

MY LIFE, MY DIABETES, MY WAY

# TYPE 1 DIABETES 101 GETTING STARTED STAYING ON TRACK

Information for Those Who Are Newly Diagnosed



PLEASE CONSULT YOUR HEALTH CARE PROFESSIONAL IF YOU HAVE ANY  
QUESTIONS ABOUT YOUR HEALTH OR TREATMENT.



Developed in  
partnership with  
**JDRF** AMERICAN  
DIABETES  
ASSOCIATION

# MESSAGE FROM NOVO NORDISK

Novo Nordisk is proud to be able to offer you this booklet as part of the **“My Life, My Diabetes, My Way”** series that we have developed in partnership with JDRF – the leading global organization funding T1D research. These booklets were developed as a resource for people who have been touched by type 1 diabetes. Maybe you just got your diagnosis. Or, perhaps you or a family member has been managing it for years. Wherever you are on your diabetes journey, Novo Nordisk is here to help. This is why we have partnered with JDRF to create a unique booklet series tailored to various ages and stages of life from children to young adults with type 1 diabetes – and the people who care for them. Because we know that every age brings new and unique challenges, we have designed these booklets to grow with you on your diabetes journey.

Who are we? Novo Nordisk is a global health care company with more than 90 years of innovation and leadership in diabetes care. In 1923, one of our three Danish founders, August Krogh, touched by his wife Marie’s struggle with diabetes, began a journey to change diabetes. We will continue to build on the legacy left by the founders of Novo Nordisk and do whatever it takes to support people with diabetes. It is this commitment which has led us to develop this booklet series.

We hope that these booklets will be helpful to you in your diabetes journey. Additional support is available online at [type1.cornerstones4care.com](http://type1.cornerstones4care.com).



**Jesper Høiland**  
President,  
Novo Nordisk  
USA

# MESSAGE FROM JDRF

Type 1 diabetes (T1D) is a challenging disease. It demands nearly constant attention and never takes a day off. People of all ages, from newly-diagnosed children to adults who have lived with T1D for decades deserve the tools and resources to help them live with T1D. Together with Novo Nordisk, we’ve created these booklets to be such a resource for anyone who needs it.

Since 1970, JDRF has been working tirelessly to realize our vision of a world without T1D, and we have been fighting for countless families and individuals affected by the disease. As the leading charitable funder of T1D research, we won’t stop until we achieve our mission of accelerating life-changing breakthroughs to cure, prevent and treat T1D and its complications.

For many years, Novo Nordisk has been a trusted ally and partner in the fight against T1D. JDRF is very grateful that Novo Nordisk shares our commitment to support everyone with T1D, and we are looking forward to seeing the positive impact these booklets have for anyone affected by T1D until we find a cure.



**Derek Rapp**  
President & CEO,  
JDRF

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# WELCOME TO THE TYPE 1 DIABETES COMMUNITY

## You Are Not Alone!

If you are reading this, chances are that either you or someone you care for has type 1 diabetes. Either way, a type 1 diabetes diagnosis can be a frightening and isolating experience. Please know that you are not alone. **Did you know that as many as 1.25 million Americans may have type 1 diabetes?** Every year, over 18,000 people younger than 20 years are diagnosed with type 1 diabetes. But you can be diagnosed later in life, too. It may be comforting to know that technologies for monitoring and treating diabetes—from smaller blood sugar testing meters to water-resistant insulin pumps—have changed and improved over the years, making diabetes management easier and more personalized than ever before.

This booklet is designed to provide a quick overview of type 1 diabetes and how to manage it, but it is just an introduction. For more in-depth support, visit [diabetes.org](http://diabetes.org), [jdrf.org](http://jdrf.org), and [type1.cornerstones4care.com](http://type1.cornerstones4care.com). And remember, this booklet is not a substitute for the advice of the health care professionals who make up your diabetes care team.



# What's the Difference Between Type 1 and Type 2 Diabetes?

The amount of diabetes information out there can be overwhelming. And a lot of it can also be confusing, since much of what you hear or read about diabetes is really about type 2 diabetes, not type 1. The reason for this may be that type 1 diabetes is much rarer than type 2 diabetes in general, making up only 5% of all cases of diabetes. Type 1 diabetes used to be referred to as “juvenile diabetes” since half of all people with type 1 diabetes are diagnosed during childhood or their early teens. But, in reality, type 1 diabetes can happen at any age, so that term isn't used much anymore. Here are the basic differences between type 1 diabetes and type 2 diabetes.

TYPE 1 DIABETES	TYPE 2 DIABETES
The body makes very little or no insulin at all.	The body doesn't make enough insulin or the body does not respond properly to the insulin it does make.
Approximately 5% to 10% of people with diabetes have type 1.	Most people with diabetes—about 95%—have type 2.
Type 1 diabetes is usually diagnosed more often in children and young adults.	Type 2 diabetes is usually diagnosed in people who are older or in those who are overweight, but that is not always the case. It can also be diagnosed in younger people.



# Type 1 Diabetes Is an Autoimmune Disease

In people without diabetes, special cells in the pancreas called *beta cells* make insulin. Insulin helps move sugar from the bloodstream into cells all over your body, like cells in your muscles and organs, where the sugar is converted into useful energy. There are mechanisms within the body that constantly check how much sugar is in the bloodstream. When blood sugar rises, like it does when you eat food, the body signals the pancreas to release more insulin.

In type 1 diabetes, the body's own immune system mistakenly attacks and destroys the beta cells in the pancreas as if they were foreign cells. This usually happens without symptoms or pain and is known as an autoimmune response. As a result of beta cells being destroyed, the pancreas makes little or no insulin. And when that happens, there's not enough insulin to help sugar get out of the blood and into the cells where it's needed for energy. Instead, this unused sugar builds up in the blood. High blood sugar and lack of insulin can lead to a severe condition called diabetic ketoacidosis (DKA). For more information on DKA, see page 31.

When you have type 1 diabetes, **you must take insulin**, usually by injection or pump, in order to control your blood sugar.

# Type 1 Diabetes Symptoms and Causes

When you have type 1 diabetes, symptoms can start very quickly, may be severe enough that you need to go to the hospital, and can include:

- ➔ Increased thirst and hunger
- ➔ Frequent urination
- ➔ Weight loss
- ➔ Blurry vision
- ➔ Feeling very tired

**How did this happen?** The frustrating truth is that no one really knows exactly what causes type 1 diabetes. It is believed that family history (genetics) and environmental factors may be involved. For example, if you have a parent or sibling with type 1 diabetes, you are 10% more likely to develop it than someone without a family history. However, many people without a recent family history of type 1 diabetes can develop it, too. There is also some evidence that viral infections, exposure to chemicals, and, in rare cases, even certain drugs can trigger type 1 diabetes.

