



Diabetes Education Program

Navigating Diabetes



PennState Health

Table Of Contents

Welcome	1
I Have Diabetes	2
Monitoring	5
A1C	11
Low Glucose (Hypoglycemia).....	12
High Glucose (Hyperglycemia).....	15
Sick Days	18
Healthy Eating	20
Being Active.....	36
Taking Medications	39
Using a Syringe or Insulin Pen	48
Insulin Pumps.....	52
Disposing of Supplies	53
Reducing Risks	54
Keeping on Track	58
Healthy Coping.....	59
Lifestyle	61
Traveling	63
My Rights at Work	64
Financial Assistance.....	65
My Diabetes Team.....	66
Glossary.....	67

Welcome

Hello! We are so glad you are reading the Navigating Diabetes handbook. Our diabetes care and education specialists have created this tool to help you understand and manage your diabetes. This handbook is based on Association of Diabetes Care and Education Specialists guidelines.

The following pages explain how someone is diagnosed with diabetes, what diabetes is and what tools are used to manage it.

As you learn more, write down any questions you have in the Notes section at the end of this handbook. Then, ask your provider to refer you to one of the diabetes care and education specialists in our accredited diabetes education program to help answer questions.

In addition, the diabetes care and education specialists will:

- Listen to your concerns
- Develop a diabetes management plan according to your lifestyle needs
- Improve your ability to manage your diabetes
- Improve your confidence by helping you to understand and use current treatment guidelines
- Instruct you on meal planning, exercise, medications, glucose monitoring, continuous glucose monitoring and insulin pumps

We look forward to working with you as you learn to manage your diabetes.

Team up with a diabetes care and education specialist who will:

- **Help you set your goals**
- **Empower you through education, encouragement and support to reach those goals**

“I am no longer afraid of storms for I am learning to sail my ship.”

– Louisa May Alcott

I Have Diabetes

Simple words to read. Have you said them out loud? Now that you have your diagnosis, you probably have a lot of questions. The good news is that you have come to the right place. We will help you answer those questions, so you will be well on your way to learning what it means to say, "I have diabetes."

What is diabetes?

When you eat food made of carbohydrates, your body breaks it down into sugar. This sugar is called glucose. Glucose travels through your bloodstream and throughout your body. In order for glucose to be used as energy, it needs to enter your cells, which are the engines of your body.

The pancreas, an organ located in the abdomen, makes a hormone called insulin. Insulin works like a key to unlock the doors of your cells. Once the doors open, glucose enters the cells to be used as energy, which lowers glucose levels in the blood.

Having diabetes means that your body has trouble controlling the amount of sugar in your blood. Medical professionals call this your "glucose," but you'll also see it called "blood sugar."

If you are told you have diabetes, it means your medical team found **too much** glucose in your blood. You are not getting the energy you need to feel your best. Learning how to help your body control glucose can help prevent the long-term health problems from diabetes.

What are the symptoms of diabetes?

Sometimes people do not feel any physical symptoms from diabetes. If that is the case, you might have been told you have diabetes following bloodwork at your doctor's office, or maybe you have noticed:

- Being thirsty/hungry
- Being tired/ cranky
- Having blurred eyesight
- Healing slower
- Dry skin
- Experiencing weight loss
- Urinating more frequently
- Having infections that do not go away
- Tingling or numbness in hands or feet

What are the common risk factors for diabetes?

- Family history – a parent, brother or sister who has diabetes
- Ethnicity – African American, Hispanic/Latino, Native American, Asian American or Pacific Islander
- Have had gestational diabetes
- Not active
- High blood pressure (greater than 130/80)
- Low HDL (less than 40)
- High triglycerides (greater than 150)
- Polycystic ovarian syndrome
- Cystic fibrosis
- Obesity and a BMI over 25

Is there a cure?

There is no cure for diabetes yet, but research to treat and cure diabetes is all around us. **People can and do live healthy and happy lives with diabetes.** While research continues, you can learn many ways to control your diabetes now and perhaps prevent future health problems.

How is diabetes diagnosed?

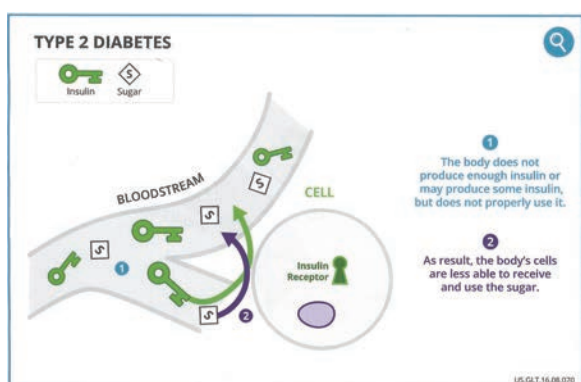
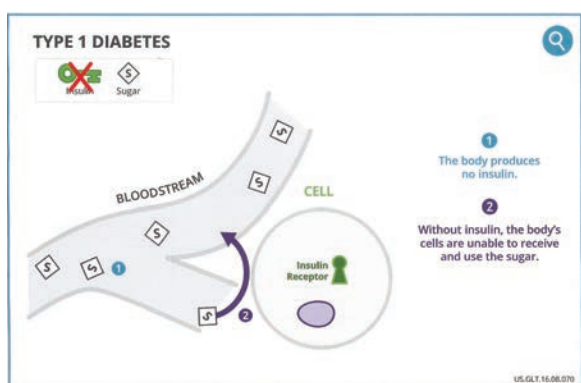
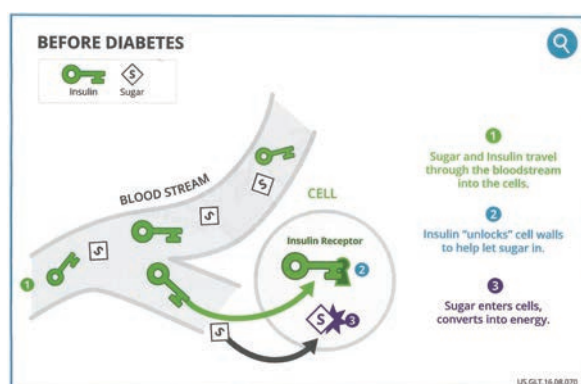
The following tests can diagnose diabetes. If any of these test results are abnormal, testing should be repeated on a different day to confirm the diagnosis.

BLOOD TEST	WITHOUT DIABETES	PREDIABETES	WITH DIABETES
Fasting glucose	Less than 100 mg/dL *	100-125 mg/dL	Two fasting glucose tests of 126 mg/dL or greater
Oral glucose tolerance test	Less than 140 mg/dL after 2 hrs.	140-199 mg/dL after 2 hrs.	200 mg/dL or greater after 2 hrs.
Random glucose	Less than 140 mg/dL	140-199 mg/dL	200 mg/dL or greater
Hemoglobin A1C	Less than 5.7%	5.7%-6.4%	6.5% or greater

*mg/dL = milligrams per deciliter

Is there more than one type of diabetes?

Yes, there is more than one type of diabetes.



Prediabetes is diagnosed when a person's glucose level is higher than normal, but not high enough to be called diabetes.

Type 1 diabetes occurs when your body attacks your insulin-producing cells. Without these cells, you cannot make insulin. Without insulin, your body is not able to use glucose in your blood. People with Type 1 diabetes need to inject insulin so they can live and stay healthy.

Type 2 diabetes occurs when your body has trouble using the insulin it makes (called insulin resistance) or when your pancreas cannot make enough insulin, and glucose remains in the bloodstream. People with Type 2 diabetes often control their diabetes with diet, exercise and medications. About 90% of Americans with diabetes have Type 2.

Gestational diabetes is caused by changes in hormones during pregnancy. It is usually diagnosed in the second or third trimester. This places women at a higher risk for developing Type 2 diabetes later in life.

Type 3C diabetes occurs when there is damage to the pancreas, which affects the ability to make insulin. All cases are different – some people can take oral medications only but some have to be on insulin. Type 3C can occur with acute or chronic pancreatitis, a removal of part of the pancreas, pancreatic cancer, too much iron in the body (hemochromatosis) or cystic fibrosis.

Latent autoimmune diabetes in adults (LADA), which is similar to Type 1 diabetes, but occurs as an adult. Insulin is needed to control glucose. LADA is sometimes also called Type 1.5.

Mature onset diabetes of the young (MODY), which is due to a gene mutation. There are different types of MODY, and treatment ranges from diet and exercise, to sulfonylureas, to insulin.

Cystic fibrosis-related diabetes (CFRD). Cystic fibrosis can affect the functioning of the pancreas and lead to diabetes.

Some medications, such as steroids, immunotherapy drugs and antipsychotic drugs, and some other disease processes, including pancreatitis and pancreatectomy, may increase the risk of diabetes. This type of diabetes is much less common.



What's next?

- Consider your thoughts, feelings and concerns as you read this handbook.
- Make a list of questions to ask your diabetes health care team. Make sure you know the names of your diabetes team members and how to contact them.
- Consider who you want to help you manage your diabetes.
- Remember to take it one day at a time and that we all may have a setback from time to time.
- Carry medical identification that tells others you have diabetes. If you were to pass out, this will identify your medical condition and may save your life. You can buy medical identification at most drug stores, find them online by searching for “medical identification” or even make one at home. At the very least, keep your information with your driver’s license/photo ID. It's also a good idea to add an emergency contact in your cellphone.

Online resources for medical identification items:

americanmedical-id.com
getmyid.com
laurenshope.com
medicalert.org
roadid.com

Monitoring

What if my glucose is not in control?

Your blood is thin, like water. Picture pouring 20 cups of sugar into the water. That is what happens when the glucose gets stuck in your bloodstream. The blood becomes thicker and grittier, like syrup. This thicker blood may cause damage to arteries, veins, nerves, eyes, kidneys and more. Too much or too little glucose can make you feel sick. To feel your best and prevent long-term health problems, it is important to keep your glucose in your target range.



How do I know my glucose?

You can check your glucose with a glucose meter, also called a glucometer. These are small devices that you can take with you no matter where you are. A continuous glucose monitor (CGM) is another option that's explained later in this section.



What increases glucose?

- Food
- Stress (emotional, physical, illness)
- Infection
- Not enough diabetes medication
- Side effects from other medications
- Changes in hormones (monthly period, pregnancy, sleep patterns)
- Injecting insulin into scar tissue or repeatedly injecting in the same spot

What decreases glucose?

- Activity/exercise
- Too much diabetes medication
- Alcohol
- Difficulty with digestion
- Skipping a meal
- Weight loss

Why should I check my glucose?

Managing your diabetes is important. Monitoring your glucose is an important tool used to:

- See how well your treatment plan is working
- Help you make decisions about your diabetes management
- Assess what affects your diabetes, such as:
 - Food
 - Activity/exercise
 - Sick days
 - Alcohol
 - Weight loss/gain
 - Medication
 - Stress
 - Changes in hormones (monthly period, pregnancy, sleep patterns)
 - Difficulty with digestion

Checking glucose at different times of the day is helpful to see how well controlled your diabetes is throughout the day. This will also help look for glucose patterns or trends. Ask your provider how often and at what time of day you should check your glucose. Everyone's plan will be based on their unique needs. Times to consider checking your glucose include:

- First thing in the morning before eating any food
- Before meals
- Before bed
- Two hours after eating a meal
- Before and after exercise
- Before driving
- When not feeling well, having symptoms of high or low glucose or when ill (cold, flu, etc.)

Always bring your glucose meter with you to all diabetes appointments, including when you see your doctor, physician assistant, nurse practitioner, diabetes care and education specialist or registered dietitian.

How do I choose a glucose meter?

There are many meters that you can use, but two ways to get one.

1. Your doctor can send in a prescription for a meter, test strips and lancets to your pharmacy. This will go through your insurance, and the brand of meter you get will depend on your insurance.
2. If you prefer to not go through your insurance, or would like a faster, potentially less expensive option, you may also purchase a meter (such as the Relion Premier meter), test strips and lancets over the counter. Before you buy one, talk to your diabetes care and education specialist about choosing a meter that is right for you and where they are sold.

Your diabetes care and education specialist will teach you how to use the meter, identify patterns and set personal goals. If you are unable to meet with your diabetes care and education specialist, questions to ask your provider are:

- How much will test supplies cost?
- Will my insurance pay for the test supplies?
- Do I need to get my supplies through a pharmacy or a durable medical equipment company?

How do I check my glucose?

Gather the following supplies: glucose meter, test strips, lancet, lancing device and glucose logbook.

- Wash your hands with soap and water, and dry with a clean towel.
- Load a new lancet into the lancing device.
- Place a test strip into the meter. Make sure the strips are not out of date, they are the correct strips for your meter and the meter is coded to match the strips, if applicable.
- Obtain your blood sample, and apply the blood on the test strip according to the manufacturer's instructions.
- Record your results in your glucose log.
- Dispose of the lancets according to your local and state medical waste guidelines.
- If you need more help, refer to your owner's manual or contact the meter's toll-free customer service number. This telephone number can usually be found on the back of the meter. A representative is typically available 24 hours a day, seven days a week.
- Checking your glucose at another location on your body, called alternate site testing, is an option when your glucose levels are steady, such as before a meal and two hours after a meal. Glucose levels are expected to change quickly in certain situations, so alternate site testing is not advised:
 - When glucose levels are rising quickly, such as within the two hours after a meal or when you are sick
 - When glucose levels are falling quickly, such as when insulin reaches its "peak" activity (rapid-, short- and intermediate-acting insulins only), after exercise and during a hypoglycemic (low glucose) event



What should my glucose be when I check it?

Glucose Goals

Before you eat	80-130 mg/dL
Two hours after you eat	Less than or equal to 180 mg/dL

Glucose Goals During Pregnancy

Before you eat	Less than or equal to 95 mg/dl
Two hours after you eat	Less than or equal to 120 mg/dL

These values are the 2023 American Diabetes Association (ADA) Standards of Care.

What is a glucose log?

A glucose log is a way to keep track of your glucose to see if you can find patterns. Examples of a glucose log include:

- Logbook – a small book that comes with your meter.
- Glucose log sheet – a single sheet of paper that can be faxed or mailed to your provider (see examples on the pages that follow).
- Downloaded logbook – a way of downloading your glucose results from your meter to your computer.
- Phone app logs – some meters link to phone apps that show you your numbers.



Whatever method you choose, it is important to **bring your glucose log and meter to every appointment** with a diabetes medical team member.

"You wouldn't go to the vet without your pet. Why go to a diabetes appointment without your meter?"

– Anonymous

Glucose and Insulin Log

Date	Morning			Lunchtime			Evening Meal			Bedtime			
	Time	Glucose	Insulin	Time	Glucose	Insulin	Time	Glucose	Insulin	Time	Glucose	Insulin	Comments

Date	Morning			Lunchtime			Evening Meal			Bedtime			
	Time	Glucose	Insulin	Time	Glucose	Insulin	Time	Glucose	Insulin	Time	Glucose	Insulin	Comments

Name: _____

Mail To: _____

My Phone Number: _____

My Diabetes Team Member: _____

Fax: _____

Glucose Log

Date	Morning		Lunchtime		Evening Meal		Two Hours After a Meal		Bedtime	
	Time	Glucose	Time	Glucose	Time	Glucose	Time	Glucose	Time	Glucose

Date	Morning		Lunchtime		Evening Meal		Two Hours After Last Meal		Bedtime	
	Time	Glucose	Time	Glucose	Time	Glucose	Time	Glucose	Time	Glucose

Name: _____

Mail To: _____

My Phone Number: _____

My Diabetes Team Member: _____

Fax: _____

Continuous glucose monitors

Continuous glucose monitors (CGMs) measure the glucose that is around our cells. These monitors use a small sensor that is inserted under the skin.

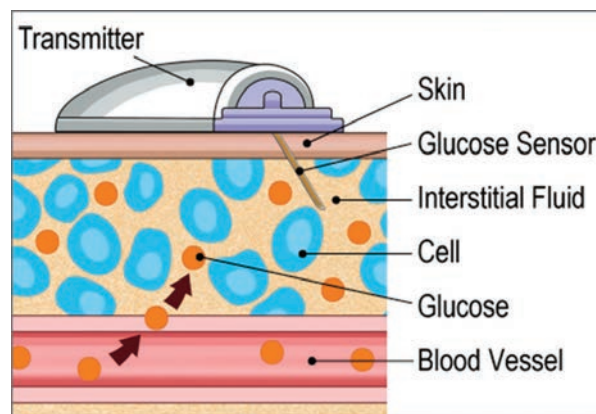
A CGM is helpful for looking at glucose trends, and some can be programmed to alarm at certain low and high levels. This can alert you to the speed and direction of your glucose so it can be treated before reaching extremes. Some CGMs are for personal, everyday use and some are for professional use.

Professional use allows your provider to assess your trends and patterns. A CGM is most appropriate for those who take multiple daily doses of insulin or use insulin pumps.

Not all insurance plans cover CGMs. Check with your insurance company to find out whether your plan covers a CGM.

