

# Your diabetes team

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## Diabetes Inpatient Education

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Call 911 or go to the nearest Emergency department right away in case of an urgent concern or emergency.

This is general information and not specific medical advice. Always consult your doctor or other healthcare provider if you have any questions or concerns.

Ask your diabetes team members to print their names and phone numbers on the list below. Keep the chart in a handy place, such as on your refrigerator door.

**Endocrinology office (diabetes doctor):** \_\_\_\_\_

**Main office:** \_\_\_\_\_

**Blood sugar hotline:** \_\_\_\_\_

**Blood sugar fax:** \_\_\_\_\_

**Blood sugar email:** \_\_\_\_\_

**After-hours number:** \_\_\_\_\_

# Caring for diabetes

This handbook contains general guidelines about diabetes care. It is not meant to be a complete source of information, but we hope it will answer some of your questions about caring for your diabetes. Your doctor is the best source of information about your treatment and care.

The handbook can help you learn:

- How to measure your blood sugar.
- How to manage your medicines.
- How to eat well, be active and stay healthy.
- How to manage certain problems.

Having diabetes can be scary at first, but you are not alone. The Children's Healthcare of Atlanta diabetes team can help you and your family learn how to take care of your diabetes. It is a lifelong condition that can be managed.

This handbook was written for you, but your family may also use it to learn more about diabetes. For easy reading, it was written using the generic terms "he" and "him". Words in *italics* are found in the Glossary.

- If you are a teen - you will learn to do most care by yourself, but your parents will still stay involved to support you.
- If you are younger - your parents will do most of your care until you are old enough.

Our diabetes team will work with you and your family to make sure you have the knowledge and skills needed to stay as healthy as possible.

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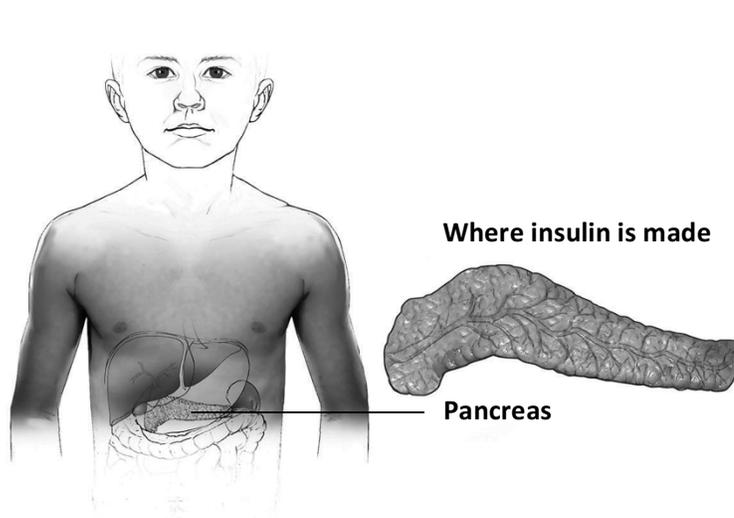
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# What is diabetes?

Your body gets energy from the food you eat. Sugar—also called *glucose*—is your body’s main source of energy. After your stomach digests food, sugar travels to your body’s cells through the blood. Your cells change sugar to energy. Having *diabetes* means your body cannot use sugar like it should.

- For your body to use sugar the right way, it needs a hormone called *insulin*.
- Insulin is a hormone made in your *pancreas* by special cells called *beta cells*. The pancreas is an organ near the stomach.



- Insulin acts like a key. It opens your body’s cells to allow sugar from the food you eat to be used as energy.
- Without enough insulin, sugar stays in your blood instead of moving into the cells. This causes high blood sugar, also called *hyperglycemia*. Hyper means “high” and glycemia means “glucose in the blood”.

Diabetes can occur when the body does not make insulin. It can also occur when your body makes insulin, but cannot use the insulin the way it should.

Doctors do not know exactly what causes diabetes. It is not contagious. This means you cannot catch it from someone else. It also means no one can catch it from you. What doctors do know is that there are 2 main types of diabetes—type 1 and type 2.

# Type 1 diabetes

This type of diabetes happens when your body does not make insulin. This means you have to take insulin through shots or an insulin pump.