There is a lot of research being done to try and determine the risk factors for type 1 diabetes and the potential causes, so in the future hopefully it can be prevented, cured, or made less damaging. At this point in time, **there is no way to prevent type 1 diabetes**. So, despite the many myths that exist, there is **nothing** you or your loved one did to cause type 1 diabetes. And, no, you cannot get type 1 diabetes from eating too much sugar! And while increased age, obesity, and inactivity may be factors in developing type 2 diabetes, they have **nothing** to do with developing type 1 diabetes. But the good news is that there are many things you can do to manage type 1 diabetes and live a full life.





# MANAGING TYPE 1 DIABETES

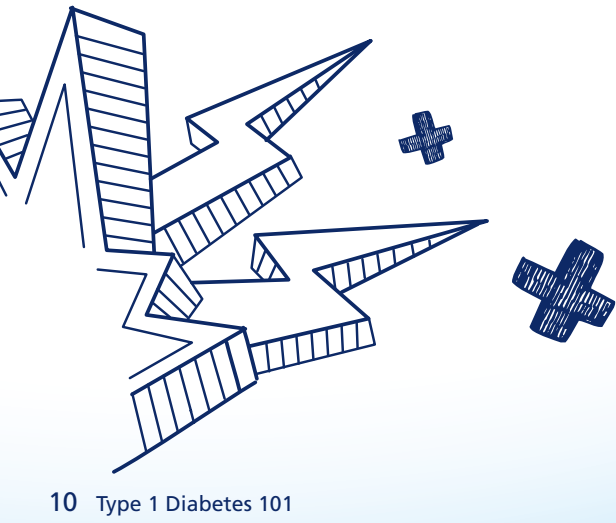
The first thing you need to know is that treating your type 1 diabetes involves taking insulin every day. Since there's little to no insulin in the body, it has to be replaced. And in order to replace the insulin the pancreas no longer produces, you must take insulin, either by injection or pump. In addition to taking insulin, healthy eating, physical activity, and tracking your blood sugar are also important for people with type 1 diabetes.

When someone in the family is diagnosed with type 1 diabetes, it can seem like the entire household has diabetes. Why? Because diabetes can touch almost every part of a person's life, including their:

- \* Food choices
- ⚡ Activity level
- ★ Moods

And these things can affect the whole family. But it can be both healthy and interesting for the whole family to take on the same diabetes-friendly habits as the person who has type 1 diabetes. Here are some diabetes "do's and don'ts" that can help friends and family stay positive and show support:

- ➔ DO choose to eat healthier
- ➔ DO enjoy the same foods as your loved one
- ➔ DO join in your loved one's activities
- ➔ DO check, or help check, your loved one's blood sugar, especially if they cannot or don't like to self-check
- ➔ DON'T become the "diabetes police" by nagging too much





# HEALTHY EATING

What's the difference between healthy eating for someone with type 1 diabetes and someone without diabetes? Not much! You do not need to eat special foods. When you have type 1 diabetes, you can and should eat a wide variety of foods. And you should balance your carbohydrates, proteins, and fat. Having type 1 diabetes doesn't mean having to say "no" to everything with sugar or avoiding dessert entirely. But when you have diabetes, you do have to pay more attention to your food choices and portion sizes.

Both kids and adults with type 1 diabetes need to make sure that the calories and carbohydrates ("carbs") they eat are balanced with the medicine they take, and the physical activity they do. So the more you understand what's actually in your food, the easier blood sugar management becomes. Working with a dietitian experienced in diabetes care can help you to develop or change a meal plan to meet your specific nutritional goals.



# Meal Planning

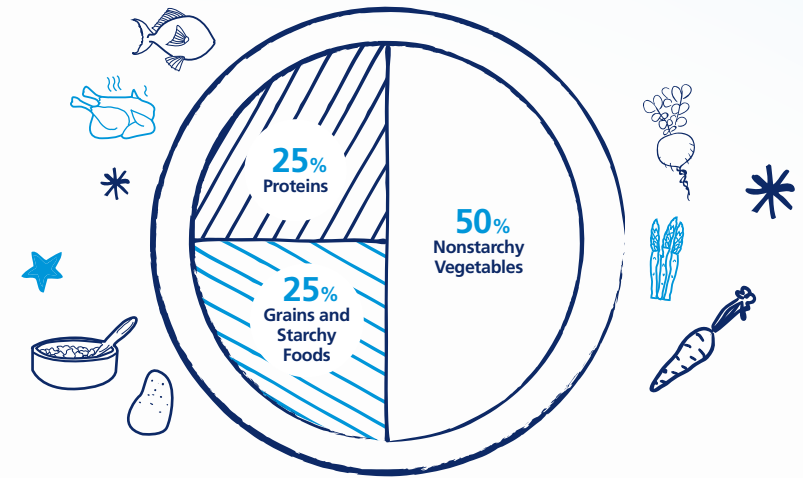
To come up with your meal plan, it's a good idea to go to a registered dietitian, a health care professional specially trained to advise people about meal planning, nutrition, and weight control. And finding a registered dietitian who is also a certified diabetes educator (CDE) is even better because that person will have additional training in diabetes management. Ask your doctor to refer you to a registered dietitian.

No matter who puts it together, a realistic meal plan should include some of your familiar favorite foods and fit within your schedule and lifestyle. There should be some flexibility built in so you (and/or the person with type 1 diabetes who you care for) don't get bored eating the same things all the time. A good meal plan should help you to:

- \* Reach individual blood sugar goals
- \* Achieve and keep a healthy weight
- \* Prevent health problems related to eating habits

There are many approaches to managing a meal plan. You and/or the person with diabetes you care for may find it useful and necessary to count:

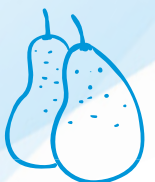
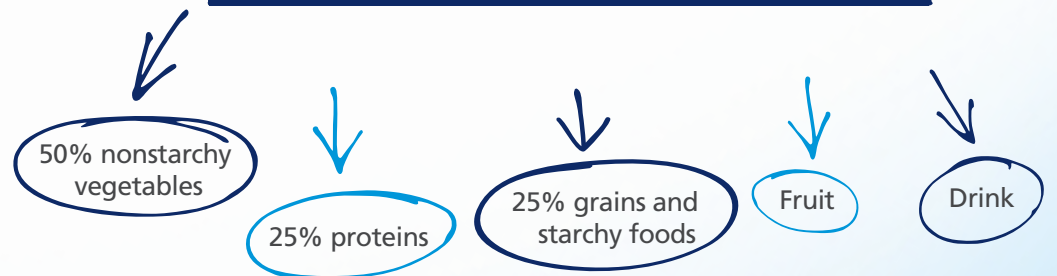
- Calories
- Grams of fat
- Grams of carbohydrates
- Milligrams of salt



This is how a healthy meal is balanced. Portion sizes will depend on your meal plan. For more information, go to the American Diabetes Association (ADA) website at [diabetes.org](http://diabetes.org).

Talk with your dietitian and other members of your diabetes care team to find out which method—or methods—work best for you.