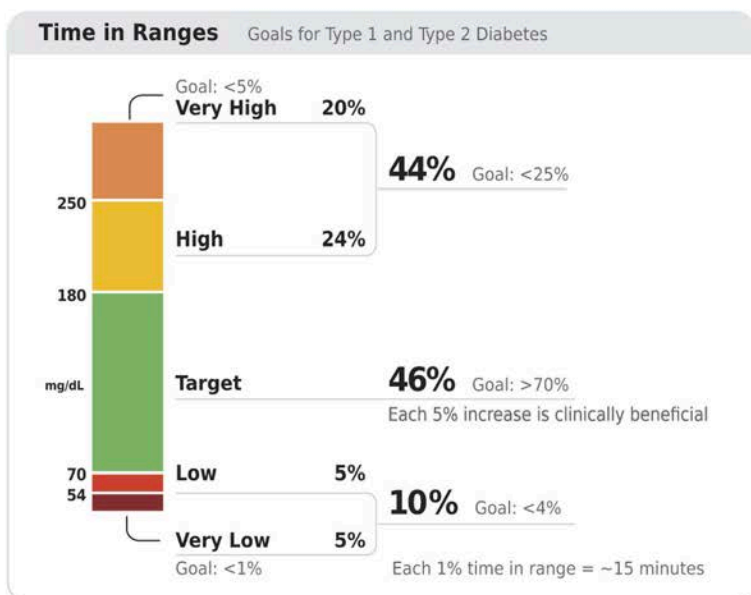
Ask your diabetes care and education specialist about available adhesive options to help your CGM adhere to your skin if you are having difficulties with it staying in place.

When you use a CGM, you and providers can see how much time in range (TIR) you have. The goal is between 70 and 180, with 70% or more TIR, or according to your provider recommendations.



A continuous glucose monitor consists of a transmitter adhered to the skin and a small sensor inserted under the skin. Some brands of CGM devices have a transmitter that separately attaches into the sensor, while others have a built-in sensor. The transmitter, whether inserted into the sensor or part of the sensor, transmits glucose data.

Below is an example of a patient's CGM report:



Test Patient DOB: Jan 1, 1970

14 Days: August 8–August 21, 2021

Time CGM Active: 100%

Glucose Metrics

Average Glucose **175 mg/dL**
Goal: <154 mg/dL

Glucose Management Indicator (GMI) **7.5%**
Goal: <7%

Glucose Variability **45.5%**
Defined as percent coefficient of variation
Goal: ≤36%

Source: diabetesjournals.org

You can find information about different brands of CGMs on their websites:

Dexcom: dexcom.com

Eversense: ascensiadiabetes.com/eversense

Abbott: abbott.com

Medtronic Guardian: medtronicdiabetes.com

A1C

What is an A1C?

An A1C (also known as glycohemoglobin) is a simple blood test ordered by your health care team to determine your average glucose for three months. The average is found by measuring how much glucose is attached to a red blood cell, and red blood cells live for three months. An A1C of 6 to 7% is great control. Goals are individualized to the person, however, and may be different depending on your risk factors. Check with your health care provider for your A1C goal because it is important to know.

Why is an A1C of 6 to 7% a goal for most people?

While there is no level below which the health risks disappear, keeping an A1C between 6 and 7% can reduce your chance of various risks, such as:

- Heart attack
- Kidney disease
- Sexual dysfunction
- Stroke
- Infections
- Dental disease
- Eye disease
- Nerve damage

Is there a way to roughly compare my glucose to my A1C?

If you know your A1C, you can use this formula to compare it to your glucose:

$$28.7 \times \text{A1C} - 46.7 = \text{your estimated average glucose over 3 months}$$

You do not need to convert the percentage to a decimal when you use the formula.

$$\text{For example, if your A1C is 6\%: } 28.7 \times 6 - 46.7 = 125.5$$

The chart below gives you an idea of where your A1C will be based on your home glucose checks.

If I can get an A1C, why should I check with my glucose meter daily?

While your A1C is important for knowing your long-term control, it does not tell you what factors affect your glucose or what time of day your glucose is not in target range. For example, an A1C of 7% is

A1C%	GLUCOSE AVERAGE (in mg/dL)
6%	126
7%	154
8%	183
9%	212
10%	240
11%	269
12%	298
13%	326
14%	355
15%	384

great if your glucose runs between 80 and 180 mg/dL. Your glucose can run between 40 and 500 mg/dL, however, and still average 7% on your A1C. This wider range of glucose is more likely to occur if your diabetes is uncontrolled or if you have taken too much or too little of your medicine. Logging your glucose trends and knowing your A1C are the best guides for you and your provider in your diabetes management. We can also test for a compound called fructosamine, which reflects your overall glucose level over the past two to three weeks, when it is not practical to wait two to three months for an A1C test, when information is needed sooner or for health conditions where the A1C level may not be accurate, such as in patients with anemia. Ask your health care provider if this test is appropriate for you.

Your A1C: _____

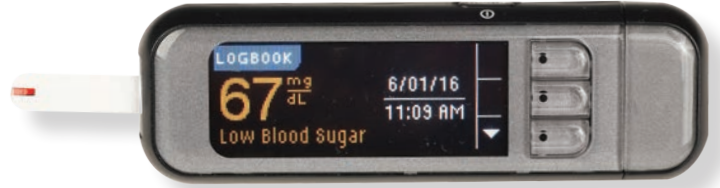
Your goal A1C: _____

LOW GLUCOSE (HYPOGLYCEMIA)

Glucose of less than 70 mg/dL on your glucose meter is called hypoglycemia. This means your body does not have the glucose it needs to work, just like a car running out of gas.

While it is rare, you can have a seizure, pass out or die from severe or untreated low glucose.

Knowing how to recognize when your glucose is too low and making a plan in advance is a great way to remain in control. Some medications have a greater chance of causing low glucose. Ask your provider or diabetes care and education specialist if your medication is one of these.



What can cause low glucose?

- Skipping and/or delaying a meal or snack
- Not eating at the right time if you take diabetes medication
- Exercising longer or harder than usual
- Taking too much diabetes medication
- Drinking alcohol

How will I feel if this happens?

Low glucose may not always feel the same. Sometimes you may not feel any symptoms, or you may feel any of the following symptoms:

- Hungry/sweaty
- Headache
- Weakness
- Dizzy/confused
- Fast heartbeat
- Cranky/irritable
- Anxious
- Clumsy/shaky
- Tingling feelings around the mouth/slurred speech
- Impaired vision

What can I do if I feel my glucose dropping?

1. Check your glucose, if you can.
2. If less than 70 mg/dL, follow the Rule of 15 (see next page).

Rule of 15

1. **Take 15 grams of a rapid-acting carbohydrate. Carbohydrates are foods that turn to sugar when you eat them. Rapid-acting carbohydrates are made of sugar and have little or no protein, fat or fiber.**

Examples of 15 grams of rapid-acting carbohydrates:

- 15 Skittles candies
- 8 ounces (1 cup) of skim (nonfat) milk
- 6 small Swedish fish
- 4 ounces (1/2 cup) of fruit juice (not diet)
- 4 ounces of regular (not diet) soda
- 4 teaspoons of table sugar (3 to 4 packets of sugar)
- 3 to 4 glucose tablets or hard candies
- 2 tablespoons of raisins
- 2 rolls of Smarties candies
- 1 tablespoon of honey or syrup (3 teaspoons = 1 tablespoon)
- 1 Fruit by the Foot roll

Note: Do not use chocolate or peanut butter. They are higher in fat and will not be able to raise your glucose as quickly.

2. Wait 15 minutes.
3. Recheck glucose. It should be above 70 mg/dL.
4. If glucose is not above 70 mg/dL, repeat all steps.
5. If glucose is not above 70 mg/dL after two treatments with a rapid-acting carbohydrate, call your doctor or 911.

Note: After your glucose returns to normal and if it will be more than 30 minutes until your next meal, eat a snack that contains protein and carbohydrates. Protein and carbohydrate examples are given in the Healthy Eating section of this handbook.

What if I don't have food within reach?

You should always have 15 grams of carbohydrates nearby. If food is not possible, **consider glucose tablets or glucose gels**. They do not require a prescription and can be bought at most stores. You can keep them anywhere – your coat pocket, purse, bedside table, workstation or the glove compartment in your car.

If you begin to feel bad, but can talk and swallow, have someone help you follow the Rule of 15.

Rule of 15

Eat or drink something with 15 grams of a rapid-acting carbohydrate (such as three to four glucose tablets or four ounces of juice), and recheck your glucose in 15 minutes; repeat if needed.

If you cannot talk or swallow, or if you have passed out, your family and friends should:

- NOT put food, candies, liquids or solid objects in your mouth. This could cause you to choke.
- Know how to use intranasal or injectable glucagon (see the next page for a picture of a kit). This is something your health care team can teach you and others to use. In case of an emergency, it helps your body raise glucose and release stored glucose into the blood.
- Call 911 in an emergency.

What is glucagon?

- Glucagon is a hormone made in the pancreas that raises glucose when levels drop too low. It helps your liver release stores of glucose.
- When you are not able to swallow a fast-acting carbohydrate, glucagon can be given by injection or inhaled (intranasally).
- Glucagon must be prescribed by a health care provider.
- A family member, friend or coworker needs to learn how to administer the glucagon and know where it is at all times.
- The glucagon kit is only used in an emergency.
- Store your kit at room temperature.
- Always check its expiration date.
- Teach others how to use it before you need it. Glucagon now comes in intranasal (Baqsimi) and liquid stable administration (Gvoke) forms.



How can I prevent low glucose?

- Do not skip meals.
- Only drink alcohol with food containing carbohydrates, and monitor glucose closely.
- Take medication as prescribed.
- Have a snack before exercising. (Refer to the Being Active section of this handbook.)
- Keep a glucose log to find patterns or trends and identify causes of your low glucose.
- Learn more about your diabetes management.
- Tell your diabetes team if you are having unexplained low glucose more than once a week.



MEDICAL EMERGENCY PLAN

You should have a medical emergency plan in place just in case you are not able to manage your low glucose. Your emergency plan should:

- Identify your support system
- Teach your support system the symptoms of low glucose and how they can help you treat it
- Teach your support system how to use glucagon
- **Include having foods or glucose tablets that contain 15 grams of carbohydrates available at all times or a glucagon kit if you have frequent low glucose**

CALL 911 IN A MEDICAL EMERGENCY.

When should I notify my health care team?

Notify your health care team if you:

- Are having more than one low glucose weekly
- Have a severe low glucose under 55
- Have a severe low glucose requiring assistance to treat or the use of glucagon

High Glucose (Hyperglycemia)

Too much glucose in your blood makes your blood thick and sticky. When this happens, it can damage the arteries in your body and make your heart pump harder than normal. Over time, uncontrolled glucose can lead to complications, such as heart attack, stroke, blindness, infections, amputations, kidney damage or nerve damage.

High glucose = glucose greater than target range:

- Greater than 130 mg/dL before a meal
- Greater than 180 mg/dL two hours after a meal

What can cause high glucose?

- Skipping medication or needing a change in dose
- Eating more food than usual
- Getting less exercise than usual
- Emotional stress
- Illness, including infections
- Changes in hormones (monthly period, pregnancy, sleep patterns)
- Medications, such as steroids
- Injecting insulin into scar tissue
- Repeated use of the same injection spot

What are some signs that my glucose is high?

- Blurred vision
- Increased urination
- Increased hunger
- Increased thirst
- Feeling tired
- Developing an infection
- Dry, itchy skin
- Slow-healing cut

What should I do if my glucose is high?

- Check your glucose more often.
- Drink plenty of water.
- Ask your provider if your medication needs to be adjusted.
- Call your provider right away if your glucose reading stays above 250 mg/dL for most of the day.
- Follow your sick day plan. Refer to the Sick Days section of this handbook for more information.
- People with Type 1 diabetes should check for ketones in their urine. Ketones are a type of acid produced by the liver and are checked with ketone test strips, which are dipsticks that can be bought over the counter. Moderate to high ketone levels in the urine are a sign of ketoacidosis.



At times, people may not feel any physical symptoms of diabetes.

What is ketoacidosis?

Ketoacidosis is a medical emergency and can be life-threatening. When your body does not have enough insulin, it cannot use the glucose in your blood for energy. Your body then finds other sources of energy and begins to break down fat and muscles. This sounds like a good thing, but it is not burning fat for energy the same way exercising does. It is using fat and muscles as emergency fuel. When this happens, a waste called ketones is created. Your body will try to get rid of ketones in your urine, but if they build up too quickly, you can develop ketoacidosis, or too many ketones in your bloodstream. This usually occurs only in people with Type 1 diabetes, but can also occur with Type 2. Being sick or having too little insulin can put you more at risk. If you are having symptoms of ketoacidosis, use ketone test strips to check your urine for ketones.

You can ask your provider to send a prescription for ketone test strips to your pharmacy or purchase ketone testing supplies over the counter at most pharmacies. The ketone test strips, just like your glucose test strips, do have an expiration date.

What are the warning signs of ketoacidosis?

- High glucose
- Abdominal pain and cramping, with or without vomiting
- Fruity, acidic breath
- Rapid, labored breathing
- Moderate to large urine ketone levels



What is hyperglycemic hyperosmolar syndrome?

Hyperglycemic hyperosmolar syndrome (HHS) is similar to ketoacidosis and usually occurs only in people with Type 2 diabetes. Unlike ketoacidosis, people with HHS generally have trace or no ketones present. Risk factors for HHS include persons over the age of 65, those with other chronic conditions like kidney disease or congestive heart failure and those who take medications such as steroids or water pills (diuretics).

What are the warning signs of HHS?

- Very high glucose, generally over 600
- Very thirsty
- Dry mouth
- Frequent urination
- Very tired
- Often confused or disoriented
- May have a fever

When should I notify my health care team?

Notify your health care team if you:

- Feel sick for more than one or two days and are not getting better
- Feel very sick or have a high fever for more than one day
- Cannot eat or drink
- Have vomiting or diarrhea for more than six hours
- Have glucose that stays above 250 mg/dL for 24 hours or if you have moderate to large ketone levels in your urine
- Have signs of dehydration – dry mouth, cracked lips, sunken eyes or weight loss
- Are developing signs of ketoacidosis – stomach pain, nausea, vomiting, changes in breath, chest pain or trouble staying awake

If you cannot reach your provider and suspect you are developing ketoacidosis, go to the nearest emergency department, or call 911.

Sick Days

When you are not feeling well because of illness, an injury, a wound or stress, we call it a sick day. Sick days can make your glucose change. Usually, glucose levels will rise as your body releases hormones to fight infections or as a response to stress. These hormones make it hard for your body to use insulin. The best time to think about your sick day plan is when you feel well. Planning ahead will help you manage your diabetes and get well faster.

What are factors that might affect my diabetes?

- Colds and flu
- Dental work or infections
- A wound, injury or surgery
- Vomiting and diarrhea
- Severe pain or emotional stress

How often should I check my glucose when I am sick?

Check your glucose every two to four hours until you are feeling better or as instructed by your provider.

What if I am not hungry?

Try to choose foods from your meal plan that provide at least 15 grams of carbohydrates each hour. Here are some examples:

- Fruit juice bar (3 ounces)
- Cooked cereal (1/2 cup)
- Soup (1 cup)
- Applesauce (1/2 cup)
- Regular Jell-O (1/2 cup)
- Toast (1 slice)
- Rice (1/3 cup)



What if I cannot eat?

Extra fluids can prevent dehydration (8 to 12 cups per day or 8 to 12 ounces per hour).

If your glucose runs high, try sugar-free liquids:

- Water
- Sugar-free ginger ale
- Sugar-free Jell-O
- Tea
- Broth (chicken, beef or vegetable)

If your glucose runs low, try liquids with about 15 grams of carbohydrates:

- Non-diet beverages (1/2 cup)
- Popsicle
- Milk (1 cup)
- Regular Jell-O (1/2 cup)
- Juice (1/2 cup)

Do not skip medication. You may be eating less, but you still need your medications to balance out the hormones that are helping you fight the illness.

Rest. Do not exercise.

Be aware of the effects of certain types of medications on your glucose. Over-the-counter medications, such as supplements, lozenges and cough syrups, can raise your glucose. However, aspirin at high doses can lower it. Check with the pharmacist before taking any extra medications. Prescribed steroid pills or steroid injections can raise your glucose as well.

When should I contact my health care team?

Contact your health care team if you:

- Feel sick for more than one or two days and are not getting better.
- Feel very sick or have a high fever for more than one day.
- Cannot eat or drink.
- Have vomiting or diarrhea for more than six hours.
- Have a glucose level below 70 mg/dL and difficulty eating.
- Have a glucose level above 250 mg/dL consistently.
- Have signs of dehydration (dry mouth, cracked lips, sunken eyes or weight loss).
- Have moderate or large ketone levels in your urine.
- Develop signs of ketoacidosis, such as stomach pain, nausea, vomiting, changes in breath, chest pain or trouble staying awake. Refer to the High Glucose section of this handbook for information on ketoacidosis.

Healthy Eating

What foods are recommended for people with diabetes?

Navigating your diet with diabetes can be difficult. This section includes some nutritional guidance until you have a chance to meet with a **registered dietitian**. Eating healthy foods in the right portions helps to control glucose, blood pressure and cholesterol. **Carbohydrates** (foods that turn to sugar when you eat them) have the most effect on your glucose.

Before we talk about carbohydrates, let's talk about some basic guidelines to help you manage your diabetes with diet.

Healthy eating guidelines

- First, enjoy the foods you eat.
- Try not to skip meals.
- Try to keep a schedule with meals and snacks.
- Eat a variety of foods from all food groups.
- Eat whole grains, fruits and non-starchy vegetables (high-fiber foods).
- Watch portions – the first bite is the best.

Carbohydrates, fat and protein are the main nutrients in foods. **Carbohydrates** are in many foods, such as starches, starchy vegetables, fruits, milk and yogurt, desserts and sugar-sweetened drinks.







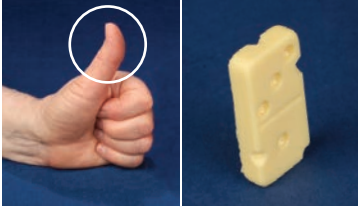
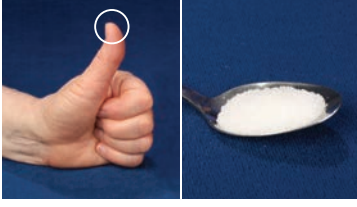
Here is a guide to help you learn which foods contain carbohydrates (carbs) and examples of serving sizes.