- About 1 in 10 (10 percent) of all people with diabetes have type 1.
- This type of diabetes most often occurs in children and young adults.
- There often is no family history of diabetes.
- It is an *autoimmune* (self-allergy) disease. Autoimmunity means that the immune system turns against its own healthy cells. Type 1 diabetes results from the destruction of the insulin producing beta cells by its own immune system.
  - Your doctor may test your blood for *antibodies specific to type 1 diabetes*. Antibodies are substances produced by the immune system. When certain antibodies exist, your doctor can tell that an autoimmune reaction has occurred within the pancreas.

If you just found out that you have type 1 diabetes and you take insulin, there is a chance that you have some beta cells that still work. These cells might start making more insulin, which can make your blood sugar levels normal for a while. You may need to reduce the amount of insulin you take during this time.

This common phase is called the *honeymoon phase* because it only lasts for a short time. After a while, the beta cells will stop making insulin and you will need to take all of your insulin through injections (shots) again.

# Type 2 diabetes

This type of diabetes happens when your body cannot use the insulin it makes or when your body does not make enough insulin. You may have to take insulin or another type of medicine to keep your blood sugar in a healthy range.

Some of the medicines used to treat diabetes help your body use insulin better. Other medicines help your body make more insulin.

- About 9 in 10 (90 percent) of all people with diabetes have type 2.
- People can develop type 2 diabetes at any age – even during childhood.
- Things that can put someone at risk for type 2 diabetes include:
  - Having a family history of diabetes.
  - Being overweight and physically inactive.
  - Certain race and ethnic backgrounds (such as Hispanic/Latino, African-American, Native American, Asian or South Pacific Islander).
  - If your mother had diabetes when she was pregnant with you.
  - Being insulin resistant. One sign of this can be if you have thick, darkened skin on the neck or armpit area, called *acanthosis nigricans*.

# Signs of diabetes

Signs of diabetes occur because the body lacks insulin. This causes blood sugar to build up in the blood, leading to these signs:

- **Passing extra urine.** Your body tries to get rid of extra sugar in the blood by passing it out of the body through urine. This can lead to urinating more often.
- **Drinking a lot.** When your body loses fluid through urine, you may get dehydrated (dried out) and be thirsty.
- **Eating a lot.** When sugar cannot get into the cells, your body does not have energy. This might cause you to be more hungry than usual.
- **Feeling tired.** Less sugar in your body's cells means less energy. This may cause you to feel tired all the time and not want to run and play like usual.
- **Weight loss.** Without enough insulin, your body looks for other sources of energy. As your body uses fat for energy, you lose fat and you can lose weight too. When you get dehydrated from passing extra urine, you can lose weight from fluid loss.
- **Change in vision.** High blood sugar can cause temporary blurry vision. As blood sugar gets closer to normal, vision should improve.
- **Nausea and vomiting.** Some people have nausea, vomiting and stomach cramping when blood sugar is very high.

# Managing diabetes

There is no cure for diabetes, but you can learn to **manage and control it**. Managing your diabetes can help you stay healthy and feel well.

Diabetes management involves learning new skills. This includes:

- **Checking your blood sugar.** You will learn to check your blood sugar with a home monitor (called monitoring). You will also learn when to check your blood sugar.
- **Testing for ketones.** You will learn how and when to test your urine or blood for ketones. Ketones can make someone with diabetes very sick.
- **Taking medicine.** This may mean taking insulin shots or other diabetes medicines.
- **Managing your food.** You will learn to balance the food you eat with either insulin or other diabetes medicines.
- **Managing your body.** You can do this through:
  - Exercise. Regular exercise helps your body use sugar and can lower your blood sugar level.
  - Managing stress. Stress can raise your blood sugar. Learning to deal with stress in a healthy way can help.
  - Getting plenty of sleep. Sleep refreshes your body and mind. You need a certain amount of rest and sleep to be healthy.

Before long, these new diabetes management skills will become part of your everyday life.





# Monitoring blood sugar

The key to managing diabetes is learning to keep your blood sugar at a certain level, called your target blood sugar range. Your doctor will decide on a range that is safe and healthy for you. Your target blood sugar range may be different from someone else you know with diabetes.