The American Diabetes Association recommends using a "Create Your Plate" method for following your meal plan. It divides your plate into:





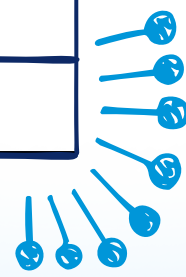
# Carbohydrates, Blood Sugar, and Insulin

It can take time to figure out how different carbohydrates affect your blood sugar. Many people who have had type 1 diabetes for a while, or have had a lot of experience being a caregiver of someone with diabetes, are experts at carbohydrate or “carb” counting. But if you’re new to diabetes or just need a reminder, this section can help. The main nutrients in food that give the body energy are:

- ➔ Carbohydrates
- ➔ Proteins
- ➔ Fats

So why do carbs get so much attention in diabetes management? It’s because carbs can raise blood sugar levels more than other nutrients. Sugars found naturally in foods like milk and fruit are types of carbs called simple carbohydrates. Foods containing simple carbohydrates will begin to raise blood sugar levels very soon after they are eaten. Sugars that take longer to break down in the body, such as starches, are called complex carbohydrates. As a result, they cause the amount of sugar in the blood to rise more slowly.

SIMPLE (SUGARY) CARBS	COMPLEX (STARCHY) CARBS
Sugary foods: candy, regular soda, jelly	Starches: bread, cereal, crackers, grains, rice, pasta
Fruit and fruit juices	Starchy vegetables: potatoes, corn, peas, beans
Milk and yogurt	
Desserts/sweets: cakes, cookies, pies, ice cream	



So why bother eating carbs if they can raise blood sugar more than other nutrients? It’s because everyone needs to eat some foods with carbs. Carbs provide the body with energy, along with many vitamins and minerals. Carb counting is a good way to better understand how eating certain foods can affect diabetes. It can help you to:

- \* Control blood sugar
- \* Manage and keep track of how many carbs you are eating
- \* Choose which foods best fit into your meal plan
- \* Find room in your meal plan for foods that you love

## To count carbohydrates, you need to:

- ➔ \* Know which foods contain carbohydrates
- ➔ \* Find out how many carbohydrates are in those foods
- ➔ \* Read food labels and use measuring tools, such as measuring cups, spoons, and a food scale
- ➔ \* Understand how the food you eat, your physical activity, and what medicines you take affect your blood sugar levels ➔



# Carb Counting (cont'd)

When counting carbohydrates, knowing how to read Nutrition Facts labels can make it easier. Two important things to look for when using a food label to count carbohydrates are serving size and the total carbohydrate. Don't worry about counting sugar and fiber grams for this purpose. They are already included in the total carbohydrate number. Always remember to check the serving size. Information on the label is based on the serving size. Keep in mind that packages often contain more than one serving. See how many grams of carbohydrates are in each serving. Then decide whether the food fits into your meal plan.

## There are two common ways that people balance carb counting and insulin.

### → Changing carbohydrate intake to match the insulin dose:

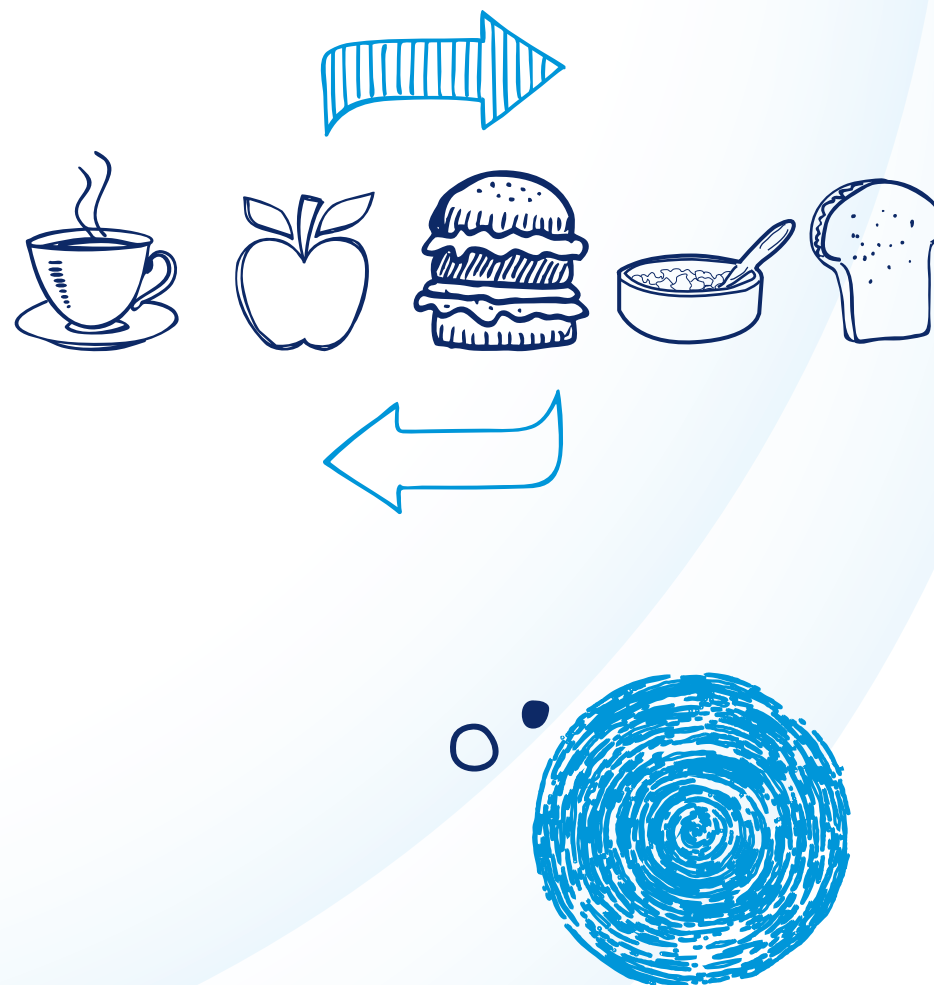
To count carbohydrates this way, you need to limit the number of servings of carbohydrates you consume so that it matches your fixed insulin dose. Doing so can help keep your blood sugar levels in your target range.

### → Changing the insulin dose to match carbohydrate intake:

Matching the amount of insulin you take before eating to the amount of carbohydrates you choose to eat at a meal is another way to count carbohydrates. This allows for more flexibility and choice at mealtimes.

Some people also find it helpful to use exchange lists. Exchange lists divide foods into groups based on how many nutrients and calories they contain. Different foods are measured and weighed so the amount of carbohydrate, protein, fat, and calories is the same in each choice. Because they're the same, any food on the list can be exchanged or swapped for any other food on the list for the same nutritional content. It's a great way to compare the nutrient content of different foods, like apples and oranges so to speak (and hundreds of other foods, too). For more information on the Diabetic Exchange List, visit [glycemic.com](http://glycemic.com).

While there are many different approaches and tools to use, working with your diabetes care team is the best way to fine-tune food intake, insulin doses, and blood sugar control.