FOOD GROUP	EXAMPLE OF A SERVING/CHOICE	TRADE FOR A SERVING OF...	
Starches* (one serving = 15 g carbs)	1 slice of bread	1/4 potato 3/4 cup dry cereal flakes 1/2 cup cooked cereal 1 (6-inch) tortilla	1/2 cup cooked peas/ corn/or lima beans 1/3 cup rice or pasta
Non-starchy Vegetables (one serving = 5 g carbs)	1 cup raw or 1/2 cup cooked carrots	1/2 cup cooked green beans/broccoli/ or cauliflower	1 cup salad or other fresh vegetables 1/2 cup vegetable juice
Fruits* (one serving =15 g carbs)	1 small apple	2 tablespoons dried fruits (such as raisins, cherries) small orange	1/2 cup canned light fruit 1 1/4 cups whole strawberries 1/2 cup 100% fruit juice
Milk*(one serving = 12 g carbs, 8 g protein)	1 cup fat-free or 1% milk	1 cup fat-free, light yogurt	1 cup low-fat yogurt
Meat & Meat Substitutes (measured in ounces – 0 carbs unless beans or substitute) (1 oz. serving)	1 oz. of cooked meat	1 oz. cooked chicken 1 oz. cooked fish 1 slice (1 oz.) turkey 1 egg	1 slice (1 oz.) low-fat cheese
Fats (one serving = 5 g fat)	1 teaspoon of oil	1 strip of bacon 1 tablespoon regular salad dressing	2 tablespoons reduced- fat salad dressing, etc. 2 tablespoons peanut butter, etc.
Sweets* (one serving = 15 g carbs)	1 tablespoon of maple syrup	1 (3") cookie 1 plain doughnut	1/2 cup light ice cream

*These food groups contain the most carbohydrates (g = grams).



Hand guide to portion sizes

HAND SYMBOL	EQUALS	EXAMPLES
	fist 1 cup	rice pasta fruits vegetables
	palm 3 oz.	beef fish poultry
	handful 1 oz.	nuts raisins
	2 handfuls 1 oz.	chips popcorn pretzels
	thumb 1 oz.	peanut butter hard cheese
	thumb tip 1 tsp.	cooking oil butter mayonnaise sugar

You can maintain your glucose when you follow a meal plan that contains a set amount of carbohydrates spread throughout each day. The following are general guidelines for you to begin planning meals that manage glucose. If you have not seen a dietitian, you can use these general guidelines until you make an appointment. If you have had an appointment with a dietitian, use the personalized guidelines from that visit.

Guide for the suggested amount of carbs you should eat at meals*

IF YOU ARE...	AMOUNT PER MEAL
Male and not overweight	60-75 g or 4-5 carb choices/servings
Female and not overweight	45-60 g or 3-4 carb choices/servings
Overweight (more than 10 lbs.)	Subtract 15 g or 1 carb choice per meal
Any of the above and are exercising (aerobic)	Add 15 g or 1 carb choice to meal before exercise

* 15-30 g with snacks between meals

Each food choice of 15 grams (g) total carbohydrate = 1 carb choice/serving



This is a sample meal plan to get started.

Schedule an appointment with a registered dietitian for a personalized meal plan by asking your provider to place a referral for you.

BREAKFAST 60 g OR 4 CHOICES	LUNCH 45 g OR 3 CHOICES	DINNER 45 g OR 3 CHOICES
1/2 cup oatmeal = 1 1/2 English muffin = 1 2 eggs = 1 1 tbsp. soft margarine = 0 1 small banana (3-4") = 1 8 oz. or 1 cup 1% or nonfat milk = 1	Sandwich: 2 slices whole wheat bread = 2 2 oz. low-fat turkey breast = 0 Lettuce, tomato, onion = 0 1 tbsp. lite mayo = 0 1 cup fresh vegetables = 0 1 small fresh fruit = 1 8 oz. unsweetened iced tea = 0	3 oz. grilled chicken breast = 0 1/2 cup mashed potatoes = 1 1 tbsp. low-fat margarine = 0 1/2 cup steamed broccoli = 0 1 cup tossed salad = 0 2 tbsp. low-fat dressing = 0 6 oz. fat-free yogurt = 1 1 1/4 cups cubed watermelon = 1

What about snacks?

If you choose to have a snack, here are some things to consider: What is your glucose? Are you trying to lose weight? Are you really hungry?

1 CARBOHYDRATE CHOICE OR 15 g CARB	NONCARBOHYDRATE CHOICE (PROTEIN) EACH SERVING ADDS ABOUT 100 CALORIES
1/2 cup cooked, unsweetened oatmeal 3/4 cup unsweetened, ready-to-eat cereal 8 animal crackers Three 2 1/2-inch squares of graham crackers 3 cups low-fat popcorn 3/4 oz. pretzels (2-3 average) Two 4" rice cakes 6 saltines 3/4 oz. (15-20 average) fat-free or baked snack chips 1 low-fat snack bar (check label) 100 calorie snack packs (check label) 1 small fresh fruit (apple, pear, orange, etc.) 1/2 cup canned fruit in light syrup or own juice 8 dried apricot halves 3/4 cup blueberries 12 cherries, fresh 1 1/4 cup whole strawberries 1 cup nonfat or 1% milk 2/3 cup low-fat, artificially sweetened fruit or plain yogurt	25 pistachios 8 walnut or pecan halves 12 almonds or cashews 20 peanuts (unsalted) 1/2 tbsp. peanut butter 1 oz. part-skim mozzarella cheese 2 oz. chicken or turkey breast 2 oz. baked flounder, haddock or crab 2 oz. low-fat/low-sodium luncheon meat, 98% fat-free 1/2 cup fat-free or low-fat cottage cheese 3 oz. canned light tuna in water (look for low sodium)

Low carbohydrates (relatively few calories)

Low-carbohydrate vegetables (non-starchy): 1 cup raw or 1/2 cup cooked celery, carrots, cauliflowers, peppers, cucumbers, radishes, broccoli or tomatoes; 1/2 cup sugar-free gelatin with 1 tbsp. of light whipped topping; sugar-free popsicles (check label, less than 25 calories); 1/4 cup salsa



How to read food labels

What you should know about Nutrition Facts

We've seen the same Nutrition Facts label on foods since 1994, with only a few minor tweaks over time. The U.S. Food and Drug Administration made major changes to the label, and food manufacturers have updated their labels.

The goal of the updated label is to help people make better-informed decisions about the foods they eat.

Here's a closer look at the changes:

1. More prominent serving sizes, with bigger, bolder type

Serving sizes are updated to better reflect the amounts people actually eat. For example, an odd-sized package that is between one and two servings, such as a 15-ounce soup can, will be labeled as one serving since that's how people typically eat it.

2. Calories in larger type

The number of calories will be easier to read. Remember, the calorie amount applies to one serving, which in many cases is not the whole package.

3. Updated Daily Value

Because recommendations for some nutrients have changed over the years, it was time to update some of the Daily Values, which are used by manufacturers to calculate the % Daily Value (DV) numbers that appear on the label.

4. Added sugars specified

You will now know how much of the sugar is added by the manufacturer versus how much is there naturally. Keep in mind that added sugars add calories, but no vitamins, minerals or other valuable nutrients, to your diet.

5. Different vitamins and minerals required

Vitamins A and C are no longer required on the label, since deficiencies of these vitamins are uncommon in Americans. Vitamin D and potassium must now be included (in addition to calcium and iron, as previously required) because Americans often fall short on these nutrients. In addition to the % DV, actual amounts are now listed for these nutrients.

6. New footnote

The note at the bottom has been simplified, but it still explains that the % DV is based on eating 2,000 calories a day. If you require a smaller or larger number of calories per day, then you will need to adjust the percentages to fit your needs.

Nutrition Facts	
8 servings per container	
Serving size	2/3 cup (55g)
Amount per serving	
Calories	230
% Daily Value*	
Total Fat 8g	10%
Saturated Fat 1g	5%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 160mg	7%
Total Carbohydrate 37g	13%
Dietary Fiber 4g	14%
Total Sugars 12g	
Includes 10g Added Sugars	20%
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Additional food label guidelines

- Look at the serving size. Remember, one serving of total carbohydrates equals 15 grams of carbohydrate or one carb choice.
- Use **Total Carbohydrate** for the carbohydrate serving (37 grams carb = 2 1/2 carb servings).

This guide will help you:

GRAMS	CARB CHOICES/SERVINGS
0-5	do not count
6-10	1/2
11-20	1
21-25	1 1/2
26-35	2
36-40	2 1/2

- Low fat is 3 grams per serving or per 100 calories. Avoid foods with trans fats and saturated fats.
- Find foods with 2 to 3 grams/serving of dietary fiber or more (the food label on the previous page has 4 grams – good!).
- Low sodium is 140 milligrams or less; find foods with at least 300 milligrams or less per serving. Aim for 2300 milligrams or less total sodium per day.
- Seven grams of protein is equal to 1 ounce of protein.

Food list

Foods can vary, depending on brand. To look up specific brands, go to calorieking.com.

Carbohydrates: Starches

FOOD	CARBOHYDRATES (in grams)	CALORIES
Bagel (4 oz.)	60	312
Bread (1 oz.)	15	80
Bread, whole wheat (1 slice)	16	90
Bun – hamburger, hot dog (1.5 oz.)	21	117
Cereal - Raisin Bran (1 cup)	46	190
Rice Krispies (1 cup)	25	112
Corn Flakes (1 cup)	25	112
Frosted Mini Wheats (1 cup)	47	200
Corn muffin (1 small – 2.3 oz.)	34	201
Doughnut (2 oz. glazed)	27	242
Graham crackers (three – 2.5" squares)	16	89
Pancake (4")	14	86
Pasta (1 cup – macaroni 4.9 oz.)	43	221
Pita (1 oz. – 4" diameter)	16	77
Popcorn (3 cups – air popped)	19	93
Pretzel (1 oz.)	22	108
Rice – white, brown, wild (1 cup)	45	216
Waffles (1 oz.)	9	82

Carbohydrates: Starchy vegetables

FOOD	CARBOHYDRATES (in grams)	CALORIES
Baked beans (1 cup)	55	392
Beans, cooked		
Black (1 cup)	41	227
Lima (1/2 cup)	21	115
Corn		
On the cob (1 ear)	30	59
Canned (1 cup)	31	143
Peas, green, frozen, cooked (1 cup)	26	125
Potatoes		
Baked (3 oz.)	18	79
French fried (3 oz.)	31	267
Mashed (1/2 cup, whole milk and margarine)	18	119
Sweet potatoes (3.5 oz. or 1/2 cup cooked)	21	60

Carbohydrates: Ice cream, milk and yogurt

FOOD	CARBOHYDRATES (in grams)	CALORIES
Ice cream – Vanilla (1 cup)		
Regular	31	273
Light	39	251
Milk		
2%	12	122
1%	12	105
Nonfat	12	91
Whole	12	146
Yogurt (varies by brand)		
Plain, low-fat (1 cup)	17	154
Fruit on the bottom (1 cup)	47	250

Carbohydrates: Fruit

FOOD	CARBOHYDRATES (in grams)	CALORIES
Apple, unpeeled, small		
5 oz.	22	90
4 oz.	18	72
Dried Apricots (3 halves)	7	25
Banana (1 medium, 3 oz.)	21	90
Blueberries (1 cup)	21	84
Cantaloupe (1 cup)	14	53
Grapefruit (1/2 medium)	10	40
Grapes (1 cup)	27	104
Orange (1 cup sections)	21	85
Peach (1 medium, 5.5 oz.)	15	58
Pear (1 medium, 7 oz.)	28	103
Pineapple (1 cup)	22	82
Plum (2 oz.)	6.5	26
Raisins (2 tbsp.)	16	62
Strawberries, whole (1 cup)	11	45
Watermelon, diced (1 cup)	12	50

Non-carbohydrates: Non-starchy vegetables

FOOD	CARBOHYDRATES (in grams)	CALORIES
Artichoke hearts (4 oz.)	14	60
Asparagus (1 cup)	7	40
Beans, green, wax, Italian (1 cup)	10	44
Beets, sliced (1 cup)	12	53
Beets, pickled, sliced (1/2 cup)	18	74
Broccoli, boiled, chopped (1 cup)	11	55
Brussels sprouts (1 cup)	11	56
Cabbage (1 cup)	7	34
Carrots, cooked (1 cup)	13	55
Carrots, raw (2 oz.)	5	23
Cauliflower, cooked (1 cup)	5	28
Celery (1 stalk)	1	6
Cucumber, slices (1 cup)	4	16
Eggplant, cooked (1 cup)	9	35
Lettuce, raw (1 cup)	2	8
Mushroom, raw (3.4 oz.)	3	21
Onions, chopped (1/2 cup)	8	34
Peppers, sliced (1 cup)	4	18
Spinach (1 cup)	7	42
Tomatoes, canned (1 cup)	10	41

Non-carbohydrates: Meat/protein

FOOD	CARBOHYDRATES (in grams)	CALORIES
Beef (3 oz.)	0	138
Ground beef, 80% lean	0	231
Chicken		
Fried, drumstick (3 oz.)	2	208
Roasted, breast (3 oz.)	0	140
Ham, lean, honey baked (3 oz.)	0	91
Lamb shank (3 oz.)	0	153
Pork chop, lean (3 oz.)	0	185
Turkey, breast, no skin (4 oz.)	0	152
Veal cutlet, lean (4 oz.)	0	190
Eggs, whole (1)	0	75
Eggs, white only (1)	0	17
Cheese		
American (1 oz.)	2.4	94
Cheddar (1 oz.)	0	114
Cottage cheese, 2% (1 cup)	8	203
Cream cheese (1 tbsp.)	0	51
Bass (3 oz.)	0	105
Bluefish (3 oz.)	0	135
Clams, cooked (3 oz.)	4	126
Crabmeat (4 oz.)	1	125
Fish sticks, breaded (4 oz.)	23	260
Flounder (4 oz.)	0	132
Haddock (4 oz.)	0	127
Haddock, breaded (4 oz.)	20	260
Lobster (3 oz.)	1	83
Oysters, raw (3 oz.)	5	50
Salmon, canned, drained (3 oz.)	1	116
Salmon, fresh, cooked (3 oz.)	0	175
Scallops (3 oz.)	0	95
Scallops, breaded, fried	9	183
Shrimp, steamed (3 oz.)	1	84
Shrimp, breaded (3 oz.)	10	206
Trout (3 oz.)	0	161
Tuna, canned in oil (3 oz.)	0	169
Tuna, canned in water (3 oz.)	0	99

Non-carbohydrates: Fats

FOOD	CARBOHYDRATES (in grams)	CALORIES
Avocado (3 oz.)	7	136
Bacon (2 slices)	0	92
Butter (1 tbsp.)	0	102
Cream		
Light (1 tbsp.)	0	29
Heavy (1 tbsp.)	0	52
Mayonnaise (1 tbsp.)	0	90
Nuts		
Almonds (1/4 cup)	7	206
Cashews, dry roasted (1/4 cup)	11	196
Peanuts (1/4 cup)	8	213
Pecans (1/4 cup)	3	177
Walnuts, halves (1/4 cup)	4	164
Olives, green, whole (4)	0	18
Peanut butter (1 tbsp.)	3	95
Sour cream (1 tbsp.)	0	26
Salad dressings		
Blue cheese (1 tbsp.)	1	71
Italian (1 tbsp.)	2	43

Miscellaneous

FOOD	CARBOHYDRATES (in grams)	CALORIES
Barbecue sauce (1 tbsp.)	7	30
Coconut, sweetened, flaked (1/2 cup)	16	170
Ketchup (1 tbsp.)	4	16
Pickles (1 oz.)	1	3
Pickles, bread and butter (1 oz.)	6	26
Tomato sauce (1/2 cup)	8	45

Combination foods

FOOD	CARBOHYDRATES (in grams)	CALORIES
Beef potpie (7 oz.)	44	436
Cole slaw		
Chick-fil-A (1 order)	17	310
Cracker Barrel (1/2 cup)	14	250
Macaroni & cheese (1 cup)	37	330
Pizza, cheese (1 slice, 1/8 of a 14" diameter)	34	272
Spaghetti and meat sauce (1 cup)	40	332
Taco (1)	16	170

Dessert

FOOD	CARBOHYDRATES (in grams)	CALORIES
Apple pie (1/8 of a slice)	58	410
Brownie (1-2" square)	12	112
Cake		
Angel food (1 oz.)	16	73
Carrot cake with cream cheese icing (1/6 of a slice)	37	300
Cheesecake (1/12 of a slice)	20	257
Cupcake with icing	35	240
Gingerbread (1/9 of a square)	36	263
Pound cake (1 oz.)	14	110
Candy		
Bar (1 oz.)	17	152
Caramels (1 – 0.4 oz.)	8	39
Fudge (1 oz.)	22	116
Hard (1 piece)	3	12
Cookies, oatmeal (2.5")	12	18
Egg custard (1/2 cup)	16	148
Gelatin		
Regular (1/2 cup)	19	80
Sugar-free (1/2 cup)	0	10
Honey (1 tbsp.)	17	64
Jam (1 tbsp.)	14	56
Jellies (1 tbsp.)	14	56
Marshmallows (1 oz.)	23	90
Molasses (1 tbsp.)	15	58
Pie, fruit (1/8 of pie)	59	370
Popsicle (3.6 oz.)	21	90
Pudding		
Regular	23	110
Sugar-free (1/2 cup)	3	60
Sherbet (1 cup)	45	213
Syrup, maple (1 tbsp.)	13	52

Beverages

FOOD	CARBOHYDRATES (in grams)	CALORIES
Beer		
Regular (12 oz.)	13	153
Light (12 oz.)	6	103
Cola (12 oz.)	34	131
Diet soft drink (12 oz.)	0	1
Water	0	0
Wine		
Red (4 oz.)	3	100
White (4 oz.)	4	96



This information will help you begin the journey to better diabetes control. **Don't forget to make an appointment with a registered dietitian to answer your questions and teach you more about diabetes nutrition.**

Nutrition Resources and Apps

diabetes.org/nutrition The American Diabetes Association has the American Diabetic Exchange list at diabetesed.net/page/_files/THE-DIABETIC-EXCHANGE-LIST.pdf

eatright.org The Academy of Nutrition and Dietetics has research-based nutrition information

diabetesfoodhub.org Recipes, menu planning, cooking classes

eatingwell.com Menus, recipes

choosemyplate.gov Menus, recipes, and record-keeping

niddk.nih.gov National Institute of Diabetes and Digestive and Kidney Diseases

calorieking.com Free search engine for all types of foods

myfitnesspal.com Track food intake and activities

May I drink alcohol?