## American Diabetes Association (ADA) target blood sugar

ADA target blood sugar levels for all children and adolescents with type 1 diabetes are included below:

Before meals (mg/dl)	Before bed (mg/dl)
90 to 130	90 to 150

Your target before meals	Your target before bed
_____ to _____.	_____ to _____.

## Factors that affect blood sugar levels

You will find that certain things raise your blood sugar and certain things lower your blood sugar. The chart below lists factors that raise blood sugar and factors that lower blood sugar.

Raises blood sugar	Lowers blood sugar
Food	Exercise
Hormones	Insulin
Stress	Diabetes medicine
Illness	

Your blood sugar level is not always the same. It will not stay in your target range all the time. There are many natural things that can affect your blood sugar levels. You will learn what changes to make to your treatment plan to adjust for these things:

- **Food.** Certain foods called carbohydrates (or carbs) can raise your blood sugar. You will learn more about carbs and their impact on blood sugar in the nutrition section of the handbook.
- **Hormones.** As you grow and develop, insulin needs often increase. This is due to chemicals in the body called hormones.
  - Hormones can make your body less sensitive to insulin.
  - Insulin needs will increase when hormone levels are high, like during the teen years.
- **Stress.** Your body makes stress hormones that can increase your blood sugar level the same way that growth hormones do.
- **Illness.** Illness can increase blood sugar. You will learn in a later chapter what to do when you are ill.
- **Exercise.** Your activity level changes during the year. You may play a sport in the spring and fall but not during the winter. This affects how much energy you burn and changes how much insulin you need.
  - When you are more active, you usually need less insulin.
  - When you are less active, you usually need more insulin.
- **Insulin and diabetes medicines.** Insulin and other diabetes medicines lower blood sugar.

# How to use a blood sugar meter

Measuring your blood sugar with a home monitor—also called a meter—is key to managing your diabetes. Blood sugar levels change during the day and night. Your levels depend on what you eat, how much insulin or medicine you have, and other things (such as exercise, stress, illness and growth).

- Each time you test your blood sugar level, the meter tells you how your body reacted to those things.
- Your blood sugar level guides your treatment, like how much insulin you should take.
- The level lets you know what you need to do next.
- You will learn to use your blood sugar level to adjust your insulin or medicine and your diet and activity. This adjustment helps you to meet your blood sugar target range.

There are many different types of blood sugar meters. Your diabetes team will help you pick one that meets your needs. They also will train you on how to use it. If you go to school, you will need 2 meters—one for home and one for school.

Using a blood sugar meter involves testing a drop of blood from your finger. To do this, follow the guidelines below:

## Get ready

- Wash your hands with soap and warm water.
  - Dry your hands well. Damp hands can affect your blood sugar reading.
  - Avoid using rubbing alcohol to clean your fingers. It can dry out the skin on your fingertips.
- To help increase the blood flow to your fingers and make it easier to get a drop of blood:
  - Warm your hands by rubbing them together.
  - Hang your hand down at your side for 1 to 2 minutes.

## Meter

Place a test strip into meter.

## Test your blood

- Use a lancet to prick your finger and draw a drop of blood. Sometimes it hurts less if you use the side of your fingertip.
  - How you use the test strips depends on the type of meter and strips that you have. The test strip will “sip” the blood up when you touch the edge of the strip to the drop of blood.
  - Be sure you get the right amount. Not putting enough blood on a strip can cause an incorrect reading or error code.
- Read the results.

## When you are done

- Record your blood sugar level in your log book.
- Check with your city or trash removal company about how to dispose of your lancets. You may also call your local health department.
- Do not recycle lancets.
- Check with your school about how to dispose of lancets while there. We will discuss sharps disposal in a later chapter.

## **When to check your blood sugar:**

- 4 or more times a day, often before each meal and before bed
- In the middle of the night when first diagnosed with diabetes or after a high activity day
- Anytime unusual symptoms (such as nausea, sweating and vomiting) occur

## **Tips to help you get correct results:**

- Keep your meter and bottle of test strips in a clean, dry place. Keep the bottle of test strips tightly closed and away from heat, steam and light.
- Test a strip with control solution each time you open a new bottle of test strips. This makes sure the strips are good to use.
- Check the date and time in your meter to be sure it is correct. This allows you to review your blood sugar readings using the memory function.
- Get enough blood on the test strip.
- Wash your hands, and dry them well before checking your blood sugar.