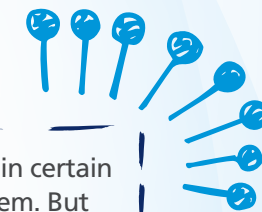
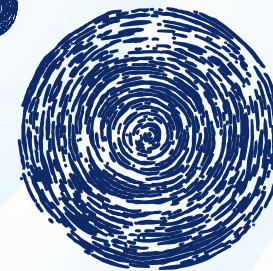
# Glycemic Index

All carbohydrates (carbs) are not created equal, so counting carbs alone may not show the whole picture. Some foods that have carbs can cause a faster rise in blood sugar than other foods. Using the glycemic index (GI) may be a helpful way to identify and compare how different foods can affect blood sugar. The GI divides foods up into 3 sections:

- ⊕ High GI (70 or more) — Foods like white bread and white rice
- \* Medium GI (56 to 69) — Foods like sweet potato and pineapple
- ⊖ Low GI (55 or less) — Foods like mixed-grain bread and chick peas

They are ranked on how they compare to glucose (sugar). The idea is that a food with a low glycemic index will cause a small and slow rise in blood sugar, while a food with a high glycemic index will cause blood sugar to rise more quickly.

While the GI can be a helpful way to compare or rank food choices, not everyone finds it to be an accurate or useful tool for blood sugar control. So before changing what you eat based on the GI, talk to your health care provider about how it may (or may not) be helpful for your diabetes care plan.



**What Is “Gluten-free” All About?** Gluten is a protein found in certain grains (wheat, rye, barley). For most people it is not a problem. But there is a condition called **celiac disease**, where the body cannot properly digest gluten and a gluten-free diet is often necessary. Because it is also an autoimmune disease, celiac disease may happen in people who have type 1 diabetes. Note that while most people with type 1 diabetes will not develop celiac disease, some might, so it is worth knowing about. If you have any concerns about your diet and digestive health, talk to your health care provider.

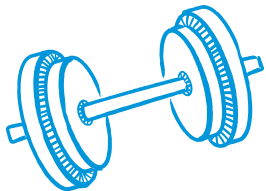


# BEING ACTIVE

Staying active can help keep blood sugar levels as close to normal as possible, which is important for people of all ages with type 1 diabetes. Consider these tips when planning to be physically active:

- + **Play it safe!** Be sure to check with your diabetes care team before beginning or changing your physical activity plan
- + **Check your blood sugar.** Before starting physical activity, it's a good idea to check your blood sugar and avoid physical activity if your blood sugar levels are higher or lower than your health care professional recommends. Everybody is a little different, but in general:
  - If your blood sugar is less than 100 mg/dL, you may need an extra carbohydrate snack, such as a piece of fruit or a few crackers. Then test 15 to 30 minutes later. Don't start exercising until your blood sugar is above 100 mg/dL
  - If your blood sugar before exercise is more than 250 mg/dL, check for ketones in your urine. If there are ketones, DO NOT exercise. Contact your diabetes care team immediately for more instructions
- + **Prepare for low blood sugar.** Low blood sugar (hypoglycemia) following heavy activity is always a possibility. Keep a sugary snack or glucose tablets nearby when you are physically active in case blood sugar levels drop quickly
- + **Keep a physical activity log.** Before and after starting any physical activity, write down your latest blood sugar readings. By reviewing your written records, you'll learn what works for you
- + **Make physical activity a normal part of your everyday life.** You may already be doing this, but if you're not, it can take a while to get started. Doing little things, like skipping the elevator and taking the stairs instead, can help. Or even walking around the block a few times a day. Lots of people use a pedometer to help count steps. Try to increase your daily step count a little each day

- + **A great way to start being more active is to start walking.** Over time, you may want to progress from walking to running. How? Start walking as normal, then try jogging for a few minutes. If you start to feel winded or out of breath, switch back to a brisk walk. Once you've gotten your breath back, try going back to jogging or running again. It may take you a while to run any distance and you may like combining walking, jogging, and running instead of going at a full-out run. Do what's comfortable for you, but never stop challenging yourself! If you're not sure how you want to start becoming more active, ask your health care professional which physical activity or activities are good for you!





# MEDICINE

People with type 1 diabetes need to replace the insulin their bodies are no longer making by taking insulin. They can take insulin by:

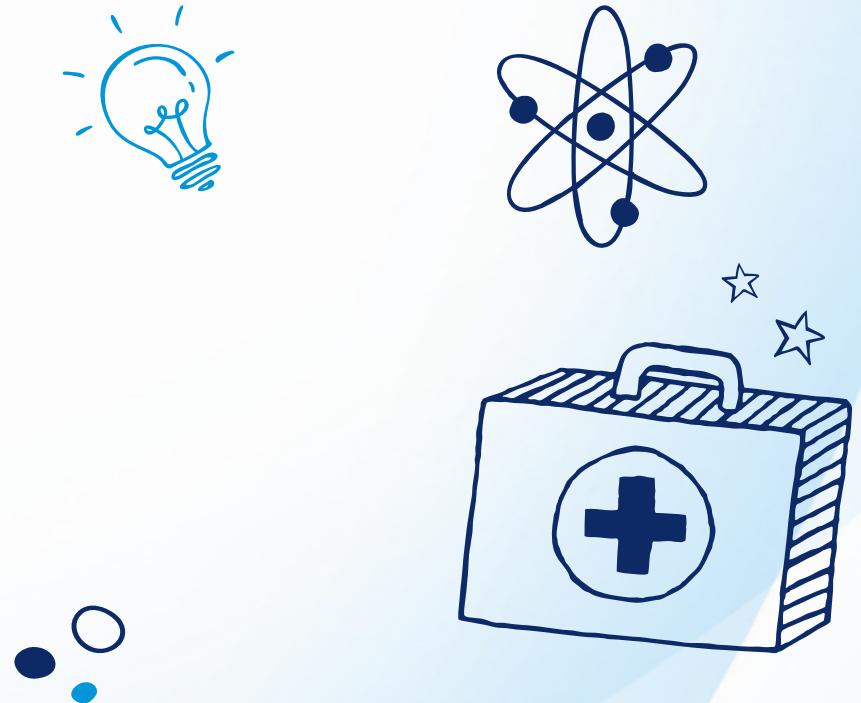
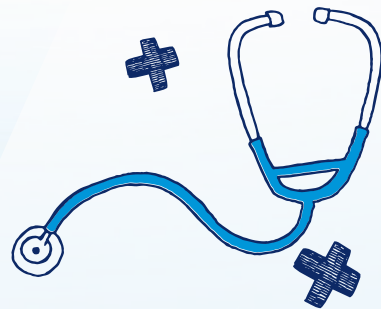
- ➔ Injecting with an insulin pen
- ➔ Injecting with a vial and syringe
- ➔ Infusing with an insulin pump

While most people taking insulin use an insulin pen or traditional vial and syringe, insulin pumps are growing in popularity. According to the American Association of Clinical Endocrinologists, about 20% to 30% of people in the United States with type 1 diabetes (an estimated 350,000 to 515,000 people) use insulin pumps.