You may, but there are a few things to keep in mind if you are of legal age and decide to drink alcohol. Many drinks with alcohol also have carbohydrates, so those drinks can affect your glucose. Plus, your liver breaks down alcohol and helps make glucose if you do not have enough. If you have low glucose after you drink alcohol, the liver might be too busy breaking down the alcohol to help raise your glucose.

Finally, sometimes those who have low glucose may seem like they are drunk. They may act confused or have slurred speech. They might have trouble answering questions or pass out. Family and friends may decide to let them “sleep off the alcohol” instead of helping them treat the low glucose. This can quickly become life-threatening.

What are some guidelines if I choose to drink alcohol?

- If your diabetes is well controlled, you may include one to two servings of alcohol per day. One serving is equal to 5 ounces of wine, a 12-ounce light beer or 1.5 ounces of 80-proof distilled spirits.
- Drink alcohol close to or with a meal. It may cause low glucose on an empty stomach.
- Use sugar-free drink mixers, such as club soda, unsweetened fruit juices or vegetable juice mixers.
- Drink low-sugar alcohols like light beer or dry wine. Avoid liqueurs, sweet wines, wine coolers or lagers.
- Discuss the use of alcohol with your health care team first. Alcohol can be dangerous for a number of health conditions or when mixed with medications.
- Avoid alcohol if you are on a weight loss diet. It makes you hungry and takes the place of calories that provide nutrients in your diet.
- Make sure you wear medical identification in case of emergency.
- Your risk of having low glucose can continue for 24 hours after drinking alcohol.
- Never drink and drive.
- Hung over? Throwing up? Not eating? If you have concerns, call your diabetes team or seek medical attention.

Advanced Food Record Sample

It is important to keep a daily food record so you can keep track of your carbohydrate intake to see what foods affect your glucose. This sample is followed by a blank form for your use.

BREAKFAST			LUNCH			DINNER		
Food	Amt.	Carbs (g)	Food	Amt.	Carbs (g)	Food	Amt.	Carbs (g)
Toast	2 slices	34 [√]	Sub roll	3 oz.*	45 [√]	Roast beef (lean)	3 oz.*	0
Margarine	1 tsp.	0	Turkey	2 oz.*	0	Baked potato	6 oz.*	45
Yogurt	6 oz.	16 [√]	2% cheese	1 oz.*	0	Steamed broccoli	1 cup	0
Strawberries	4 oz.*	8	Lettuce, tomato, onion		0	Dinner roll	1 oz.*	15 [√]
			Mayo	1 tbsp.	0			
			Banana	3 oz.*	21			
Total		58	Total		66	Total		60
MORNING SNACK			AFTERNOON SNACK			EVENING SNACK		
Food	Amt.	Carbs (g)	Food	Amt.	Carbs (g)	Food	Amt.	Carbs (g)
Diet soda		0	Celery and carrots	1 cup	0	Popcorn (low-fat)	3 cups	15 [√]

* Food weighed [√] Label checked

DATE/TIME	1/10/2024	8 a.m.	Noon	3 a.m.	5 p.m.	6 p.m.	11 p.m.	COMMENTS
GLUCOSE		120	163	105	50	150	90	
INSULIN — BASAL							24 units	
CARBOHYDRATES TOTAL		58	66			60	15	
INSULIN — BOLUS		6 units	6 units			6 units		
INSULIN — CORRECTION			1 unit					
EXERCISE					30 minutes			treadmill
LOW-SUGAR TREATMENT					15			1/2 cup juice
KETONES								

Carbohydrates should be listed by grams (g).

Being Active

What about exercise?

EXERCISE IS ANY ACTIVITY THAT GETS YOUR BODY MOVING. Regular activity is a key part of managing diabetes. When you are active, your cells become more sensitive to insulin, and the insulin can work more effectively. Exercising consistently can lower your glucose and improve your A1C. Overall, this may help reduce diabetes medications or doses, improve cardiovascular health and improve blood circulation and healing. Research has shown that sitting too much is harmful to your health. Take every opportunity to get up and move every 30 minutes.

There are three types of exercises:

1. **AEROBIC** strengthens your heart and lungs. (Examples: walking, swimming, biking, dancing, water aerobics)
2. **STRENGTH TRAINING** strengthens your muscles and maintains bone density. (Examples: lifting free weights or using machines, resistance bands, situps/pushups)
3. **STRETCHING** helps prevent injury and improves flexibility. It is recommended before and after an exercise routine. (Examples: yoga, Pilates)

The American Diabetes Association recommends 150 minutes of moderate intensity aerobic activity per week. An easy way to structure an exercise routine is to break it into 30 minutes per day, five days per week. Muscle-strengthening activities that involve all muscle groups are recommended two or more days per week. For older adults, balance and flexibility exercises are important and recommended.

In addition to lowering your glucose and A1C, exercise has many other health benefits:

- Lowers your blood pressure and cholesterol
- Reduces your risk for heart disease and stroke
- Helps you maintain or lose weight
- Helps you sleep better
- Relieves stress and reduces symptoms of depression
- Strengthens your muscles and bones
- Improves mood



What should I consider when starting an exercise program?

- Always check with your doctor before beginning an exercise program. Autonomic or peripheral neuropathy can increase risks for injury during exercise. (Neuropathy is explained in the Reducing Risks section of this handbook.)
- Glucose monitoring will be important to help you determine your body's glucose response to different activities. Always have your meter and supplies available.
- If you have neuropathy, check your feet before and after your exercise routine.
- Make sure your shoes and socks fit properly to prevent a foot injury.
- If you have a foot injury, try upper body exercises or chair exercises to allow your foot to heal.
- If you have eye problems, avoid vigorous exercise that may increase eye pressure. Ask your eye doctor how you can exercise safely.
- Wear medical identification.
- Wear a helmet if biking.
- Always have plenty of water available to drink before, during and after exercise.
- Take your phone if exercising alone and tell a family member or friend where you will be.
- Always have glucose tablets or rapid-acting carbohydrates available to treat low glucose.

How should I design my exercise program?

- Choose the exercise you like. Walking is considered an excellent activity for most people with diabetes.
- If you are unable to walk, have balance issues or other medical issues that prevent you from standing for too long, consider upper body exercises seated in a chair.
- Consider what motivates you. Does music energize you? Or, does wearing a step counter or fitness watch or logging your time and distance encourage you?
- If you have not been active recently, you can begin with five or 10 minutes of activity per day. Increase your activity sessions by a few minutes each week. Over time, your fitness will improve.
- Seek out friends or neighbors to join you, or take a fitness class to help you stay motivated. Include your children, and turn exercise into family time.
- Your glucose will need to be monitored before, during and after your exercise routine, so determine how you will carry your glucose meter and a treatment for low glucose.



How can I manage my glucose during exercise?

- Planning ahead and knowing your body's typical glucose response to exercise can help you keep your glucose from going too low or too high. If you are having frequent lows with exercise, talk to your provider for advice.
- To learn how different types of activity affect you, frequently check your glucose before, during and after an exercise session. Record these readings.
- Keep records of your exercise routine, foods eaten and medications taken, as well as your glucose response.
- Consider any changes you have made to your insulin dosing or diabetes medications.
- It is very important to show all of the records and logs you keep to your provider for expert advice on managing your medication or insulin.

Remember, your glucose response during and after exercise will depend on:

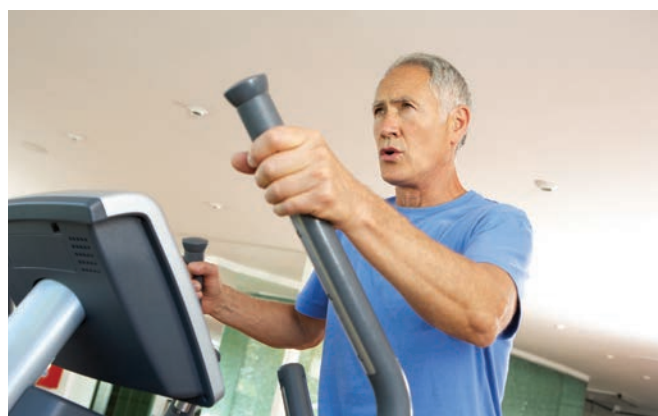
- Your glucose before exercise
- The active insulin or other diabetes medications in your body
- The type and amount of foods you ate before and during your exercise
- The intensity and duration of your activity

Based on your exercise plan and glucose, a carbohydrate snack may be recommended. The following table shows general guidelines for grams of carbohydrates needed to maintain glucose during exercise.

DURATION	INTENSITY	GLUCOSE BEFORE EXERCISE			
		Less than 100	100-150	150-200	Greater than 200
15 minutes	Low	0-5 g	None	None	None
	Moderate	5-10 g	0-10 g	0-5 g	None
	High	0-15 g	0-15 g	0-10 g	0-5 g
30 minutes	Low	5-10 g	0-10 g	None	None
	Moderate	10-25 g	10-20 g	5-15 g	0-10 g
	High	15-35 g	15-30 g	10-25 g	5-20 g
45 minutes	Low	5-15 g	5-10 g	0-5 g	None
	Moderate	15-35 g	10-30 g	5-20 g	0-10 g
	High	20-40 g	20-35 g	15-30 g	10-25 g
60 minutes	Low	10-15 g	10-15 g	5-10 g	0-5 g
	Moderate	20-50 g	15-40 g	10-30 g	5-15 g
	High	30-45 g	25-40 g	20-35 g	15-30 g

This table is adapted from the Diabetic Athlete's Handbook by Sheri Colberg, PhD.

For glucose greater than 250 or if ketones are present, do not exercise. You may require additional insulin and should get advice from your provider.



"To enjoy the glow of good health, you must exercise." – Gene Tunney

Taking medications

Will I need to take medicine to control my diabetes?

Most people with diabetes will need medication. Diet and exercise are great ways to help manage diabetes, but are not enough for most people. People with Type 1 diabetes need multiple-dose injections of long-acting and mealtime insulin or use an insulin pump. Those with Type 2 diabetes usually begin with pills but may eventually need insulin, too. Needing medication does not mean your diabetes is worse than someone else's. It's a tool to control diabetes and lower your risk of developing complications.

Some important points to remember about your diabetes medications:

- Know your medication's name, how it works, when to take it, possible side effects and special considerations. Medication doesn't work if you don't take it. Talk to your PCP about any side effects.
- If you cannot afford your medications, ask your provider if you qualify for special help.
- If your diabetes medication is not listed here, it may be a new or combination medication. Ask your health care provider to explain how it works.
- Keep your health care team updated on any notable changes in your glucose. They will help with the right medication, dose and adjustments needed.
- A diabetes care and education specialist can help you understand your medication and treatment plan.
- Meeting with a diabetes care and education specialist will help you understand your medication and treatment plan.

What are the names of pills used to control diabetes? How do they work?

There are different types of diabetes pills that work in different ways. Use these tables to find your medication. Medications change often. Some may have been removed or added to the list since this guide was updated.

BIGUANIDES* – Decrease amount of glucose produced by the liver; help cells use insulin better			
Brand (generic name)	When to Take	Doses	Possible Side Effects
Glucophage (metformin)	Usually twice a day with breakfast and evening meal	500-2550 mg	Bloating, gas, diarrhea, upset stomach, loss of appetite. In rare cases, lactic acidosis may occur. Take with food to minimize symptoms or consider extended release.
Glucophage XR Glumetza (metformin)	Usually once a day, in the morning	500-2000 mg daily 500-2000 mg daily 500-2500 mg daily	

*You may be asked to stop taking this medication if you are having a dye study or surgical procedure.

SGLT2 (SODIUM-GLUCOSE COTRANSPORTER-2) INHIBITORS* – Decrease glucose reabsorption in kidneys; increase glucosuria

Brand (generic name)	When to Take	Doses	Possible Side Effects
Invokana (canagliflozin)	Upon rising	100-300 mg daily	Low blood pressure, urinary tract infections, increased urination, genital infections
Farxiga (dapagliflozin)	Upon rising	5-10 mg daily	
Jardiance (empagliflozin)	Upon rising	10-25 mg daily	
Steglatro (ertugliflozin)	Upon rising	5-15 mg daily	

*SGLT2 inhibitors may increase your risk for ketoacidosis.

DPP4 (DIPEPTIDYL PEPTIDASE-4) INHIBITORS* – Prevent breakdown of glp1 digestive hormone, which increases insulin secretion and slows emptying of stomach

Brand (generic name)	When to Take	Doses	Possible Side Effects
Januvia, Zituvo (sitagliptin)	Upon rising	25-100 mg daily	Possible pancreatitis, nasopharyngitis, headache, upper respiratory infections, joint pain
Onglyza (saxagliptin)	Upon rising	2.5-5 mg daily	
Tradjenta (linagliptin)	Upon rising	5 mg once daily	
Nesina (alogliptin)	Upon rising	6.25-25 mg once daily	

*There are several combination medications.

GLP1 (GLUCAGON-LIKE PEPTIDE-1) AGONISTS – Increase insulin secretion with food, prevent the liver from releasing glucose, slow digestion, decrease appetite; may contribute to weight loss

Brand (generic name)	When to Take	Doses
Rybelsus (semaglutide)	Must be taken within 30 minutes before first meal, beverage or other medication and must be taken with 4 oz. plain water only. Wait 30 minutes before eating, drinking beverages other than water or taking other medications, as this can interfere with Rybelsus absorption.	3-14 mg daily

SULFONYLUREAS – Help pancreas release insulin			
Brand (generic name)	When to Take	Doses	Possible Side Effects
Amaryl (glimepiride)	With the first meal of the day	1.0-8 mg	Low glucose
DiaBeta (glyburide) Micronase	Before the first meal of the day	1.25-20 mg	
Glynase (micronized glyburide)	Before the first meal of the day	0.75-12 mg	
Glucotrol (glipizide)	Before the first meal of the day	5-40 mg	
Glucotrol XL (glipizide)	Before the first meal of the day	2.5-20 mg	

MEGLITINIDES – Help pancreas release insulin			
Brand (generic name)	When to Take	Doses	Possible Side Effects
Starlix (nateglinide)	5-30 minutes before meals*	60-120 mg	Low glucose
Prandin (repaglinide)	15 minutes before meals*	0.5-4 mg	

*If you skip a meal, skip that dose.

TZDS* – Improve insulin sensitivity, which increases uptake of glucose into cells			
Brand (generic name)	When to Take	Doses	Possible Side Effects
Actos (pioglitazone)	With or without meals	15 mg, 30 mg, 45 mg Max: 45 mg	Anemia, swelling, weight gain
Avandia (rosiglitazone)	With or without meals	4-8 mg daily	

*TZDs may cause or worsen heart failure; increased peripheral fracture risk.

ALPHA GLUCOSIDASE INHIBITORS - Slow absorption of carbohydrates from the stomach and intestines			
Brand (generic name)	When to Take	Doses	Possible Side Effects
Precose (acarbose)	With the first bite of each meal*	25-100 mg, 3 times/day Max: 300 mg	Nausea, diarrhea, gas
Glyset (miglitol)	With the first bite of each meal*	25 mg, 50 mg, 100 mg Max: 300 mg	

*If you skip a meal, skip that dose. Must use glucose gel, tablets or honey to treat low glucose due to how the medicine works.

DOPAMINE 2 AGONISTS – Reset circadian rhythm; increase insulin sensitivity			
Brand (generic name)	When to Take	Doses	Possible Side Effects
Cycloset (bromocriptine mesylate)	Within 2 hours of waking	1.6-4.8 mg daily	Low glucose, nausea, headache, fatigue, dizziness

COMBINATION MEDICATIONS		
Brand (generic name)	When to Take/Doses	Possible Side Effects
Janumet and Janumet XR (metformin and sitagliptin)	Morning or evening 50 mg/500 mg - 100 mg/2000 mg	Runny nose or sore throat, upset stomach, diarrhea, headache, weakness, upper respiratory infections
Synjardy and Synjardy XR (empagliflozin and metformin)	Morning or evening Max: 25 mg/2000 mg	Nausea, vomiting, diarrhea, constipation, dizziness, headache
Glyxambi (empagliflozin and linagliptin)	Morning or evening 10 mg/5 mg - 25 mg/5 mg	Headache, back pain, diarrhea, cough
Xigduo and Xigduo XR (dapagliflozin and metformin)	Morning or evening Max: 10 mg/2000 mg	Genital infections, dehydration, headache, nausea, vomiting, diarrhea, respiratory infections
Jentadueto and Jentadueto XR (linagliptin and metformin)	Morning and evening 2.5 mg/500 mg - 2.5 mg/1000 mg, twice daily	Headache, dizziness, nausea, vomiting, constipation, gas
Invokamet and Invokamet XR (canagliflozin and metformin)	Morning and evening Max: 150 mg/1000 mg, twice daily	Headache, dizziness, nausea, vomiting, diarrhea, gas, upper respiratory infections

What are the non-insulin injectables used to treat diabetes?

