is only available to people enrolled in research studies. Learn more about [islet transplantation studies](#) .

References

[1] Cordera R, Adami GF. From bariatric to metabolic surgery: looking for a “disease modifier” surgery for type 2 diabetes. *World Journal of Diabetes*. 2016;7(2):27–33.

[2] Kirwan JP, Aminian A, Kashyap SR, Burguera B, Brethauer SA, Schauer PR. Bariatric surgery in obese patients with type 1 diabetes. *Diabetes Care*. 2016;39(6):941–948.

Diabetes Diet, Eating, & Physical Activity

Nutrition and physical activity are important parts of a healthy lifestyle when you have diabetes. Along with other benefits, following a healthy meal plan and being active can help you keep your [blood glucose level](#), also called blood sugar, in your target range. To manage your blood glucose, you need to balance what you eat and drink with physical activity and diabetes medicine, if you take any. What you choose to eat, how much you eat, and when you eat are all important in keeping your blood glucose level in the range that your health care team recommends.

Becoming more active and making changes in what you eat and drink can seem challenging at first. You may find it easier to start with small changes and get help from your family, friends, and health care team.

Eating well and being physically active most days of the week can help you

- keep your blood glucose level, blood pressure, and cholesterol in your target ranges
- lose weight or stay at a [healthy weight](#)
- prevent or delay [diabetes problems](#)
- feel good and have more energy

What foods can I eat if I have diabetes?

You may worry that having diabetes means going without foods you enjoy. The good news is that you can still eat your favorite foods, but you might need to eat smaller portions or enjoy them less often. Your health care team will help create a diabetes meal plan for you that meets your needs and likes.

The key to eating with diabetes is to eat a variety of healthy foods from all food groups, in the amounts your meal plan outlines.

The food groups are

- **vegetables**
 - nonstarchy: includes broccoli, carrots, greens, peppers, and tomatoes
 - starchy: includes potatoes, corn, and green peas
- **fruits**—includes oranges, melon, berries, apples, bananas, and grapes
- **grains**—at least half of your grains for the day should be [whole grains](#)
 - includes wheat, rice, oats, cornmeal, barley, and quinoa
 - examples: bread, pasta, cereal, and tortillas
- **protein**
 - lean meat
 - chicken or turkey without the skin
 - fish
 - eggs
 - nuts and peanuts
 - dried beans and certain peas, such as chickpeas and split peas
 - meat substitutes, such as tofu
- **dairy—nonfat or low fat**
 - milk or lactose-free milk if you have [lactose intolerance](#)
 - yogurt
 - cheese

Learn more about the food groups at the U.S. Department of Agriculture's (USDA)

[ChooseMyPlate.gov](https://www.choosemyplate.gov) .

Eat foods with heart-healthy fats, which mainly come from these foods:

- oils that are liquid at room temperature, such as canola and olive oil
- nuts and seeds
- heart-healthy fish such as salmon, tuna, and mackerel
- avocado

Use oils when cooking food instead of butter, cream, shortening, lard, or stick margarine.



Choose healthy fats, such as from nuts, seeds, and olive oil.

What foods and drinks should I limit if I have diabetes?

Foods and drinks to limit include

- fried foods and other foods high in [saturated fat](#) and [trans fat](#)
- foods high in salt, also called [sodium](#)
- sweets, such as baked goods, candy, and ice cream
- beverages with [added sugars](#), such as juice, regular soda, and regular sports or energy drinks

Drink water instead of sweetened beverages. Consider using a sugar substitute in your coffee or tea.


If you drink alcohol, drink moderately—no more than one drink a day if you're a woman or two drinks a day if you're a man. If you use insulin or diabetes medicines that increase the amount of insulin your body makes, alcohol can make your blood glucose level drop too low. This is especially true if you haven't eaten in a while. It's best to eat some food when you drink alcohol.

When should I eat if I have diabetes?

Some people with diabetes need to eat at about the same time each day. Others can be more flexible with the timing of their meals. Depending on your diabetes medicines or type of insulin, you may need to eat the same amount of carbohydrates at the same time each day. If you take “mealtime” insulin, your eating schedule can be more flexible.

If you use certain diabetes medicines or insulin and you skip or delay a meal, your blood glucose level can drop too low. Ask your health care team when you should eat and whether you should eat before and after physical activity.


How much can I eat if I have diabetes?

Eating the right amount of food will also help you manage your blood glucose level and your weight. Your health care team can help you figure out how much food and how many calories you should eat each day. Look up how many calories are in what you eat and drink at the USDA’s [Food-A-Pedia](#) .

Weight-loss planning

If you are [overweight](#) or [obese](#), work with your health care team to create a weight-loss plan.

These tools may help:

- The [Body Weight Planner](#) can help you tailor your plans to reach and maintain your goal weight.
- The [SuperTracker](#)  lets you track your food, physical activity, and weight.