If you have type 1 diabetes, you will need insulin coverage 24 hours a day, 7 days a week, 365 days a year. In fact, most people with type 1 diabetes need to take multiple daily injections of insulin or multiple infusions using an insulin pump. They also need to keep a close watch on their blood sugar. Blood sugar checks throughout the day are the best way to do this.

The goal of your insulin therapy is to provide you with replacement insulin in a pattern that closely mimics the way your pancreas would release insulin if you did not have diabetes. You may also be taking other medicines to treat your diabetes or for other health conditions that can occur with your type 1 diabetes but are not directly related to it (called coexisting conditions).

Let your health care provider know about all the medicines you take, even vitamins and herbal remedies, because some medicines don't work as effectively when they are mixed with others.



# CHECKING AND TRACKING BLOOD SUGAR

Checking your blood sugar on a regular basis is an important part of managing type 1 diabetes. Usually, you will check your own blood sugar. However, infants, young children, and people who are hospitalized or who have severe disabilities may need to rely on a caregiver. Caregivers can be parents, other family members, school staff, childcare providers, and/or health care providers.

Keeping a good record of your blood sugar readings over time (tracking) gives clues to how well your meal and activity plans are working together with insulin. It also allows your health care providers to see how well your diabetes care plan is working, or if it needs to change.

## Tools for checking your blood sugar

You will need to check your blood sugar up to several times a day according to your health care provider's instructions. Most people use meters that take a small sample (drop) of blood from a finger-prick. Before pricking your finger, you insert the test strip into the meter. Then you prick your finger with a lancing device to bring out a drop of blood. You then place that drop of blood by the side of a test strip. The test strip draws the blood in by capillary action and then the meter produces a blood sugar reading.

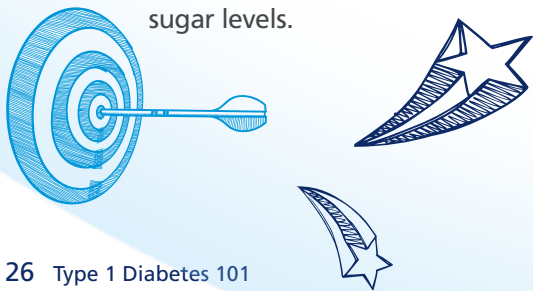
There is another way of checking your blood sugar called a "continuous glucose monitor" or CGM. This is a more advanced way of checking blood sugar that can be useful. The CGM has a small sensor probe that is inserted beneath the skin (like a pump infusion set), which measures the fluid between cells (interstitial fluid). This measure can also be used to calculate blood sugar. This sensor communicates through a transmitter, which sits on top of the skin and is attached to the sensor. It communicates wirelessly with a handheld device known as a receiver that can display real-time blood sugar readings at 1- and 5-minute intervals. You can also set alarms to alert you to high or low blood sugar levels.

CGM provides much more information than finger-prick readings alone. The detailed information the CGM provides may be used to help you figure out blood sugar patterns, so you and your diabetes care team can fine-tune food choices and insulin doses.

Your health care provider and diabetes care team will help you figure out when, how often, and with what tools your blood sugar should be checked.

## Your blood sugar tracker

You don't need to use a complicated system. In fact, you can use a simple notebook and pencil to write down the numbers and testing times. Or you can download a blood sugar tracker from [type1.cornerstones4care.com](http://type1.cornerstones4care.com). You should also make sure to read the instructions that came with your blood sugar meter. Some meters record a digital log of blood sugar readings that you can download to your computer and/or your health care professional's computer.





# BLOOD SUGAR HIGHS AND LOWS

## Understanding A1C and Blood Sugar Control

When it comes to taking care of type 1 diabetes, you may hear a lot about your A1C numbers. This may be especially true if your numbers are not at goal, meaning that they are higher than your diabetes care team has decided they should be. So what do your A1C numbers really mean?

**An A1C test measures average blood sugar over the past 2 to 3 months, and the results are shown as a percentage. But what does A1C actually measure?**

There is a protein inside red blood cells called hemoglobin that carries oxygen from the lungs to all the cells of the body. Blood sugar (or glucose) enters red blood cells and links up (or glyicates) with hemoglobin. When more glucose is in the blood, more of it can attach to hemoglobin. When too much glucose is attached to hemoglobin, it's a sign you have too much sugar in your blood.

Red blood cells live for about 3 months. So an A1C test shows the average level of glucose in the blood during that time. It's like a snapshot of blood sugar levels for the past 2 to 3 months.

While both A1C tests and regular blood sugar checks show how well diabetes is being managed, A1C provides a longer-term picture of blood sugar control. So your health care provider should measure your A1C levels at least twice a year if your blood sugar goals are being reached. When your treatment plan has changed or your goals are not being reached, your A1C may be tested as much as 4 times a year.



While everyone's goals are going to be slightly different, the ADA does have general recommendations for A1C goals and for what blood sugar numbers should be when they are checked throughout the day. This includes your **FPG** (your blood sugar when you haven't eaten for at least 8 hours) and your **PPG** (your blood sugar 1 to 2 hours after you eat).

SUMMARY OF BLOOD SUGAR GOALS FOR CHILDREN AND NONPREGNANT ADULTS WITH DIABETES	
Blood Sugar Goals for Children (ages 0-18)	
Before meals (FPG)	90–130 mg/dL
Bedtime/overnight	90–150 mg/dL
A1C	Less than 7.5%
Blood Sugar Goals for Nonpregnant Adults (ages 19+)	
Before meals (FPG)	80–130 mg/dL
After meals (PPG)	Less than 180 mg/dL
A1C	Less than 7.0%

FPG=Fasting plasma glucose, or before meal blood sugar  
PPG=Postprandial glucose, or after meal blood sugar

Higher or lower blood sugar goals may be recommended for different people with type 1 diabetes. Talk to your health care provider about your personal goals.

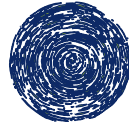


# High Blood Sugar

With type 1 diabetes, blood sugar can sometimes go too high (also called hyperglycemia). This usually happens when the body has either too little insulin or no insulin.

A number of different things can cause high blood sugar, including:

- ★ Not taking enough insulin
- ★ Eating more than planned
- ★ Being less active than planned
- ★ Physical stress from illnesses, such as a cold or the flu
- ★ Emotional stress or excitement



Blood sugar is considered high when it is above your recommended blood sugar target. Talk to your health care provider about what he or she thinks is a safe target for your blood sugar before and after meals. In order to avoid high blood sugar emergencies, you have to know the signs and symptoms of severe high blood sugar and have a plan for dealing with them.