GLP1 AGONISTS* – Increase insulin secretion with food, prevent the liver from releasing glucose, slow digestion, decrease appetite; may contribute to weight loss			
Brand (generic name)	When to Use	Possible Side Effects	How Long In-Use Medication Lasts at Room Temperature
Byetta (exenatide)	0-60 minutes before morning and evening meals, 5 or 10 mcg twice a day	Nausea, vomiting, constipation, decreased appetite, pancreatitis	30 days
Bydureon BCise (exenatide extended release)	2 mg once weekly		4 weeks
Trulicity (dulaglutide)	0.75, 1.5, 3 and 4.5 mg once weekly		14 days
Victoza (liraglutide)	0.6, 1.2 or 1.8 mg once daily		30 days
Ozempic (semaglutide)	0.25-2 mg once weekly		56 days
Adlyxin (lixisenatide)	10-20 mcg daily within 1 hour before first meal of the day		14 days

GIP/GLP1 AGONIST (GLUCOSE-DEPENDENT INSULINOTROPIC POLYPEPTIDE/GLUCAGON-LIKE PEPTIDE AGONIST) – Helps the body release more insulin when glucose is high; helps remove excess glucose from the blood; keeps the liver from making and releasing too much glucose; reduces how much food is eaten; slows down how quickly food leaves the stomach

Brand (generic name)	When to Use	Possible Side Effects
Mounjaro (tirzepatide)	2.5-15mg weekly	Nausea, diarrhea, decreased appetite, constipation, vomiting, indigestion, stomach pain

AMYLIN MIMETICS* – Slow digestion and stomach emptying, decrease appetite, prevent the liver from releasing glucose, decrease amount of insulin needed

Brand (generic name)	When to Use	Possible Side Effects
Symlin (pramlintide acetate)	At mealtime; used with insulin Type 1: 15-60 mcg Type 2: 60-120 mcg	Low glucose, nausea, vomiting

*Acceptable injection sites vary. Discuss where to inject with your provider, diabetes care and education specialist or pharmacist; refer to the package or see the image on the last page of this section for injection site options.





*Insulin vials
and syringes*

Insulin pens

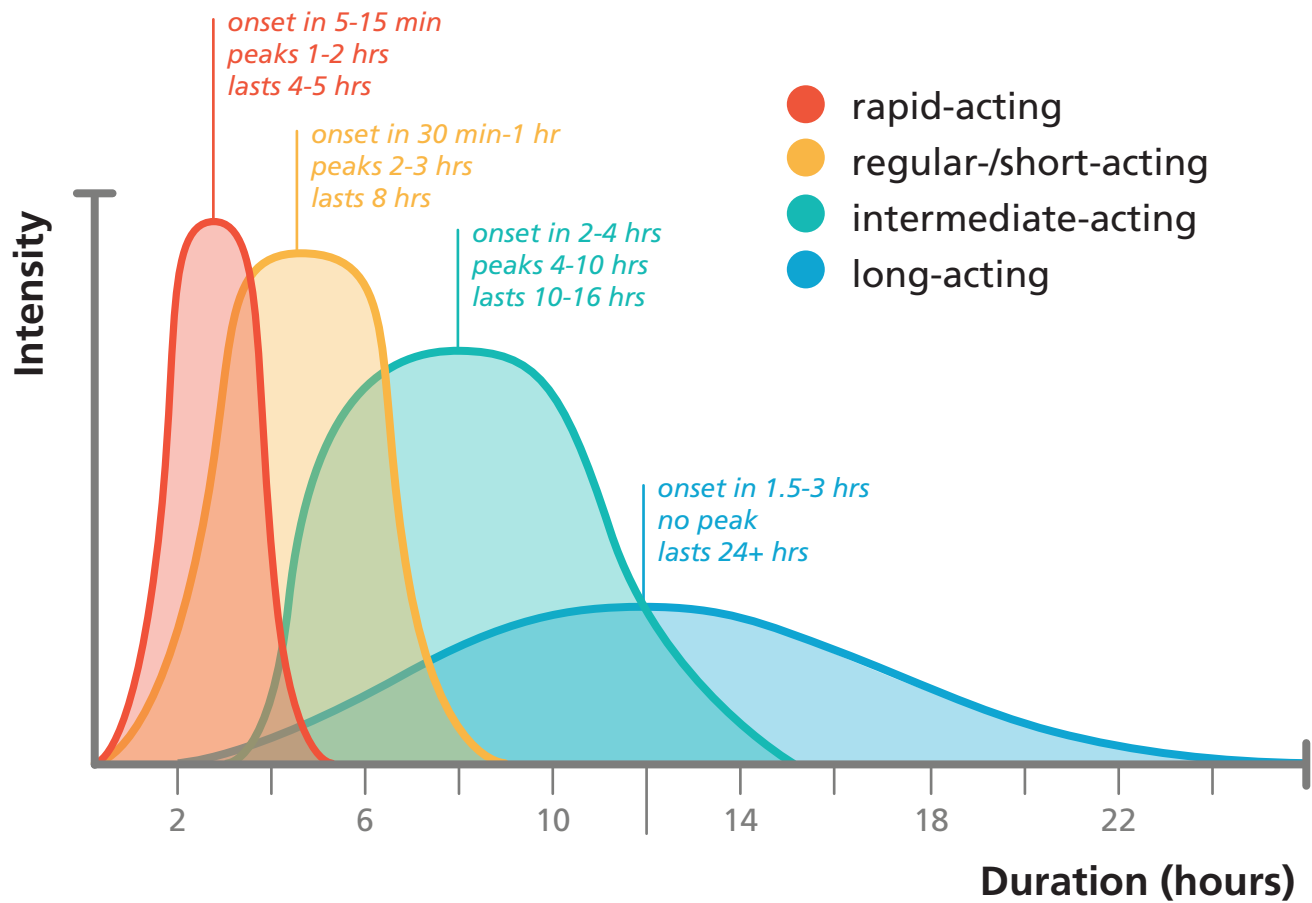
What about insulin injectables?

Insulin is a hormone that is made in the pancreas. It is essential for life. If your pancreas is not making any insulin or not enough insulin, taking it by injection is necessary. The amount of insulin prescribed varies from person to person and can depend on your sensitivity to insulin, how much you eat and how active you are. If you need insulin, this does not mean your diabetes is worse than someone else's. The worst type of diabetes to have is uncontrolled diabetes.

Most insulins come in a vial. A syringe is needed to draw out the insulin and inject it under the skin. Many insulins also are available in a pen and use a pen needle for injection. Pens tend to be more convenient than using a vial and syringe, but personal preference and insurance coverage can affect which method is used. Insulin pumps are a third option for administering insulin. Pumps are mechanical devices that offer advanced features for glucose management. Much education is involved in learning how to care for and use an insulin pump. If you are interested in an insulin pump, talk to your health care team for more information and read the Insulin Pumps section of this handbook. The following table lists different brands of insulin injectables.

INSULIN TYPE	BRAND NAME	GENERIC NAME	WHEN TO USE/HOW IT WORKS	POSSIBLE SIDE EFFECTS
Rapid-Acting Insulin	Apidra Humalog Humalog U200 NovoLog Admelog Fiasp Afrezza* (Inhaled) Lyumjev U100, Lyumjev U200	Insulin glulisine Insulin lispro Insulin lispro U200 Insulin aspart Insulin lispro Insulin aspart Insulin human rDNA Insulin lispro U100, insulin lispro U200	Before you eat; starts working within 5-15 minutes. Peaks around 1-2 hours. Lasts up to 4-5 hours. Starts working within 2 1/2 minutes. Starts working within 1 minute after inhalation. Take at start of or within 20 minutes of starting your meal.	Low glucose, weight gain
Short-Acting Insulin	Humulin R Novolin R ReliOn R	Regular	Before you eat; starts working within 1/2-1 hour. Peaks around 2-3 hours. Lasts up to 8 hours.	
Intermediate-Acting Insulin	Humulin N Novolin N ReliOn N	NPH isophane	In morning and evening; starts working within 2-4 hours. Peaks around 4-10 hours. Lasts 10-16 hours.	
Long-Acting Insulin	Lantus, Lantus Solostar Toujeo U300 concentration Basaglar Tresiba U100 or U200 Rezvoglar (interchangeable with Lantus)	Insulin glargine Insulin glargine Insulin glargine Insulin detemire Insulin degludec	Slow, steady release of background insulin. Usually given once a day. Starts working within 1 1/2-3 hours. No peak. Lasts 24+ hours, depending on brand.	
Premixed Insulins	Humalog 75/25, Humalog 50/50 Novolog 70/30 Humulin 70/30 Novolin 70/30 ReliOn 70/30	Lispro 75/25 Lispro 50/50 Aspart 70/30 NPH/R 70/30 NPH/R 70/30 NPH/R 70/30	Usually given before breakfast and evening meal. Begins to work in 15-30 minutes and lasts up to 12 hours.	
Concentrated Regular Insulin	Humulin R 500	Regular U 500	Has similarities of both short-acting and long-acting insulin. Begins working in 30 minutes and can last up to 24 hours. Given before meals 2-3 times per day.	
Combination Insulin	Soliqua	Insulin glargine and lixisenatide	Once daily, one hour before the first meal of the day. Provides long-acting insulin and a GLP 1 agonist.	
Combination Insulin	Xultophy	Degludec and liraglutide	Any time once daily regardless of meals. Provides long-acting insulin and a GLP1 agonist.	Hypoglycemia, nasopharyngitis, headache, nausea, diarrhea, upper respiratory infection

Types of insulin



Note: Each brand of insulin may differ slightly.

Smart pens

There are “smart” insulin pens that use Bluetooth technology via phone app to help track, monitor and calculate doses of rapid-acting insulin.



How do I store and handle insulin?

All unopened insulin should be kept in the refrigerator at 36°- 46°F (2.2°-7.7°C). Once insulin is in use, it should be kept at room temperature (less than 86°F/30°C). If insulin is not stored properly, it may not work effectively, which could cause unpredictable glucose values.

- Make sure the type of insulin you received is what your health care provider ordered.
- Be sure to prepare your insulin as instructed.
- Examine your insulin. If it does not look right, do not use it.
- Check the expiration date (before opened).
- Check the use-by date (after opened).
- Insulin will spoil if it gets above 90°F (32.2°C) or if it freezes.
- Insulin bottles and pens should not be left in a car.
- Cooling packs are available for traveling.

Throw insulin away if:

- Clumps of insulin are sticking to the side of the bottle.
- Clear, rapid-acting insulin becomes cloudy.
- The insulin is past the expiration date.

What is the use-by date for my insulin after it is opened or kept at room temperature?

SANOFI AVENTIS	HOW LONG IN-USE INSULIN LASTS AT ROOM TEMPERATURE
Insulin glulisine (Apidra) pen or vial*	28 days
Insulin lispro (Admelog) pen or vial	28 days
Glargine (Lantus) pen or vial	28 days
Glargine U300 (Toujeo) pen	42 days
Glargine/Lixisenatide (Soliqua)	14 days

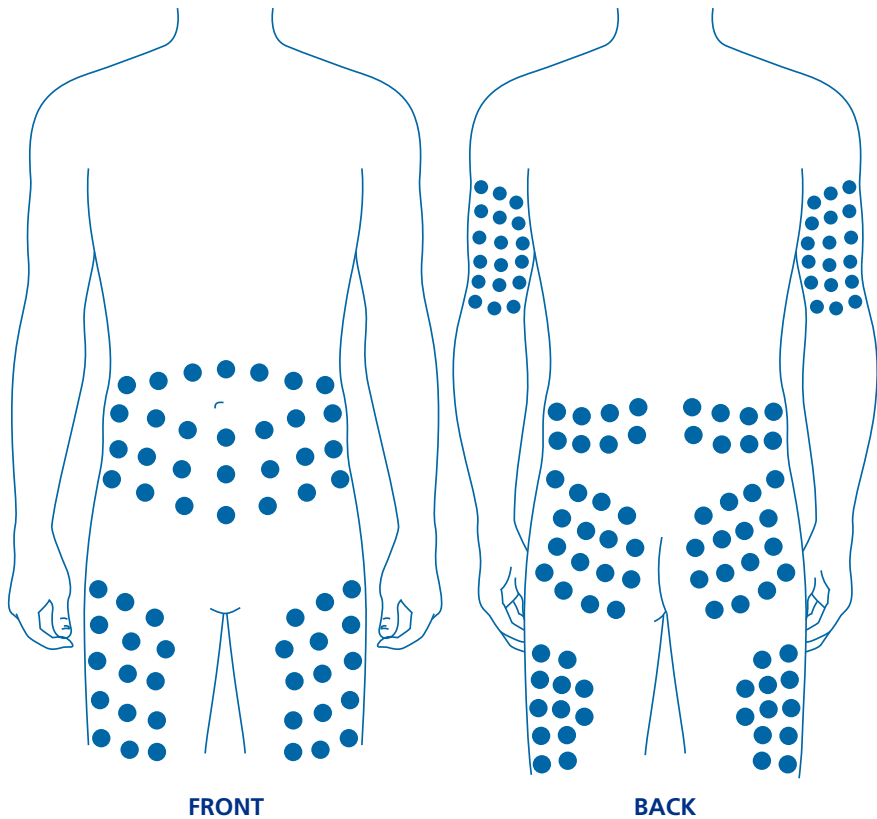
NOVO NORDISK	HOW LONG IN-USE INSULIN LASTS AT ROOM TEMPERATURE
Novolin R vial*	42 days
Novolin N vial*	42 days
Novolin 70/30 vial*	42 days
Novolin 70/30 pen	10 days
Aspart (Novolog) Mix 70/30 pen	14 days
Aspart (Novolog) Mix 70/30 vial	28 days
Aspart (Novolog) pen or vial	28 days
Aspart (Fiasp) pen or vial	28 days
Determir pen or vial*	42 days
Degludec (Tresiba) pen (U100 or U200)	56 days
Degludec/Liraglutide (Xultophy)	21 days

* These insulins must be stored below 77°F (25°C)

ELI LILLY	HOW LONG IN-USE INSULIN LASTS AT ROOM TEMPERATURE
Humulin R vial (U 100)	31 days
Humulin N pen or vial	14 days
Humulin 70/30 pen or vial	10 days
Lispro (Humalog) Mix 50/50 pen or vial	10 days
Lispro (Humalog) Mix 75/25 pen or vial	10 days
Lispro (Humalog) pen or vial (U 100)	28 days
Lispro U200 (Humalog) pen	28 days
Humulin R U500 pen or vial	28 days
Giargine (Basaglar) pen	28 days

How and where do I choose a site for insulin injection, insulin pump infusion or continuous glucose monitor placement?

Knowing where to give your injections is very important. The chart below shows sites for your injectable medication.



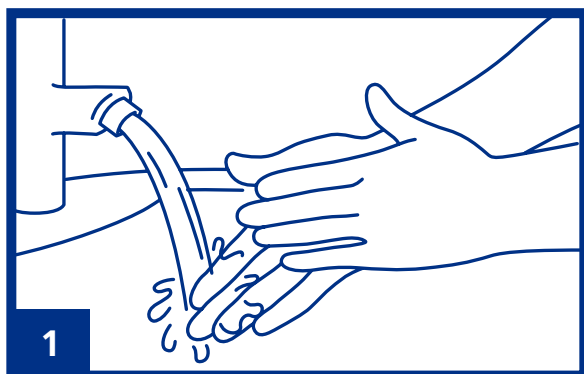
Using a different site each time you inject your medication is very important. Overusing the same spot can increase the risk of tissue damage, which can change how well the insulin works.

Using a syringe or insulin pen

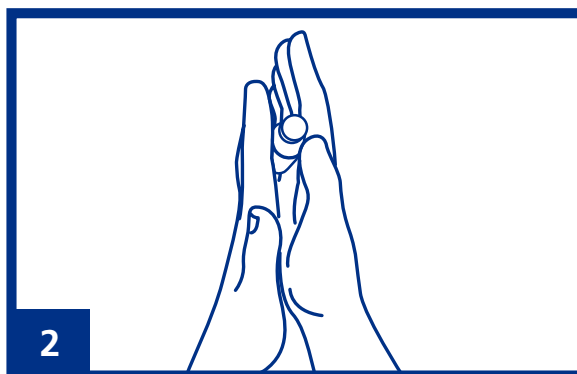
How do I fill an insulin syringe or use an insulin pen?

Your diabetes care and education specialist will help you learn how to use these. In-person education is best because you are able to practice using an insulin vial or pen. The following directions are meant to support this education. Some insulins can be mixed in the same syringe. This involves a special technique that your educator can teach you. DO NOT mix two types of insulin before discussing with your provider or diabetes care and education specialist.