To lose weight, you need to eat fewer calories and replace less healthy foods with foods lower in calories, fat, and sugar.

If you have diabetes, are overweight or obese, and are planning to have a baby, you should try to lose any excess weight before you become pregnant. [Learn more about planning for pregnancy if you have diabetes.](#)

Meal plan methods

Two common ways to help you plan how much to eat if you have diabetes are the plate method and carbohydrate counting, also called carb counting. Check with your health care team about the method that’s best for you.

Plate method


The plate method helps you control your [portion sizes](#). You don’t need to count calories. The plate method shows the amount of each food group you should eat. This method works best for lunch

and dinner.

Use a 9-inch plate. Put nonstarchy vegetables on half of the plate; a meat or other protein on one-fourth of the plate; and a grain or other starch on the last one-fourth. Starches include starchy vegetables such as corn and peas. You also may eat a small bowl of fruit or a piece of fruit, and drink a small glass of milk as included in your meal plan.



The plate method shows the amount of each food group you should eat.

You can find many different combinations of food and more details about using the plate method from the American Diabetes Association's [Create Your Plate](#) .

Your daily eating plan also may include small snacks between meals.

Portion sizes

- You can use everyday objects or your hand to judge the size of a portion.
- 1 serving of meat or poultry is the palm of your hand or a deck of cards
- 1 3-ounce serving of fish is a checkbook
- 1 serving of cheese is six dice
- 1/2 cup of cooked rice or pasta is a rounded handful or a tennis ball
- 1 serving of a pancake or waffle is a DVD
- 2 tablespoons of peanut butter is a ping-pong ball

Carbohydrate counting

Carbohydrate counting involves keeping track of the amount of carbohydrates you eat and drink each day. Because carbohydrates turn into glucose in your body, they affect your blood glucose level more than other foods do. Carb counting can help you manage your blood glucose level. If you take [insulin](#), counting carbohydrates can help you know how much insulin to take.

The right amount of carbohydrates varies by how you manage your diabetes, including how physically active you are and what medicines you take, if any. Your health care team can help you create a personal eating plan based on carbohydrate counting.

The amount of carbohydrates in foods is measured in grams. To count carbohydrate grams in what you eat, you'll need to

- learn which foods have carbohydrates
- read the [Nutrition Facts food label](#), or learn to estimate the number of grams of carbohydrate in the foods you eat
- add the grams of carbohydrate from each food you eat to get your total for each meal and for the day

Most carbohydrates come from starches, fruits, milk, and sweets. Try to limit carbohydrates with added sugars or those with refined grains, such as white bread and white rice. Instead, eat carbohydrates from fruit, vegetables, whole grains, beans, and low-fat or nonfat milk.



Choose healthy carbohydrates, such as fruit, vegetables, whole grains, beans, and low-fat milk, as part of your diabetes meal plan.

In addition to using the plate method and carb counting, you may want to visit a [registered dietitian](#) (RD) for medical nutrition therapy.

What is medical nutrition therapy?

Medical nutrition therapy is a service provided by an RD to create personal eating plans based on your needs and likes. For people with diabetes, medical nutrition therapy has been shown to improve diabetes management. [Medicare pays for medical nutrition therapy for people with diabetes](#). [↗](#) If you have insurance other than Medicare, ask if it covers medical nutrition therapy for diabetes.

Will supplements and vitamins help my diabetes?

No clear proof exists that taking [dietary supplements](#) [NIH](#) [↗](#) such as vitamins, minerals, herbs, or spices can help manage diabetes.¹ You may need supplements if you cannot get enough vitamins and minerals from foods. Talk with your health care provider before you take any dietary supplement since some can cause side effects or affect how your medicines work.²

Why should I be physically active if I have diabetes?

Physical activity is an important part of managing your blood glucose level and staying healthy. Being active has many health benefits.

Physical activity

- lowers blood glucose levels
- lowers [blood pressure](#)
- improves blood flow
- burns extra calories so you can keep your weight down if needed
- improves your mood
- can prevent falls and improve memory in older adults
- may help you sleep better

If you are overweight, combining physical activity with a reduced-calorie eating plan can lead to even more benefits. In the [Look AHEAD: Action for Health in Diabetes](#) study,¹ overweight adults with [type 2 diabetes](#) who ate less and moved more had greater long-term health benefits compared to those who didn't make these changes. These benefits included improved cholesterol levels, less [sleep apnea](#), and being able to move around more easily.

Even small amounts of physical activity can help. Experts suggest that you aim for at least 30 minutes of moderate or vigorous physical activity 5 days of the week.³ Moderate activity feels somewhat hard, and vigorous activity is intense and feels hard. If you want to lose weight or maintain weight loss, you may need to do 60 minutes or more of physical activity 5 days of the week.³

Be patient. It may take a few weeks of physical activity before you see changes in your health.