Signs and symptoms of high blood sugar can include:

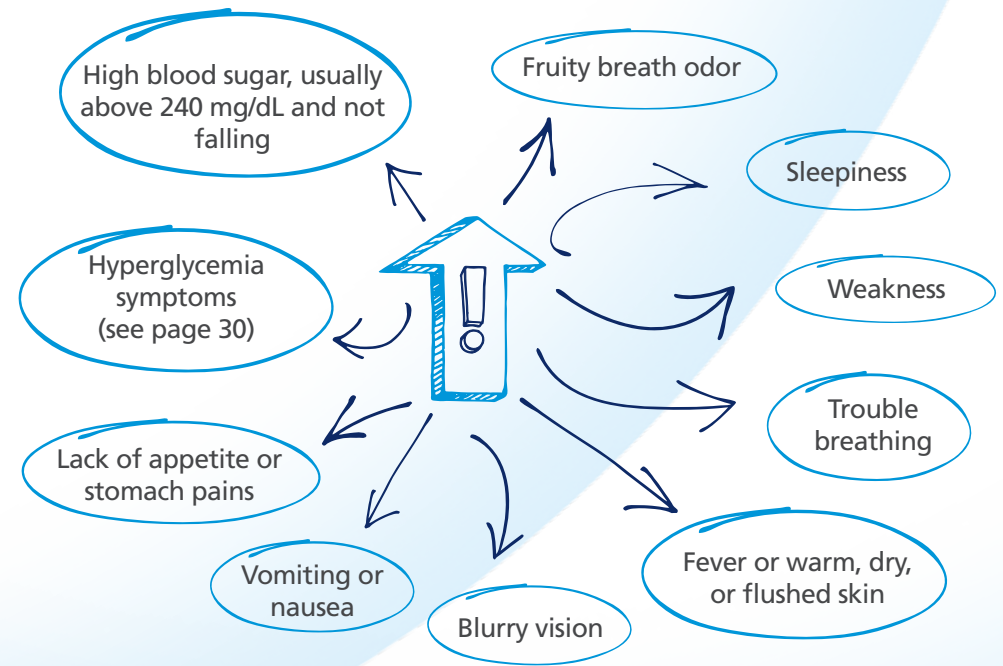
- ★ High blood sugar readings when testing
- ★ High levels of sugar in the urine
- ★ Frequent urination
- ★ Increased thirst
- ★ High levels of ketones in your urine



# Why Is High Blood Sugar a Problem?

High blood sugar can be serious if left untreated. In the long term, it may increase the risk for diabetes-related problems with the feet, eyes, kidneys, nerves, teeth, gums, heart, and blood vessels. In the short term, it could lead to a severe condition called DKA, which stands for diabetic ketoacidosis.

DKA can develop when the body doesn't have enough insulin. This can happen if you are not using the correct amount of insulin to account for your food intake, or when you are not taking your insulin at all. Without insulin, sugar can't get into the body's cells to be used for fuel, so the body breaks down fats instead. But when the body breaks down fats, it produces waste products called ketones. Ketones are acidic and too many of them can change the pH of the blood to unsafe levels. DKA usually happens as a result of high blood sugar (hyperglycemia). Common signs and symptoms of DKA can include:



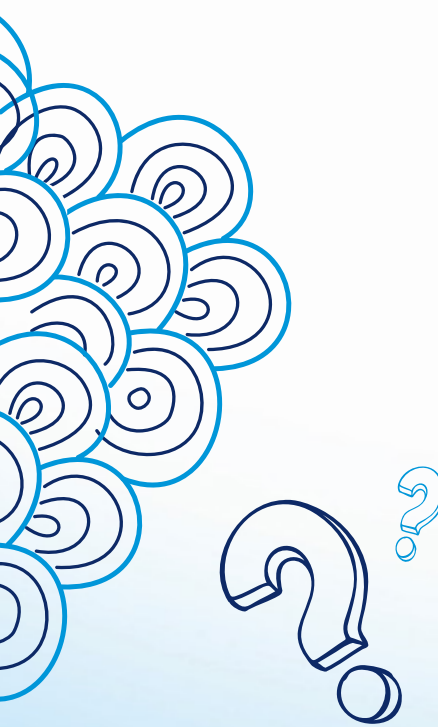
DKA is an emergency. Untreated DKA can lead to coma and loss of life. If you or your loved one has any of the above symptoms, contact your health care provider right away.

# What to Do About High Blood Sugar

One way to help lower blood sugar is to do some physical activity. But according to the American Diabetes Association (ADA), if your blood sugar is higher than 250 mg/dL and not falling, do not exercise and check urine for ketones. Exercising with ketones can make blood sugar go even higher. Ask your health care provider for recommendations about this and what you should do.

If blood sugar is high after meals, make sure to talk to your health care provider so they can help you adjust your insulin dose accordingly. Watch what you are eating to see how different foods affect your blood sugar. Once you know how your body reacts to foods, you can make changes to the meal plan so blood sugar won't rise too high, too quickly.

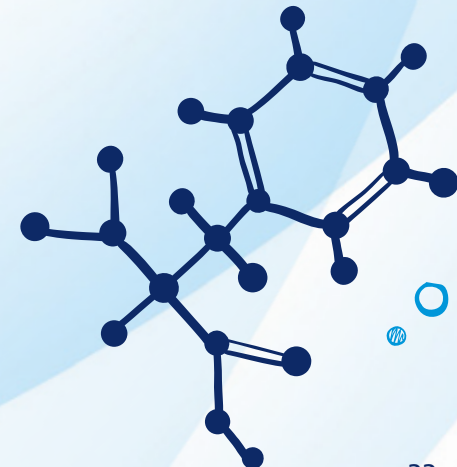
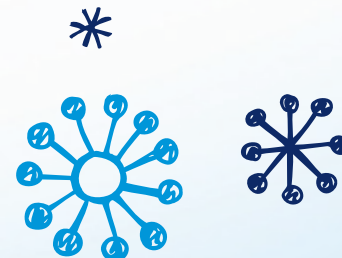
Physical activity and changes to a meal plan can help bring down blood sugar. If this does not work, you may need to take more insulin. Talk to a health care provider before making any changes in the amount or timing of your insulin dose.



# Ketones and Ketone Testing

**What are ketones?** Ketones are acidic substances that the body creates when it breaks down fat for energy, rather than glucose. This usually happens when blood sugar is high (over 240 mg/dL) and there isn't enough insulin for the body to process sugar (glucose). When too many ketones build up in the blood and urine, it can lead to serious illness. If you find ketones in your urine, call your health care provider right away and talk about how to safely lower blood sugar. Seek emergency help immediately if your ketones do not go down or if you are vomiting and can't stop.