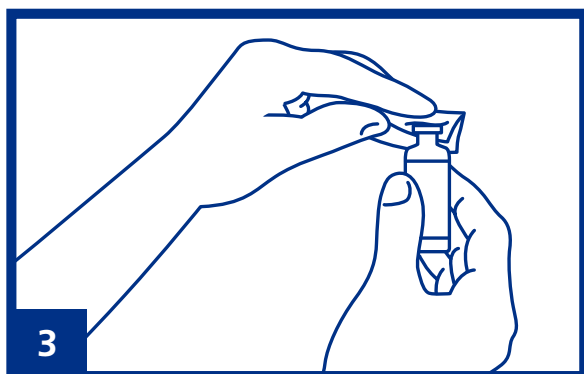
Using a vial and syringe



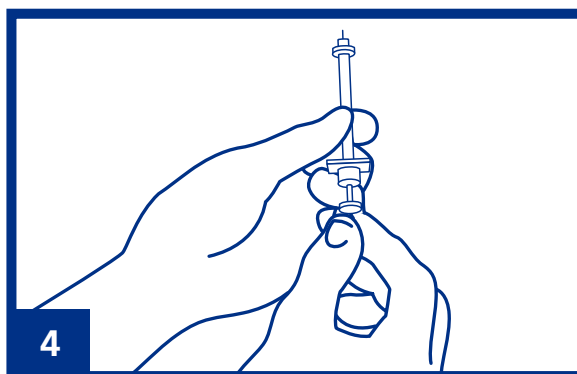
Wash your hands.



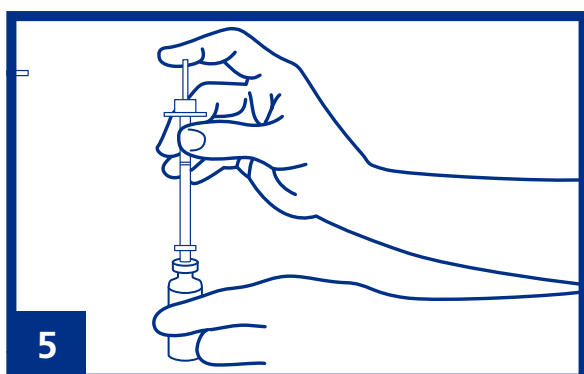
If your insulin is a premixed or intermediate-acting insulin and appears cloudy, gently roll the vial to mix the insulin evenly.



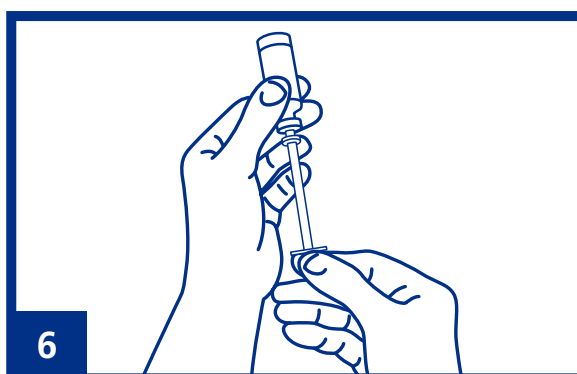
Remove and discard the cap from the vial. Swab the top of vial with an alcohol swab.



Remove the cap from your insulin syringe and pull the plunger down until at the prescribed units. This is intended to fill the syringe with air.

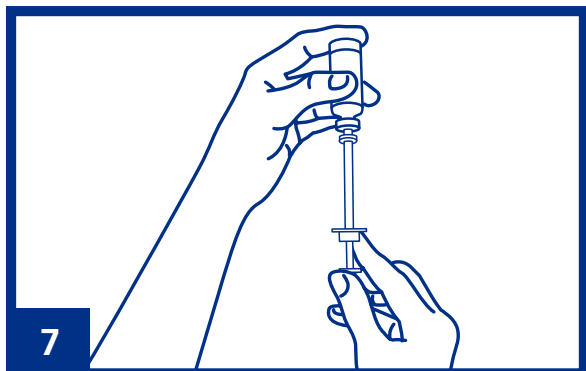


With the insulin vial on the table, insert the syringe needle into the vial. Push the plunger down to insert air into the vial.

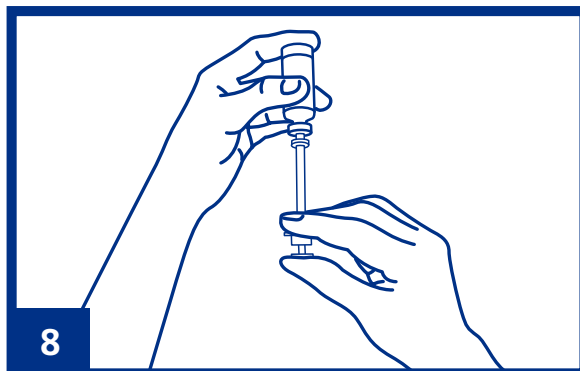


Keeping the syringe in the vial, pick up the vial and turn it upside down.

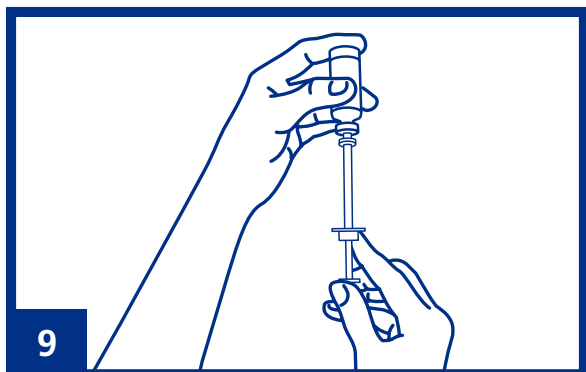
Using a vial and syringe



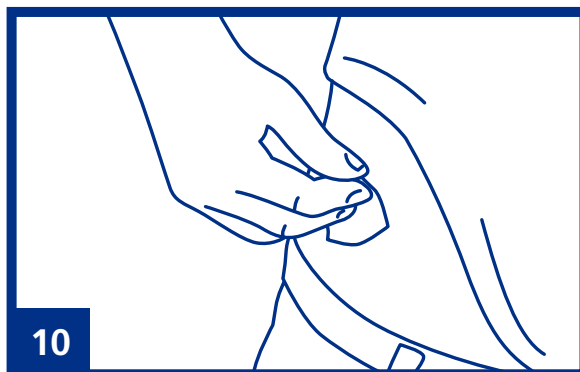
7 Pull the plunger halfway down the syringe, filling it with insulin.



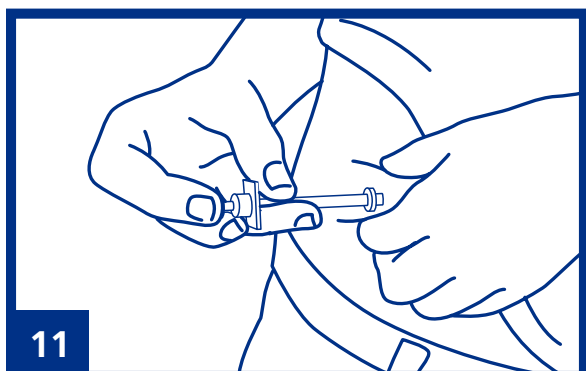
8 Push the insulin back into the bottle. This helps remove air bubbles.



9 Pull the plunger down again until the prescribed unit dose fills the syringe.

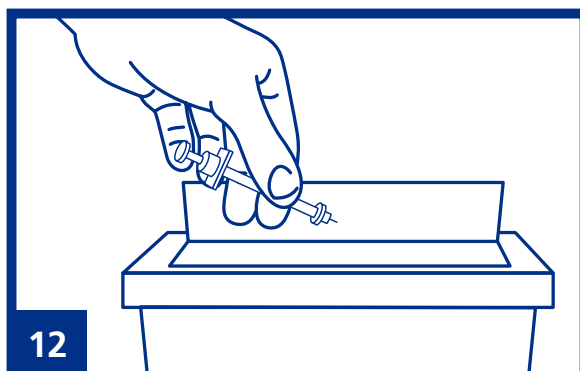


10 Choose an injection site and clean your skin with soap and water, or wipe with an alcohol swab.



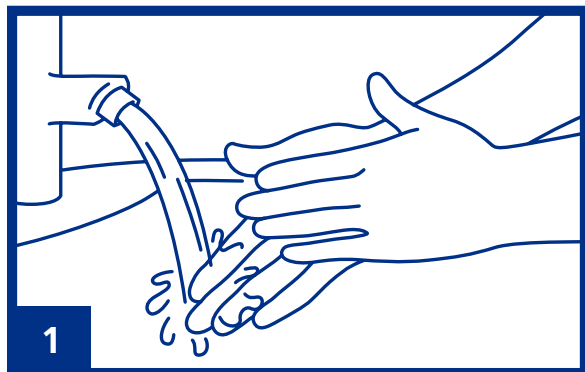
11 Insert the syringe needle gently, and push the plunger down all the way to deliver your insulin dose.

Hold the insulin syringe in place for 10 seconds before removing the needle from your skin.

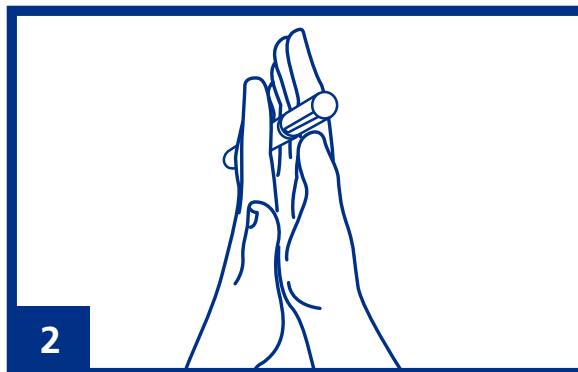


12 Dispose of the syringe in a sharps container.

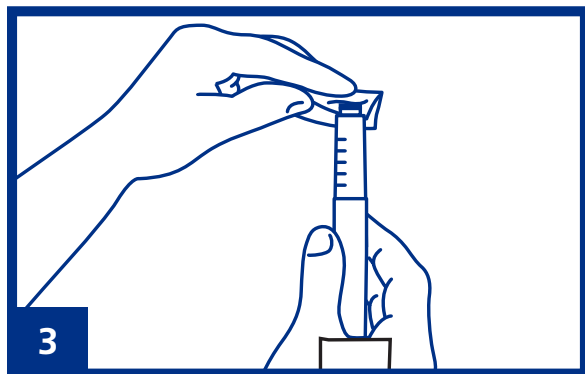
Using an insulin pen



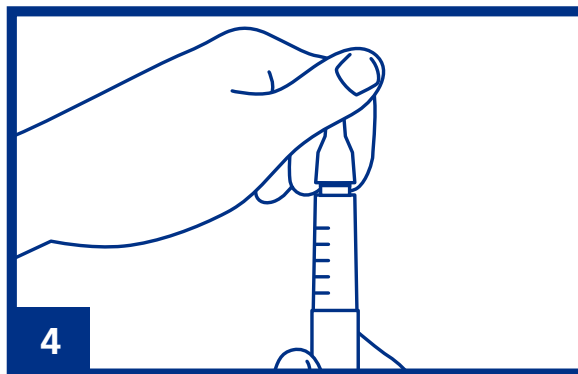
Wash your hands.



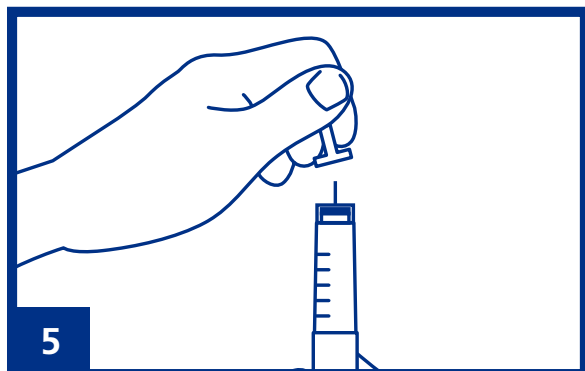
If your insulin is a premixed or intermediate-acting insulin and appears cloudy, gently roll the pen to mix the insulin evenly.



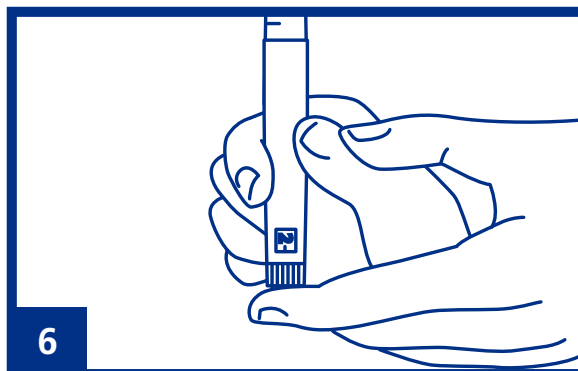
Remove the cap from the pen and swab the end with an alcohol swab.



Remove the paper from the pen needle, attach to the end of the pen and turn clockwise to secure.

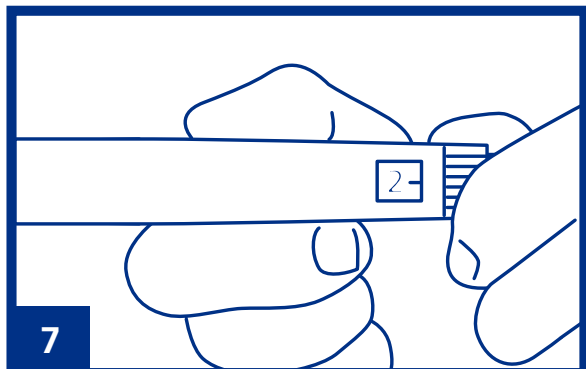


Remove the outer and inner cover from the pen needle, exposing the injection needle.

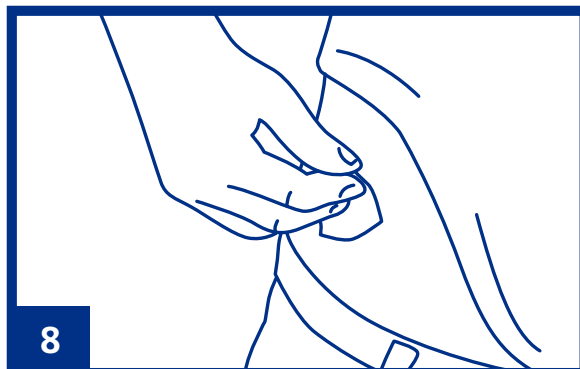


Dial the pen to 2 units. Holding the pen upright, depress the button at the end opposite the injection needle. Look for drops of insulin. If none are seen, repeat this step. This is called "priming" the pen.

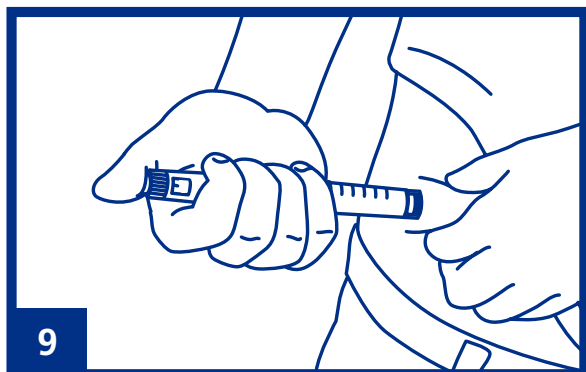
Using an insulin pen



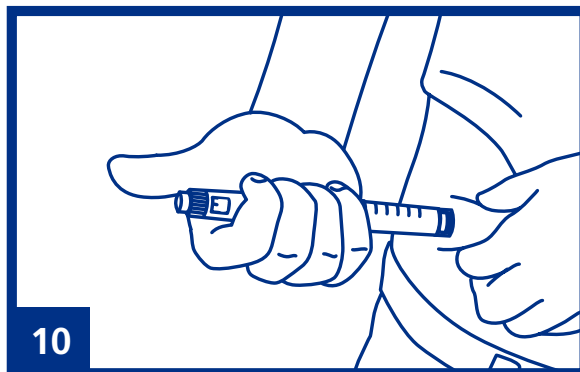
Dial the pen to your prescribed dose.



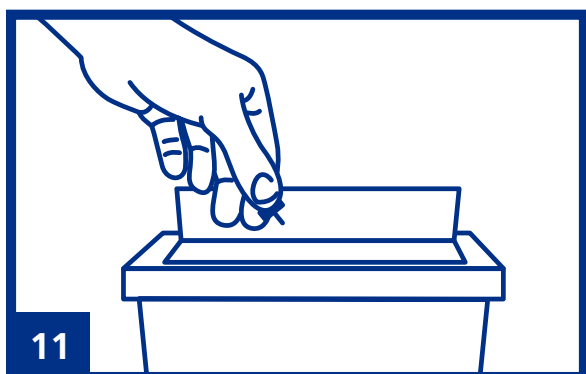
Choose an injection site and clean your skin with soap and water, or wipe with an alcohol swab.



Insert the injection needle gently, and depress the button at the opposite end to deliver your insulin dose.



Remove your finger from the delivery button, but hold the insulin pen in place for 10 seconds before removing the needle from your skin.



Remove the pen needle from the pen by turning counterclockwise. You should remove your pen needle after each use. If you leave the pen needle attached to your pen, it can suck air bubbles into the pen. Dispose of the pen needle in a sharps container. Recap your pen. Do not reuse pen needles.

Insulin Pumps

An insulin pump is a small, computerized device that is programmed to deliver insulin. There is a reservoir/cartridge that holds insulin inside the pump. There also is an infusion set, which is a small plastic tube (cannula) or small needle that is inserted under the skin where insulin is absorbed. The pump user will change the infusion set and reservoir/cartridge every two to three days. The pump uses only rapid-acting insulin.

There are two ways that an insulin pump delivers insulin:

1. Basal delivery – The pump delivers insulin continuously over a 24-hour period. This can be programmed in very small, precise doses and can be adjusted hourly. It can better match a person’s insulin needs throughout the day and is more similar to how a functioning pancreas works.
2. Bolus delivery – The pump can give a dose of insulin in addition to the basal delivery. This bolus dose is given before a meal. The amount is calculated by the pump based on the size of the meal, current glucose and the person’s sensitivity to insulin. The user programs the bolus before meals or when blood glucose is high. Your provider calculates the bolus for meals based on the insulin to carbohydrate ratio (ICR) and for high glucose based on the insulin sensitivity factor (ISF). Pumps also offer several advanced features that may help a person gain better control and have more flexibility in their lifestyle.
3. Many insulin pumps can get glucose information from an integrated CGM and adjust insulin delivery as needed for low or high glucose.