How can I be physically active safely if I have diabetes?

Be sure to drink water before, during, and after exercise to stay well hydrated. The following are some other tips for safe physical activity when you have diabetes.



Drink water when you exercise to stay well hydrated.

Plan ahead

Talk with your health care team before you start a new physical activity routine, especially if you have other health problems. Your health care team will tell you a target range for your blood glucose level and suggest how you can be active safely.

Your health care team also can help you decide the best time of day for you to do physical activity based on your daily schedule, meal plan, and diabetes medicines. If you take insulin, you need to balance the activity that you do with your insulin doses and meals so you don't get low blood glucose.

Prevent low blood glucose

Because physical activity lowers your blood glucose, you should protect yourself against low blood glucose levels, also called [hypoglycemia](#). You are most likely to have hypoglycemia if you take insulin or certain other diabetes medicines, such as a [sulfonylurea](#). Hypoglycemia also can occur after a long intense workout or if you have skipped a meal before being active. Hypoglycemia can happen during or up to 24 hours after physical activity.

Planning is key to preventing hypoglycemia. For instance, if you take insulin, your health care provider might suggest you take less insulin or eat a small snack with carbohydrates before,

during, or after physical activity, especially intense activity.⁴

You may need to check your blood glucose level before, during, and right after you are physically active.

Stay safe when blood glucose is high

If you have **type 1 diabetes**, avoid vigorous physical activity when you have ketones in your blood or urine. Ketones are chemicals your body might make when your blood glucose level is too high, a condition called hyperglycemia, and your insulin level is too low. If you are physically active when you have ketones in your blood or urine, your blood glucose level may go even higher. Ask your health care team what level of ketones are dangerous for you and how to test for them. Ketones are uncommon in people with type 2 diabetes.

Take care of your feet

People with diabetes may have problems with their feet because of poor blood flow and nerve damage that can result from high blood glucose levels. To help prevent foot problems, you should wear comfortable, supportive shoes and **take care of your feet** before, during, and after physical activity.

What physical activities should I do if I have diabetes?

Most kinds of physical activity can help you take care of your diabetes. Certain activities may be unsafe for some people, such as those with low vision or nerve damage to their feet. Ask your health care team what physical activities are safe for you. Many people choose walking with friends or family members for their activity.

Doing different types of physical activity each week will give you the most health benefits. Mixing it up also helps reduce boredom and lower your chance of getting hurt. Try these options for physical activity.

Add extra activity to your daily routine

If you have been inactive or you are trying a new activity, start slowly, with 5 to 10 minutes a day. Then add a little more time each week. Increase daily activity by spending less time in front of a TV or other screen. Try these simple ways to add physical activities in your life each day:

- Walk around while you talk on the phone or during TV commercials.
- Do chores, such as work in the garden, rake leaves, clean the house, or wash the car.
- Park at the far end of the shopping center parking lot and walk to the store.

- Take the stairs instead of the elevator.
- Make your family outings active, such as a family bike ride or a walk in a park.

If you are sitting for a long time, such as working at a desk or watching TV, do some light activity for 3 minutes or more every half hour.⁵ Light activities include

- leg lifts or extensions
- overhead arm stretches
- desk chair swivels
- torso twists
- side lunges
- walking in place

Do aerobic exercise

Aerobic exercise is activity that makes your heart beat faster and makes you breathe harder. You should aim for doing aerobic exercise for 30 minutes a day most days of the week. You do not have to do all the activity at one time. You can split up these minutes into a few times throughout the day.

To get the most out of your activity, exercise at a moderate to vigorous level. Try

- walking briskly or hiking
- climbing stairs
- swimming or a water-aerobics class
- dancing
- riding a bicycle or a stationary bicycle
- taking an exercise class
- playing basketball, tennis, or other sports

Talk with your health care team about how to warm up and cool down before and after you exercise.

Do strength training to build muscle

Strength training is a light or moderate physical activity that builds muscle and helps keep your bones healthy. Strength training is important for both men and women. When you have more muscle and less body fat, you'll burn more calories. Burning more calories can help you lose and keep off extra weight.

You can do strength training with hand weights, elastic bands, or weight machines. Try to do strength training two to three times a week. Start with a light weight. Slowly increase the size of your weights as your muscles become stronger.





You can do strength training with hand weights, elastic bands, or weight machines.

Do stretching exercises

Stretching exercises are light or moderate physical activity. When you stretch, you increase your flexibility, lower your stress, and help prevent sore muscles.

You can choose from many types of stretching exercises. Yoga is a type of stretching that focuses on your breathing and helps you relax. Even if you have problems moving or balancing, certain types of yoga can help. For instance, chair yoga has stretches you can do when sitting in a chair or holding onto a chair while standing. Your health care team can suggest whether yoga is right for you.