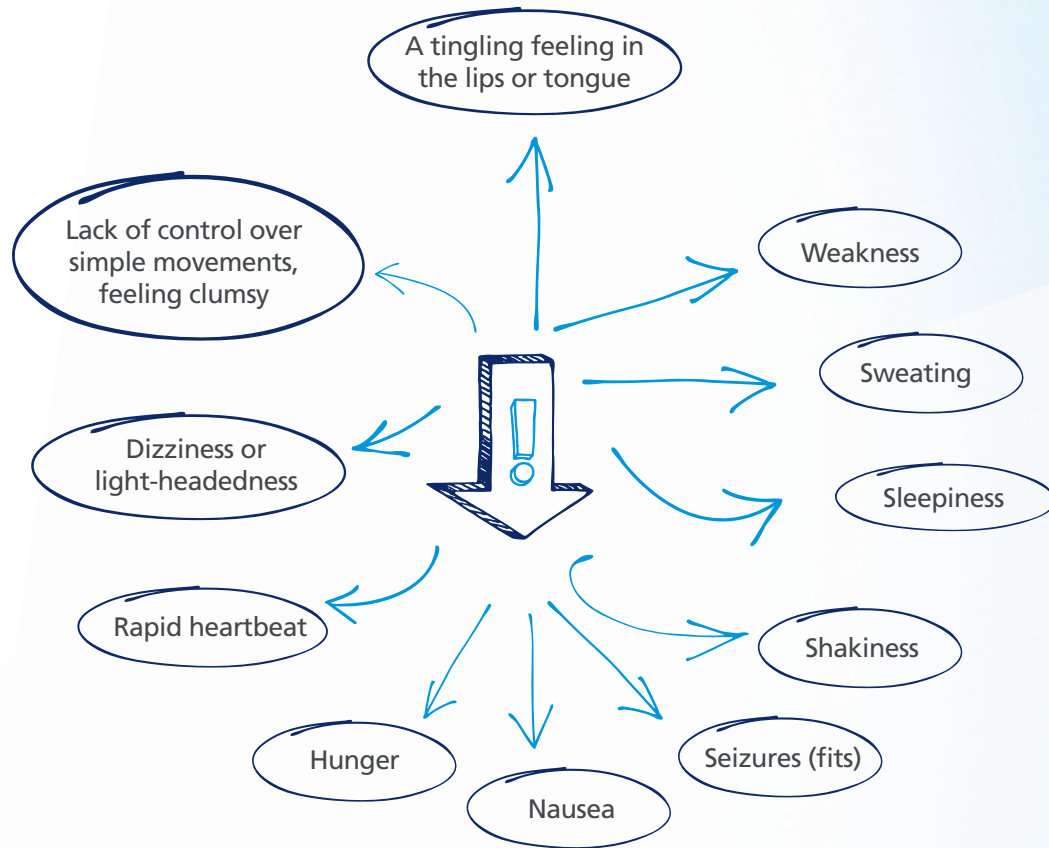
Ketones can be detected with a simple urine test using a test strip, similar to a blood-testing strip. Some blood glucose meters also check for ketones. Ask the doctor when and how to test for ketones. According to the ADA, urine should be checked for ketones when blood sugar is more than 240 mg/dL and not falling or if the person with diabetes feels ill. When you or your loved one with diabetes is sick (for example, with a cold or the flu), check for ketones every 4 hours. Also check for ketones when there are symptoms of DKA.





# Low Blood Sugar

Low blood sugar (hypoglycemia) happens when blood sugar is lower than normal (usually less than 70 mg/dL) and can be a side effect of insulin. Low blood sugar can be dangerous if not detected and treated immediately. There are many possible symptoms of low blood sugar, including:



Checking your blood sugar is the best way to find out if it is low. If it's not possible to check your blood sugar right away, but you experience some of the symptoms listed above, play it safe and treat for low blood sugar. If left untreated, low blood sugar can get worse and you can pass out (become unconscious) or have a seizure.

**The quickest way to raise blood sugar and treat hypoglycemia is with some form of fast-acting carbohydrates.** Many people with diabetes carry glucose tablets. You can purchase them at many drugstores. Other foods with sugar also work well to treat low blood sugar, like fruit juice, nondiet soda (about 4 oz), or hard candies (5 to 7 pieces). The important thing is to eat at least 15 grams of sugars or carbohydrates as soon as symptoms of low blood sugar show up. After checking for and treating low blood sugar, wait 15 minutes and check again. If it is still low and symptoms haven't gone away, try another 15 grams of carbohydrates. After you feel better, go back to eating regular meals and snacks as planned to keep blood sugar up.

Talk to your health care provider about the best way to treat low blood sugar.



## Low Blood Sugar (cont'd)

Sometimes low blood sugar can be severe enough that it can cause you to pass out (lose consciousness). When this happens it is serious, but it is also treatable. In cases where you can't swallow, low blood sugar can be treated with an injection of glucagon. Glucagon does the opposite of what insulin does. It's injected to raise blood sugar instead of lowering it. You should have glucagon emergency medicine around at all times. Most likely, the doctor has already written a prescription for it. If not, talk to your doctor about glucagon emergency medicine as soon as possible. If your doctor decides that it is appropriate for you, the diabetes care team can give you instructions on how to use it.

Obviously, if you pass out from low blood sugar, you won't be able to inject glucagon yourself. So you need to teach family and friends who are around the most how to inject it for you. Go over the steps with them so they'll know what to do if the time comes. Whoever gives you a glucagon injection should also know to call 911 immediately in case you need additional emergency assistance. If you experienced a severe low blood sugar event that had to be treated with a glucagon injection, be sure to let your diabetes care team know. This may be a sign that they may need to help you adjust your diabetes care plan. They may also be able to help figure out why the low blood sugar event happened and help prevent another one.



## Nighttime Low Blood Sugar

A low blood sugar event can happen in the middle of the night. This can be scary because when you are asleep, you may not know what's happening. And because others are asleep too, they may not see what's happening, either. That could mean that your low blood sugar may not get treated when it's needed. It's also important to keep an eye out for children with type 1 diabetes when they are asleep. Parents and other caregivers may need to get up in the middle of the night, or even several times a night, to check their child's blood sugar. Some CGM systems even have alarms that wake you up when blood sugar falls too low at night.

**A number of different things can cause nighttime low blood sugar.** Sometimes having a very busy day or being active close to bedtime can lower blood sugar too much. Drinking alcohol in the evening can put you at risk for low blood sugar, too. Having a late dinner and going to sleep a couple of hours later can also cause low blood sugar during the night because the mealtime insulin you took at dinner may still be working to lower blood sugar for several hours afterwards.

There are some ways to figure out if you may have had nighttime low blood sugar. You may sweat so much that you wake up with damp pajamas or sheets. You may also wake up with a headache and feel tired, irritable, or confused. It can also cause you to cry out during sleep or have nightmares. A fast heartbeat and anxiety before bed may also be signs. If you are having nighttime low blood sugar, talk to your health care provider immediately about how to help prevent and treat it.



# AVOIDING DIABETES-RELATED HEALTH PROBLEMS

Keeping your blood sugar at goal is a big part of diabetes care. Why? Because high blood sugar can, over time, affect many different parts of the body.