An insulin pump does not make diabetes care “easier,” it just eliminates the need for multiple insulin injections.

If you are considering an insulin pump, the first steps are to check glucose frequently – at least four times a day – and learn how to count the number of carbohydrates you are eating. There are several different insulin pumps available, including Mobi, V-Go and iLet Bionic Pancreas. CeQur Simplicity is a non-pump option that is a wearable insulin patch for bolus insulin. Ask your health care provider if you are interested in learning more about insulin pumps.



Disposing of Supplies

How do I dispose of syringes, pen needles, lancets and pump supplies?

- Syringes, pen needles and lancets should be thrown away immediately after use. They should be placed into a heavy, puncture-proof, nonbreakable sharps container that has a lid or cap. An empty detergent container or coffee can should be used if you do not have an actual sharps container.
- Dispose of the container and its contents according to local and state medical waste rules.
- Do not recycle your sharps container.



More information is available at SafeNeedleDisposal.org.

Have your medications and supplies ready in case of a disaster or emergency!

It is important to be prepared for emergencies by keeping a “disaster kit.” This should be an insulated, waterproof kit that includes:

- Prescription numbers/medication names and dosages or pump settings
- Glucose meter, testing supplies and alcohol wipes
- Logbook
- ID card and medical ID
- If you use insulin, include syringes and pen needles or reservoirs and infusion sets
- Ketone testing strips
- Glucagon emergency kit
- Glucose tablets
- Emergency contact numbers
- Batteries for glucose meter and/or insulin pump
- Emergency blanket and flashlight
- Bottled water
- Sharps container



Reducing Risks

People with diabetes can live long and healthy lives, but it comes with the responsibility of controlling their glucose. When glucose is too high for long periods of time, it can lead to many health problems. You can prevent or delay complications (listed on the right) by managing your glucose and other factors, such as cholesterol and blood pressure.



BODY SYSTEM	COMPLICATIONS
Heart & blood vessels (cardiovascular system)	Heart attack Stroke Peripheral vascular disease (PVD)
Nerves	Peripheral neuropathy Autonomic neuropathy Gastroparesis Sexual problems/erectile dysfunction
Kidneys	Nephropathy Chronic kidney disease
Eyes	Retinopathy Cataracts
Feet	Ulcers Charcot foot
Teeth & gums	Dental infections

How can I keep my heart, arteries and veins healthy?

Thick and sticky blood from high glucose is harder for your heart to pump and can damage your arteries and veins. This increases your risk for heart attack and stroke. If you also have high blood pressure, with or without high cholesterol, you have an even greater risk for these problems. High blood pressure can damage your vessel walls, leading to scarred and narrowed vessels during the healing process. Cholesterol can then build up on the scarred blood vessel walls, forming plaques. These cholesterol plaques can further narrow your vessel walls. This narrowing leads to blockages that prevent proper blood flow to the heart and brain, causing a heart attack or stroke. A heart attack or stroke is life-threatening, and you should know the warning signs.

Warning signs of a heart attack

- Chest discomfort
- Shortness of breath
- Pain in the jaw, neck or arms
- Sweating, lightheadedness or nausea

Think S.T.O.P.

- **S**hortness of breath
- **T**ightness of the chest or pressure
- **O**ther symptoms, such as cold sweats, weakness, heart palpitations, dizziness and even loss of consciousness
- **P**ain in the chest, neck, throat, jaw or back

Warning signs of stroke

- Numbness or weakness in the face, arms or legs
- Confusion, difficulty speaking or understanding
- Vision changes
- Difficulty walking, loss of balance
- Severe headache

B.E.F.A.S.T.

- **B**alance loss
- **E**yes – vision loss
- **F**acial drooping
- **A**rm weakness
- **S**peech difficulties
- **T**ime to call 911

Peripheral vascular disease

Peripheral vascular disease (PVD) occurs when there is decreased blood flow in the legs or arms due to damage to those blood vessels. This damage occurs much in the same way that damage occurs to the heart and brain vessels from high glucose, high cholesterol and high blood pressure. This may cause pain or numbness in the legs or arms. It may also prevent proper healing of infections or wounds.

YOUR NUMBERS	GOALS
Blood pressure	Less than 130/80
Total cholesterol	Less than 200
LDL (bad cholesterol)	Less than 100 with diabetes Less than 70 with diabetes and heart disease
HDL (good cholesterol)	Greater than 40 in men Greater than 50 in women
Triglycerides	Less than 150

American Diabetes Association 2023.

How can I control my blood pressure and cholesterol?

- Monitor your glucose as directed, and notify your health care team when your glucose does not reach your determined goal.
- Get a cholesterol screening once a year. Discuss the results with your provider and ask whether the current medication is right for you.
- Have your blood pressure checked once a year. Discuss the results with your provider and ask whether the current medication is right for you.
- Work with the dietitian to choose foods low in saturated fat and cholesterol.
- Exercise regularly or be more active.
- Maintain a healthy weight.
- Quit smoking. There are many smoking cessation programs available.
- Limit alcohol drinks to no more than one to two a day.
- Decrease stress, if possible.

How can I keep my nerves healthy?

Your nerves send signals from your brain to all parts of your body. When glucose is too high for long periods of time, the glucose may stick to the nerves and cause problems. Damage to the nerves is called **neuropathy**.

- **Peripheral neuropathy** usually affects the hands and feet and may cause tingling, burning, pain or numbness. It may result in lack of feeling in the hands and feet. This can lead to injuries you may not notice.
- **Gastroparesis** is nerve damage in the stomach or digestive tract. This causes your digestion to slow down and may make you feel bloated. Other symptoms may include nausea, constipation or feeling full before you have finished your meal.
- **Autonomic neuropathy** is when the nerves associated with the heart and blood vessels are affected. This can cause lightheadedness or dizziness and can affect your blood pressure. Autonomic neuropathy may also decrease your ability to sweat or feel the side effects of low glucose.
- **Sexual problems** may occur in men and women. Men may experience erectile dysfunction due to nerve and blood vessel damage. Women may experience vaginal dryness and have a higher rate of vaginal infections.

To keep your nerves healthy:

- Keep your glucose under good control.
- Learn proper foot care. Visit a podiatrist (foot doctor), if needed. Make sure your health insurance covers podiatry care.
- Talk to your health care team if you are having any of the symptoms mentioned above. There are medications that can alleviate symptoms of peripheral neuropathy, gastroparesis and sexual problems.

How can I keep my kidneys healthy?

Your kidneys work to filter out all the waste from your blood. High glucose can stick to the walls of the arteries and veins in your kidneys, causing them to be blocked or leaky. Some of the important proteins and nutrients that should stay in the blood are then lost into the urine. When too much protein is lost in the urine, it is called diabetic nephropathy, which can lead to permanent kidney damage.

To keep your kidneys healthy:

- Keep your glucose under good control.
- Have routine testing of your blood (creatinine, BUN and GFR) and urine (microalbumin) once every year.
- Maintain good blood pressure control.
- Maintain good cholesterol control.
- Consider medications such as ACE inhibitors or ARBs, which you can discuss with your health care provider.

How can I keep my eyes healthy?

Changes in glucose can make your eyesight blurry for short periods of time. If glucose levels stay high for long periods of time, the thick and sticky blood can damage the tiny arteries and veins in your eyes. These blood vessels can become weak and start to leak fluid or blood, which is called diabetic retinopathy. It can lead to permanent eye damage and is the number one cause of blindness in the United States. There are treatments available that include injections and laser treatments. Cataracts, which are a clouding of the lens in the eye, also are more common with diabetes.

To keep your eyes healthy:

- Keep your glucose under good control.
- Have a dilated eye exam every year. Some offices can do retinal scans.
- Maintain good blood pressure control.
- Call your eye doctor whenever you notice trouble with your eyesight.

How can I keep my feet healthy?

High glucose can cause damage to the arteries, veins and nerves in your feet. You may get infections more easily, and cuts may heal more slowly. You may not notice the pressure from tight shoes, which can lead to blisters when walking. You also might not notice injuries, such as scrapes and cuts, which may result in infections.

Charcot foot is a serious condition in which the bones of the foot can abnormally move or break. The foot may look swollen, red or be warm to the touch. Quick treatment is important to prevent permanent foot damage from occurring.

To keep your feet healthy:

- Check your feet every day. Look for cracks, red areas, corns/calluses or minor cuts.
- Apply a moisturizer to prevent dry and cracked skin, but avoid applying moisturizer between the toes.
- Wash your feet daily with warm water and pat dry. Do not soak your feet.
- Do not use over-the-counter corn/callus remedies.
- Keep toenails trimmed straight across, not into the sides. If you have trouble, see a podiatrist (foot doctor) for help.
- Wear shoes that are the correct size and cover your heels and toes. Check your shoes before putting them on for damage or foreign objects inside each shoe.
- Wear cotton or wool socks without elastic.
- Have your feet examined every year by your health care team.

How can I keep my teeth and gums healthy?

Everyone gets plaque on his or her teeth. Plaque is a sticky film that comes from chewing food. It is filled with germs, and high glucose can help these germs grow. Watch for red, sore or swollen gums; bleeding gums; bad breath; and tooth loss.

To keep your teeth and gums healthy:

- Keep your glucose under good control.
- Brush your teeth twice a day.
- Floss regularly or use an oral water flosser.
- See the dentist every six months.

Which vaccines should I get?

People who have diabetes are at a greater risk for getting Influenza (flu) and other infections, such as pneumonia. These infections can lead to serious consequences and hospitalizations. Additional chronic conditions can raise this risk even more. Having diabetes also can make it harder to heal from these infections, so it is important to do all you can to prevent them. Flu and pneumonia are conditions that can be prevented through vaccines. The flu vaccine is recommended every year during the fall/winter seasons. There are different types of pneumonia vaccines, and their administration depends on your age and other health conditions you may have. Talk to your provider about receiving your pneumonia vaccine.

We also recommend the shingles, COVID and RSV (for people over 60) vaccines.

Hepatitis is another infection that can be prevented through a vaccine. While many people are vaccinated at birth, the American Diabetes Association recommends people with diabetes (who have not been vaccinated) get the hepatitis B vaccine. Talk to your provider to determine if you need the hepatitis B vaccine.

What are some issues for women with diabetes?

Your menstrual cycle, or monthly period, can affect your glucose. If you find your sugars are different when you have your period, talk to your medical team.

You can have a healthy pregnancy when you have diabetes. It is important to have excellent control of your glucose before becoming pregnant and to keep your glucose under tighter control during pregnancy. Your goal glucose range is generally lowered when you are pregnant. This will help make sure you and your baby stay healthy. Several pills and insulins are not safe during pregnancy. If you are thinking about becoming pregnant, or if you recently learned that you are pregnant, talk to your provider.



“Discipline is the bridge between goals and accomplishment.” – Jim Rohn

Keeping on Track

Standard guidelines for diabetes care

The following is based on the American Diabetes Association's Clinical Practice Guidelines. Only your provider can recommend your personal health care guidelines.

Review glucose records (every visit) ADA Goal: pre-meals 80-130 mg/dL Target (pre-meals) _____ ADA Goal: 2 hours after meals less than 180 mg/dL Target (post-meals) _____	Date:				
	Value:				
Blood pressure (every visit) ADA Goal: Sys less than 130, Dia less than 80 mmHg Target: _____	Date:				
	Value:				
Weight (every visit) Target: _____	Date:				
	Value:				
Thorough foot exam (visually examined every visit)	Date:				
	Value:				
HbA1C Blood test to measure past 3 months' glucose levels (2 or more times a year) ADA Goal: less than 7.0% or according to provider's recommendations Target: _____	Date:				
	Value:				
Microalbuminuria Urine kidney test (once a year) ADA Goal: less than 30 mg Target: _____	Date:				
	Value:				
Creatinine, BUN and GFR Blood kidney test (once a year) Target: _____	Date:				
	Value:				
Dilated eye exam (once a year)	Date:				
	Value:				
Cholesterol (every 1-2 years, based on risk) Target: _____	Date:				
	Value:				
Triglycerides (every 1-2 years, based on risk) ADA Goal: less than 150 mg/dL Target: _____	Date:				
	Value:				
HDL and LDL (every 1-2 years, based on risk) HDL: men greater than 40 mg/dL, women greater than 50 mg/dL LDL less than 100 mg/dL Target: _____	Date:				
	Value:				
Flu shot (once a year)	Date:				
	Value:				
Pneumonia, shingles, COVID and RSV (for people over 60) vaccines (ask your provider)	Date:				
	Value:				
Hepatitis B vaccine	Date:				
	Value:				
Diabetes education (annually)	Date:				
	Value:				

Healthy Coping

What does diabetes mean to me?

Navigating diabetes is a life-long commitment. Each day you will need to make many healthy, informed choices. With practice and support from your diabetes team, your diabetes care will become easier to manage.

What about my emotions?

Managing and living with diabetes can be hard work. Some days your glucose will be right where you want it. Other days, it may be difficult to keep your glucose at goal. There are many feelings you may have about your diabetes (denial, anger, guilt). Ask yourself, "What are my feelings about diabetes?" Write them down.

What can I do about my feelings?

Share your thoughts and feelings about having diabetes with someone on your team. That person can be a health care member, close friend, family member or someone in the community. Maybe it is another person who has diabetes and can relate to what you are going through.

What about when I stumble?

Occasionally, you will "get off track" in your self-management plan. You may go off your meal plan, skip your medication or ignore checking your glucose. When you make a mistake, you may feel angry, guilty or disappointed in yourself. In order to get beyond these emotions, you must get back on track as quickly as possible. Call and reach out to those who can help you.

How do I get motivated?

- Put your mistake behind you.
- Remember that one mistake does not represent failure in your diabetes care.
- Move forward and focus on one goal at a time.
- Share your struggles with your diabetes care and education specialist, and ask for support.

Who should I talk to about diabetes?

The choice is yours. Diabetes is a part of who you are, but it is not the only thing you are! It is good to tell some people about your diabetes, like your co-workers or friends. They may be able to offer valuable support. They may even be able to assist you with recognizing symptoms of low and high glucose and assist with treatment. But the choice is always yours.

"Calm mind brings inner strength and self-confidence, so that's very important for good health."

– Dalai Lama



What can other people do?

People may want to help, but may not understand what you need. They may say, “You shouldn’t be eating that doughnut,” or “You need to exercise.” Keep in mind that they are trying to show you they care. By talking about what you need from them, people can learn to show their concern and support you in a way that helps you.

1. Ask yourself what you need them to stop doing.
 - Do you want them to stop telling you what to eat?
 - Do you want them to stop talking about your diabetes in front of other people?
 - Do you want them to stop talking about your weight?
2. Tell them how these comments make you feel.
3. Tell them what they can do to help.
 - Ask them to eat healthy with you so you are not tempted.
 - Invite them to come to your appointments.
 - Challenge them to exercise with you.
 - Show them how they can help when you have low glucose.
 - You may want to remind them that everyone should try to follow a healthy diet and exercise, not just people with diabetes

Where can I get more support?

It can be a great relief to know that you are not alone in trying to manage your diabetes. Your Penn State Health diabetes team offers education and support.

Most importantly...

Do what you can to help yourself – medically, physically and emotionally. You are a person with diabetes, but that does not define who you are. It is important to understand and take care of yourself as best you can. You are not alone. There are many people living with diabetes and there are many health care members who can help you navigate your diabetes management.

Lifestyle

Can I get tattoos and piercings?

When choosing a tattoo/piercing parlor, ask about how they manage their equipment. The shop you choose should:

1. Have a licensed artist.
2. Use a brand-new needle just for you.
3. Autoclave their tattoo machines between customers.
4. Use disposable ink pots.

It is best to have your hemoglobin A1C in a good range before you get a tattoo or piercing. If your levels are out of target range, you are at risk for slower healing and infections.

A person with diabetes needs to be vigilant about preventing infection. Follow all aftercare precautions.

Can I get pedicures?

- Know when to postpone a pedicure. If you currently have any infections, cuts or open sores on your legs, feet or toenails, skip the pedicure as these breaks in the skin will make you more vulnerable to infection. Instead, contact your physician for a referral to a podiatrist or other professional who is medically trained to care for feet.
- Avoid shaving your legs for a day or two before your pedicure. Shaving can leave tiny nicks in your skin and increase the chance of infection. It is fine to shave afterward.
- Choose a salon that is clean and practices good sanitation. Ask about the cleaning and sterilization practices.
- Make a morning appointment. If you can, schedule your appointment early in the day, so that you are one of the first customers.
- Let your technician know you have diabetes before the pedicure begins. Ask him or her to be very gentle and avoid doing anything that can scratch or injure the skin.
- Keep the technician informed of protective practices. Ask the technician not to cut nails too short, as this can encourage ingrown toenails and lead to infection. Make sure toenail edges are not sharp; they should be rounded off with a file.
- Skip any services that can injure the skin. Never allow the technician to cut your cuticles or use any sharp instruments on your skin or under your toenails. Instead, after your feet have been soaking for a few minutes and the skin around your toes is soft, cuticles can be gently pushed back with an orange stick.

Dating and diabetes

diabetesforecast.org
diatribe.org
thediabetescouncil.com
Search "dating"

Social media sites

diabetes.org
dlife.com
hopewarshaw.com

Why join a social networking site?