References

- [1] American Diabetes Association. Foundations of care and comprehensive medical evaluation. *Diabetes Care*. 2016;39(suppl 1):S26 (Table 3.3).
- [2] National Institutes of Health, Office of Dietary Supplements. Dietary supplements: what you need to know. ods.od.nih.gov/HealthInformation/DS_WhatYouNeedToKnow.aspx NIH . Reviewed June 17, 2011. Accessed June 21, 2016.
- [3] U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. 2008 Physical Activity Guidelines for Americans summary. <https://health.gov/paguidelines/guidelines/summary.aspx> . Updated June 21, 2016. Accessed June 21, 2016.
- [4] Yardley JE, Sigal RJ. Exercise strategies for hypoglycemia prevention in individuals with type 1 diabetes. *Diabetes Spectrum*. 2015;28(1):32–38.
- [5] Colberg SR, Sigal RJ, Yardley JE, et al. Physical activity/exercise and diabetes: a position statement of the American Diabetes Association. *Diabetes Care*. 2016;39(11):2065–2079.

Preventing Diabetes Problems

Diabetes can lead to serious health problems such as heart disease, vision problems, nerve damage, and kidney disease. Learn more about preventing these diabetes problems and [managing your diabetes](#).

Heart Disease & Stroke

Diabetes can damage blood vessels and lead to heart disease and stroke. You can do a lot to prevent heart disease and stroke by managing your blood glucose, blood pressure, and cholesterol levels; and by not smoking.

Low Blood Glucose (Hypoglycemia)

Hypoglycemia occurs when your blood glucose drops too low. Certain diabetes medicines make low blood glucose more likely. You can prevent hypoglycemia by following your meal plan and balancing your physical activity, food, and medicines. Testing your blood glucose regularly can also help prevent hypoglycemia.

Nerve Damage (Diabetic Neuropathy)

Diabetic neuropathy is nerve damage that can result from diabetes. Different types of nerve damage affect different parts of your body. Managing your diabetes can help prevent nerve damage that affects your feet and limbs, and organs such as your heart.

Foot Problems

Diabetes can cause nerve damage and poor blood flow, which can lead to serious foot problems. Common foot problems, such as a callus, can lead to pain or an infection that makes it hard to walk. Get a foot checkup at each visit with your health care team.

Kidney Disease

Diabetic kidney disease, also called diabetic nephropathy, is kidney disease caused by diabetes. You can help protect your kidneys by managing your diabetes and meeting your blood pressure goals.

Eye Disease

Diabetes can damage your eyes and lead to low vision and blindness. The best way to prevent eye disease is to manage your blood glucose, blood pressure, and cholesterol; and to not smoke. Also, have a dilated eye exam at least once a year.

Gum Disease & Other Dental Problems

Diabetes can lead to problems in your mouth, such as infection, gum disease, or dry mouth. To help keep your mouth healthy, manage your blood glucose, brush your teeth twice a day, see your dentist at least once a year, and don't smoke.

Sexual & Urologic Problems

Having diabetes can increase your chance of having bladder problems and changes in sexual function. Following your diabetes management plan is important to help prevent or delay sexual

and urologic problems.


Cancer & Diabetes

Diabetes is linked to some types of [cancer](#) . Many risk factors for cancer and for diabetes are the same. Not smoking and getting recommended cancer screenings can help prevent cancer.


Dementia & Diabetes

High blood glucose increases the chance of developing [dementia](#) . Tell your doctor if you are forgetful because dementia can make it hard to manage your diabetes.

Depression & Diabetes

[Depression](#)  is common among people with a chronic, or long-term, illness such as diabetes. Depression can be treated so tell your doctor if you feel sad, hopeless, or anxious.

Sleep Apnea & Diabetes

People who have [sleep apnea](#) —when you stop breathing for short periods during sleep—are more likely to develop type 2 diabetes. Sleep apnea also can make diabetes worse. Treatment for sleep apnea can help.

December 2016

Share     


This content is provided as a service of the [National Institute of Diabetes and Digestive and Kidney Diseases](#) (NIDDK), part of the National Institutes of Health. The NIDDK translates and disseminates research findings through its clearinghouses and education programs to increase knowledge and understanding about health and disease among patients, health professionals, and the public. Content produced by the NIDDK is carefully reviewed by NIDDK scientists and other experts.

Contact Us

The National Institute of Diabetes and Digestive and Kidney Diseases
Health Information Center

 **Phone:** 1-800-860-8747

 **Email:** healthinfo@niddk.nih.gov

 **TTY:** 1-866-569-1162

 **Hours:** 8:30 a.m. to 5 p.m. eastern time, M-F