## Nerves (Neuropathy)

Although diabetes doesn't usually damage the brain and spinal cord, it can cause problems with the rest of the nerves in the body (neuropathy). It is not completely clear why this happens. But some people who have had uncontrolled diabetes for a long time are more likely to have some nerve damage. Not all people with diabetes have nerve damage. And having well-controlled blood sugar certainly reduces the risk.

Some of the symptoms of nerve damage may include pain in hands and feet, trouble digesting food, loss of bladder or bowel control, and lack of strength. These symptoms may come and go and may feel worse at certain times. But they can also be caused by other health problems, so be sure to talk with the diabetes care team if you are having any of them.

➔ **Feet (Peripheral Neuropathy)** High blood sugar can affect nerves in the feet. This can cause painful sensations in some people and numbness in others. If you lose feeling in your feet and legs, an injury there can go unnoticed for a while and may become infected. That's why it's important, at each visit with the diabetes care team, to make sure that your feet are checked. A good way to remind you and your health care provider is to take off your socks and shoes before the examination.

## Eyes (Retinopathy)

Small blood vessels run through the retina of the eye. Over time, uncontrolled high blood sugar can affect these vessels, leading to a number of eye problems—even blindness. That's why it's important for people with diabetes to get their eyes checked regularly. Once a year, get an eye exam where the eye doctor widens (dilates) the pupils to look for problems inside the eye.

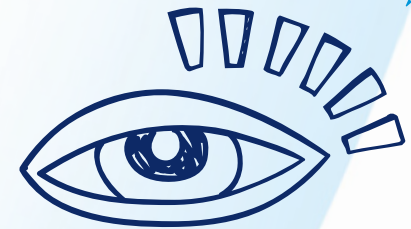
## Kidneys (Nephropathy)

The kidneys perform a vital function in the body, so having normal kidney function is important. Uncontrolled diabetes can raise the risk of kidney disease. When it is not treated, high blood sugar can damage the small blood vessels in the kidneys over time, and the kidneys can no longer filter out the impurities in your blood. There are tests the doctor will request at least once a year to check for kidney damage, including the urinary albumin test and the serum creatinine blood test.

## Teeth and Gums

Diabetes can cause tooth decay and gum infections. That's because high blood sugar can add more sugar to saliva, which can help harmful bacteria to grow. You should get a dental checkup and cleaning at least twice a year. Let the dentist know that you have diabetes.

**Talk to your health care provider immediately if you are having any of these problems.**





# THE DIABETES CARE TEAM

You will work with your diabetes care team to create a diabetes care plan that is designed to fit your individual needs. You are responsible for assembling your own care team, but it may be helpful to ask your current health care providers if they have referrals or recommendations for the other providers you need. Along with the primary care doctor, your diabetes care team may include the following health care professionals:

## Endocrinologist

a doctor who treats people who have endocrine gland problems, such as diabetes

## Nurse

who works with doctors, and they may show you how to do certain things, like how to take insulin (or how to give it if you are a parent or caregiver)

## Diabetes Educator

a health care provider who teaches you about diabetes, including how to check your blood sugar and reduce the risk of diabetes-related problems

## Registered Dietitian

who can help you create a meal plan that fits your personal needs and tastes

## Ophthalmologist

a doctor who diagnoses and treats all eye diseases and eye disorders

## Podiatrist

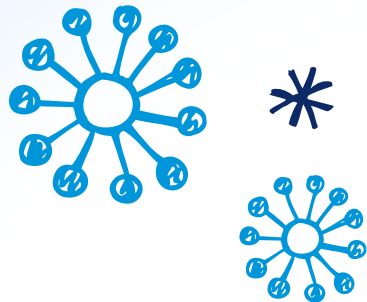
a doctor who specializes in the feet and checks feet for wounds and infections

## Pharmacist

a trained professional who knows about the chemistry of medicines you take for your diabetes and other conditions

## Mental Health Professional

this can include social workers, family therapists, psychologists, or psychiatrists who help people cope with the stress and emotions that can come from living with type 1 diabetes



# DIABETES GLOSSARY

## Accommodations

Additional aids, services, and modifications to the school's academic program that may be required to allow students with diabetes to participate in the regular educational environment, such as additional breaks during tests.

## A1C Test

A blood sugar test performed at your health care professional's office that gives you and your diabetes care team a picture of your average blood glucose (blood sugar) control for the past 2 to 3 months. The results can give you a good idea of how well your diabetes treatment plan is working.

## Carbohydrates

One of the main nutrients found in food, along with fat and protein. Carbohydrates (carbs) include certain vegetables, fruits, beans, and whole-grain cereals, grains, pastas, and breads. Of the 3, carbs supply most of the sugar your body uses for energy.

## Diabetes Care Team

The members of your health care team. This could include your primary care physician, endocrinologist, podiatrist, ophthalmologist, registered dietitian, diabetes educator, and other health care providers who assist in your diabetes care.

## Diabetic Ketoacidosis (DKA)

A serious condition that happens when a person with diabetes doesn't have enough insulin in his or her body to process sugar, so the body burns fat instead for energy, which causes it to produce high levels of acids in the blood called ketones. DKA is a medical emergency.

## Glucagon Emergency Medicine

An emergency medicine for the treatment of low blood sugar that contains an injection of glucagon, which is a hormone that raises blood sugar levels.

## Hyperglycemia

High blood sugar. Some of the symptoms are having to urinate often and being very thirsty.

## Hypoglycemia

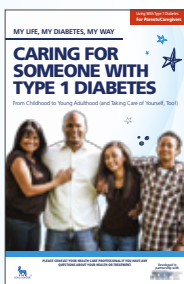
Low blood sugar. Some of the symptoms are feeling anxious or confused, weak or tired, and shaking or feeling dizzy.

## Ketones

Substances produced when the body breaks down fats and fatty acids to use as fuel. This is most likely to occur when the body cannot use sugar effectively due to low insulin levels. High levels of ketones are dangerous. A urine test is one way to check the level of ketones in your body.

# Here Are Even More Resources for Your Type 1 Diabetes Journey From Novo Nordisk and JDRF

This booklet is part of the "My Life, My Diabetes, My Way" educational series for people with type 1 diabetes. There are other booklets in this series, brought to you by Novo Nordisk and JDRF, that may be of interest to you, your family, and friends.



## Caring for Someone With Type 1 Diabetes

Written especially for busy parents or caregivers of children, teens, and young adults with type 1 diabetes

**Ask your doctor about FREE copies of all our type 1 diabetes booklets today!** They are also available online as free PDF downloads at [t1support.cornerstones4care.com](http://t1support.cornerstones4care.com).

Additional type 1 diabetes resources can be found online at:

[jdrf.org](http://jdrf.org)

[typeonation.org](http://typeonation.org)

[childrenwithdiabetes.com](http://childrenwithdiabetes.com)

[diabetes.org](http://diabetes.org)

[type1.cornerstones4care.com](http://type1.cornerstones4care.com)

Remember, these booklets and resources are for educational purposes only. If you have any questions about your diabetes care, be sure to ask your diabetes care team.



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