- Discussing your experiences with diabetes with others who also have diabetes can be helpful.
- You are exposed to other diabetes management practices; you can learn a great deal from others in an online community.
- You learn about new research and treatment alternatives.
- You get valuable tips on how to work with insurance companies.
- You can get answers to many of your diabetes questions, but be sure to verify the answers with your diabetes care and education specialist or provider.
- You can get great support through rough times.
- You can help others. The feeling you get from helping someone else, answering their questions or directing them to where they can get answers will make you feel even better than when you get help from others.
- You can make great new friends – friendships start and grow through online diabetes communities.
- Be aware – any medical “advice” offered on a social media site may not be accurate.



Traveling

What should I think about before I travel?

- Pack twice as many supplies as you will need.
- Call the airlines/cruise lines in advance. Let them know you may need a special meal plan and ask about bringing diabetes supplies aboard.
- Pack extra snacks in case of low glucose.
- Find out if your health insurance will cover the cost of emergency health care out of your state or out of the country.
- Carry/wear medical identification at all times.
- Keep diabetic supplies with you at all times. Checked bags may not make it to the destination or may be exposed to dangerous temperatures.
- CGMs and insulin pumps should not go through scanners or security devices.
- Carry phone numbers for your medical team, insurance company, glucose meter and insulin pump companies.
- Consider having a “travel letter” from your health care provider that explains you have diabetes and what supplies you will be carrying.
- If you use an insulin pump, consider asking your pump company for a loaner pump for a small fee.

My Diabetes Travel Checklist

- Medications
- Syringes, pens, pump supplies, pen needles, CGM supplies
- Alcohol swabs
- Extra prescriptions, with labels
- Snacks in case of low glucose
- Medical identification
- Glucose meter with supplies
- Insurance information
- Batteries
- Sharps container
- Emergency contact information
- Letter from your provider about needed supplies, if desired



What about the medical waste disposal when traveling?

Leaving needles and testing supplies in trashcans is both dangerous and illegal. Carry an appropriate waste container when you travel. Look up the guidelines for medical waste disposal in the areas where you will be traveling.



My Rights at Work

Do I have any rights at work?

There are laws that can protect you while you are at work. Your employer does not have the right to use your diabetes as an excuse for hiring, firing, discipline, pay, promotion, job training, benefits or any other part of your job. They are not legally allowed to “get back” at you for defending your rights. You are protected under what is called the anti-discrimination laws. To be protected under these laws, you must tell your employer you have diabetes. You also need to tell them what you need to stay safe while on the job.

What are some examples of things I can ask for?

Here are a few examples of accommodations you might need because of your diabetes:

- Bathroom
- Special permission to eat and drink on the job
- The ability to keep diabetes supplies and food nearby
- Ability to take a 15-minute break for low glucose
- A special schedule or a standard work shift instead of a swing shift

What can I do if I am having trouble at work?

A good first step is to get information about anti-discrimination laws as they apply to you. Contact the American Diabetes Association at 1-800-DIABETES (1-800-342-2383), or visit their website at diabetes.org to request a packet on employment discrimination.



Financial Assistance

What if I can't afford my supplies?

There are many people who have difficulty paying for diabetes supplies. Sometimes it is a short-term problem because of a job change or loss of insurance. Sometimes it is a life-long problem because of finances. Unfortunately, diabetes does not take a break. Talk to your medical team – sometimes they can change your pills, insulin or even glucose meter to make it less costly. Ask for generic forms of medication whenever possible.

Use the American Diabetes Association resource guide

The resource guide is a list of all diabetes pills, insulin and supplies for sale in the United States, with pricing included. It can show you the wide range of prices at diabetes.org/resources.



Contact the Partnership for Prescription Assistance

The Partnership for Prescription Assistance may be able to help you get your prescriptions free or nearly free if your insurance doesn't cover medicine. Call 1-888-477-2669 for more information, or visit medicineassistancetool.org.

Ask about pharmaceutical patient assistance programs

Many of the companies that make diabetes pills, insulin and supplies offer free supplies for a short period of time to those who qualify. These are not state or federal programs. The companies voluntarily offer these programs.

My Diabetes Team

The following people are on your medical team:

You!

Ultimately, you are the center of your diabetes management. Your team must listen to and understand your needs and feelings regarding the best approach to your diabetes management.

Doctor

Your family doctor will help you take control of your diabetes. He or she may ask you to see a doctor with special training in diabetes (called an **endocrinologist**).

Nurse practitioners and physician assistants

Nurse practitioners and physician assistants are licensed professionals who can help you manage your diabetes and prescribe medications.

Diabetes Care and Education Specialists

Nurse educators

Nurse educators are registered nurses with special training in caring for people with diabetes. They teach you about diabetes and support you with your self management. You should see a nurse educator at least once a year.

Registered dietitians

Registered dietitians are trained in nutrition. They teach you how the foods you eat affect your glucose, how to read food labels and how to make your healthy meal plan. You should see a registered dietitian at least once a year.

Pharmacists

Pharmacists fill your medications and can answer questions you may have about your medications. Additionally, some pharmacists are certified in diabetes education to provide advanced education and support with medications.

Others on your team

There are many other people who you may want to help you with your care, such as family, friends or other support people. These include people who check your eyes (ophthalmologists/optometrists), your heart (cardiologists), your feet (podiatrists), your nerves (neurologists) and your kidneys (nephrologists). You also may want to see a counselor or psychologist for extra support. If you need to see a doctor who is a specialist in a medical field not associated with your diabetes, such as a dermatologist or plastic surgeon, it is very important that you tell this doctor you have diabetes.

Glossary

A1C or glycohemoglobin – a blood test revealing your estimated average glucose over the past three months.

Angiotensin converting enzyme (ACE) inhibitor – a medication that helps lower blood pressure and protects the kidneys from nephropathy.

Angiotensin receptor blocker (ARB) – a medication that helps lower blood pressure and protects the kidneys from nephropathy. It works differently than an ACE inhibitor.

Blood glucose – many times people will refer to this as blood sugar. It is the amount of glucose in your bloodstream. The carbohydrates we eat digest and break down into glucose.

Carbohydrate – the main source of energy for the body, which comes from foods such as bread, pasta, grains, fruits, milk, desserts, sugar, sweetened beverages and vegetables. The amount of carbohydrates differs among food types.

Cardiologist – a doctor who specializes in the heart and blood vessels and evaluates blood pressure and cholesterol.

Cells – the smallest structural unit of an organism that is capable of independent functioning.

Charcot foot – weakening of the foot bones that leads to fractures and deformity. It is often seen in people who have neuropathy.

Diabetic ketoacidosis (DKA) – a serious health problem where cells are unable to use glucose for energy because of a lack of insulin. The body breaks down fat for energy, resulting in a waste called ketones. These ketones build up in the blood, appear in the urine and can lead to coma or death if not treated.

Dietitian or registered dietitian – a person trained in nutrition and dietary counseling.

Endocrinologist – a doctor who specializes in diabetes and other disorders of the glands and organs that make hormones.

Fasting glucose – the amount of glucose in the blood after not having eaten or drank (anything with calories) for at least eight hours.

Fat – one of the three main nutrients in food. Can be found in butter, oil, meat and dairy products.

Gastroparesis – a condition due to nerve damage in the gastrointestinal tract that slows the emptying of the stomach.

Gestational diabetes – high glucose caused by hormone changes during pregnancy.

Glucagon – a hormone made by the pancreas to help the body respond to low glucose. Glucagon causes the liver to release stored sugar into the bloodstream.

Glucagon injection kit – an injection that contains glucagon and is available through a prescription. It is used for the treatment of severe low glucose.

Glucose – a type of sugar that, with the help of insulin, is used by our cells for energy.

Glucose gel – a cake icing-like product available without a prescription. It is used for the treatment of low glucose.

Glucose log – a record of glucose results and times and doses of medications or insulin. It also includes other factors affecting glucose, such as exercise, food, stress or illness.

Glucose meter – also called a glucose monitor or glucometer. A small device that allows a person to check glucose.

Glucose tablets – a chewable product available without a prescription. It is used for treatment of low glucose.

Hormone – a chemical substance made in the body that has a specific effect on how certain target cells or organs work.

Hyperglycemia – high glucose.

Hypertension – also called high blood pressure. When blood flows through the blood vessels with a force greater than normal. This can increase the risk of heart attack, stroke and kidney problems.

Hypoglycemia – low glucose under 70 mg/dL. Low glucose must be treated right away with 15 grams of a rapid-acting carbohydrate.

Impotence – also called erectile dysfunction. The inability to get or maintain an erection for sexual activity.

Injection – inserting medications with a needle using a syringe or pen.

Injection site rotation – changing the location on the body where medication is injected.

Insulin – a hormone that helps the body use glucose for energy.

Insulin resistance – the body's inability to respond to and use insulin properly.

Intermediate-acting insulin – a type of insulin that starts to lower glucose within one to two hours after injection and works strongest six to 12 hours after injection.

Ketones – waste product released into the bloodstream when the cells use fat or muscle cells for energy because they cannot take in sugar. When high levels of ketones appear in the urine, it may be a sign of a serious complication called diabetic ketoacidosis.

Lancet – a tiny needle used in a lancing device to prick your finger.

Lancing device – a tool that makes it easier to collect blood for glucose monitoring by using a lancet.

Laser eye surgery – a type of laser therapy used to treat a damaged area of the eye.

Latent autoimmune diabetes in adults (LADA) – LADA is similar to Type 1 diabetes, but occurs as an adult. Insulin is needed to control glucose. Can also be called type 1.5.

Lipodystrophy – the breakdown or buildup of fat below the surface of the skin, causing lumps or small dents. This may be caused by repeated injections of insulin in the same spot.

Liver – a large organ that stores extra glucose and releases it back into the bloodstream when glucose is low, among other functions.

Long-term complications – health problems caused from having high glucose for a number of years. Examples may include heart disease, eye damage (retinopathy), kidney disease (nephropathy) or nerve damage (neuropathy).

Medical identification – an item that alerts others that you have a medical condition. Available in various forms, including bracelets, necklaces, wallet cards, etc.

Meter correlation – a test done at a laboratory that checks whether the glucose meter is accurate.

Microvascular disease – disease of the smallest blood vessels, such as those found in the eyes, nerves and kidneys.

Nephrologist – a doctor who specializes in treating kidney disease (known as nephropathy) that can result from diabetes.

Nephropathy – when high glucose levels damage the kidneys, causing them to leak protein. It can lead to kidney failure.

Neurologist – a doctor who specializes in treating nerve damage, known as neuropathy, that can result from diabetes.

Neuropathy – nerve damage caused by high glucose. It causes pain, loss of feeling and muscle weakness, usually in the hands, legs and feet. It can also affect the heart, bladder, digestive system and sexual organs.

Nurse educator – a registered nurse (RN) with special training in caring for people with diabetes.

Nurse practitioner – an advanced practice RN who can diagnose and treat diabetes.

Obesity – a body mass index of 30 or more.

Oral glucose tolerance test (OGTT) – a test to diagnose prediabetes and diabetes, most often in pregnant women. An overnight fast is required; a blood sample is taken; and a high glucose beverage is given. Blood samples are then taken approximately every two hours and compared with a standard.

Ophthalmologist – a doctor who has attended medical school and specializes in eye care. Ophthalmologists can prescribe corrective lenses, perform dilated eye exams, prescribe drugs and perform surgery.

Optometrist – a person who has attended optometry school and specializes in examining the eyes. An optometrist can prescribe corrective lenses and perform dilated eye exams, but cannot perform surgery.

Pancreas – a gland located behind the stomach that releases the hormones insulin and glucagon. It also helps with digestion.

Pancreatitis – inflammation or infection of the pancreas.

Peripheral neuropathy – nerve damage that affects the feet, legs or hands, causing pain, burning, numbness or a tingling feeling.

Pharmacist – professional who dispenses medications to patients and counsels them on the proper use and adverse effects of that medication.

Physician assistant – a certified medical professional who can also diagnose and treat diabetes.

Podiatrist – a doctor who specializes in foot care.

Polydipsia – excessive thirst; may be a sign of diabetes.

Polyphagia – excessive hunger; may be a sign of diabetes.

Polyuria – excessive urination; may be a sign of diabetes.

Postprandial glucose – the glucose level taken one to two hours after eating.

Prediabetes – diagnosed when a person's A1C is 5.7 to 6.4% and the glucose level is higher than normal, but not high enough to be called diabetes.

Premixed insulin – a commercially produced combination of two different types of insulin.

Preprandial glucose – the glucose level taken before eating. Also called fasting blood sugar.

Protein – one of the three main nutrients in food. Found in meat, poultry, fish, eggs and legumes, for example.

Proteinuria – the presence of protein in the urine, indicating the kidneys are not working properly.

Psychiatrist – a doctor who specializes in the treatment of mental difficulties.

Rapid-acting insulin – a type of insulin that starts to lower glucose within five to 10 minutes after injection, works its strongest 30 minutes to three hours after injection and keeps working up to six hours.

Regular insulin – a type of insulin that starts to lower glucose within 30 minutes after injection. It works its strongest from two to five hours after injection and keeps working up to eight hours.

Retinopathy – eye disease that is caused by damage to the small blood vessels in the retina.

Risk factor – anything that raises the chances of a person developing a disease.

Rule of 15 – how to treat low glucose. Eat 15 grams of a rapid-acting carbohydrate and repeat glucose in 15 minutes.

Self-management – the ongoing process of managing diabetes.

Sharps container – a puncture-resistant container used for safe disposal of used needles and syringes.

Target glucose range – the glucose level ideal to prevent long-term health problems.

Team management – a diabetes treatment approach that includes you and professionals, including a doctor, a nurse practitioner, physician assistants, nurse educators, registered dietitians and pharmacists.

Type 1 diabetes – high glucose because the body's immune system attacked the pancreas until it could no longer make insulin.

Type 2 diabetes – high glucose because the body is unable to make enough insulin or use insulin properly.

Unit – standard measurement used for insulin.

Vascular – relating to the body's blood vessels.

Resources

Reliable websites for diabetes information

Do not trust everything you read on the internet. Use the reliable websites listed below. Others exist, but be sure they are medical or reliable sites, without a lot of advertisements.

diabetes.org	cdc.gov
myfitnesspal.com	joslin.org
calorieking.com	jdrf.org

These are some sites we recommend:

Helpful phone apps for diabetes management

All of the apps listed below are available for Apple or Android devices.

Name of App	Category	Cost	Description
Gymshark	Fitness	Free	<ul style="list-style-type: none"> • Guided exercise tutorials by athletes and trainers • Customizable workout plans • Step-by step exercise breakdowns
Nike Training Club	Fitness	Free	<ul style="list-style-type: none"> • Multiweek training programs catered to specific goals • Standalone workout videos • Live classes • Virtual guidance from Nike master trainers
ICE Medical Standard	Health and Safety	Free	<ul style="list-style-type: none"> • Place emergency health and medical contact information as lock screen wallpaper • Option to be connected to smart 911 database • Can be integrated with online safety profile for faster and more precise treatment
d-Nav	Management and Monitoring	Available by prescription only	<ul style="list-style-type: none"> • FDA-cleared Insulin management guidance service • Translates glucose readings to recommended insulin doses • Calculates next dose of insulin to aid in optimizing insulin management
embassador Companion 24/7	Management and Monitoring	Free	<ul style="list-style-type: none"> • Educational content, personalized health management tools and diabetes-friendly recipes • Keep a personal logbook and receive actionable insights
Glooko	Management and Monitoring	Free with in-app purchases	<ul style="list-style-type: none"> • Comprehensive diabetes management platform • Track glucose, medication, weight, exercise and food • Connect with diabetes care team, identify trends and share reports with friends/family
mySugr	Management and Monitoring	Free with in-app purchases	<ul style="list-style-type: none"> • Smart tracking and automating data importing from devices • Stores data, including glucose, meals, activity, medications and mood • Bolus calculator

Helpful phone apps continued

All of the apps listed below are available for Apple or Android devices.

Name of App	Category	Cost	Description
One Drop	Management and Monitoring	Free with in-app purchases	<ul style="list-style-type: none"> • Comprehensive health data tracking • Displays glucose hourly trends • Expert coaching and community insight data
Sugarmate	Management and Monitoring	Free	<ul style="list-style-type: none"> • Streamlines and maximizes glucose data • Track progress by choosing and following customizable and real-time data and alerts • Integrates smart device technology
Tidepool Mobile	Management and Monitoring	Free	<ul style="list-style-type: none"> • Web app with mobile companion • Integrates data from meters, CGMs and pumps • Tracking for a variety of metrics
Relax Lite	Mindfulness	Free with in-app purchases	<ul style="list-style-type: none"> • Simple and intuitive stress management tool • Guided breathing and meditation exercises • Uses calming music to promote relaxation
CalorieKing	Nutrition and Fitness	Free	<ul style="list-style-type: none"> • Food database search app • Provides nutritional information per item and allows quick comparison • Includes fast food chains and restaurants
Figwee	Nutrition and Fitness	Free with in-app purchases	<ul style="list-style-type: none"> • Photo-based calorie counter • Incremental portion indicator • Visual fitness diary
Fooducate	Nutrition and Fitness	Free with in-app purchases	<ul style="list-style-type: none"> • Track calories, nutrition and workouts • Scan barcode or search food item • Provides letter grade (A-D) with explanation of nutritional benefits
MyFitnessPal	Nutrition and Fitness	Free with in-app purchases	<ul style="list-style-type: none"> • Calorie tracker and basal metabolic rate calculator with large food database • Barcode scanner and device integration • Exercise tracking with personal daily plan
Ate Food Journal	Nutrition and Mindfulness	\$9.99/month \$49.99/year	<ul style="list-style-type: none"> • Mindful food journaling app • Explains why foods are eaten and how they make you feel • Take photos of meals and activities to create a visual timeline of your day

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