# Ketone testing

When there is not enough insulin to move sugar into the cells, your body looks for other forms of fuel to use as energy. It uses fat as a fuel source.

- As fats break down, acids called ketones build up in your blood and urine.
- Ketones in the blood and urine are a sign that diabetes is out of balance.

A build-up of ketones often happens when someone first finds out he has diabetes. It can also occur again once someone has diagnosed diabetes. This can happen if you are sick or if you do not get enough insulin.

Signs that you might have ketones include:

- Dry mouth and skin
- Increased thirst
- Urinating more often
- Nausea and vomiting
- Stomach cramps or pain
- Sweet, fruity odor on the breath
- Feeling weak or sleepy
- Breathing hard and deep
- Pain in the back or side

## When and how to check for ketones

Ketones can make someone with diabetes very sick. Excess ketones can lead to a condition called *ketoacidosis*. It is important to test for ketones when:

- Your blood sugar level is more than 300 *mg/dL* or as advised by your doctor.
- You feel sick, especially if you vomit or have an upset stomach.
- Your blood sugar levels have been high for 2 to 3 days and do not come down after taking insulin.

There are 2 ways to test for ketones—either a urine test using a ketone test strip or a blood test.

### To check for urine ketones:

1. Dip a ketone test strip in a urine sample. (You can also urinate directly onto the test strip). Cover the test pad on the end of the strip.
2. Wait 15 seconds after dipping the strip or as the label on the bottle directs. Be sure to wait the right amount of time to get a correct reading.
3. Compare the color on the test pad to the color guide on the label.
4. Ketone levels can be trace, small, moderate or large. **Always call your doctor if you have moderate or large ketone levels.**
5. Wash your hands well when you are done.

Urine ketone test strips are typically good for 6 months once you open the bottle. Check the expiration date on your bottle. Using expired ketone test strips may cause an incorrect result.

## To check for blood ketones:

Some blood sugar meters measure both blood sugar and blood ketones. The blood sugar test strips cannot be used to test for blood ketones. You will need to buy a special type of ketone test strip.

1. Put a drop of blood on a blood ketone strip.
2. While the strip is in the meter, read the results. Your diabetes team can tell you how to read the results on this meter.

## Reading the results:

- **Trace or small ketones** – check ketones again in 2 to 4 hours to make sure they are decreasing
- **Moderate or large ketones**- call your doctor **right away**. Follow your doctor's advice about what to do.

This may include:

- Resting and drinking a glass of water or other calorie-free fluid.
- Checking your blood sugar and ketones often, such as every 2 to 4 hours.
- Giving yourself extra insulin if the doctor tells you to do so.

You may also need to go to the hospital for more treatment. Never stay by yourself if you have ketones or you are vomiting.

## Diabetic ketoacidosis (DKA)

Diabetic ketoacidosis (DKA) means that there is a high level of ketones (acid) in the blood. If not treated, it can be life threatening.

Finding ketones in the blood or urine **EARLY** is the best way to treat it. The 2 main reasons ketones show up in the blood or urine are:

- Not getting enough insulin. This can happen from:
  - Forgetting to take insulin; missing shots
  - Not taking enough insulin
  - If you have an insulin pump and the tubing gets kinked or the pump stops working, you will not get enough insulin. When this happens, you will quickly start making ketones.
- Illness. The stress of illness causes the body to make stress hormones. These hormones can raise blood glucose and blood ketone levels.
  - DKA happens more quickly if you vomit or have diarrhea. This is because you can become dehydrated (dried out), and this raises blood ketone levels.

Be sure to take insulin during times of illness, even if you do not eat. If you ever have a blood sugar level more than 300 mg/dL, have an upset stomach or are sick, tell your parents or another adult **right away**.

- Someone may need to help you.
- You will need to test yourself for ketones, and you may need to take extra insulin if you have them.
- You will learn more about DKA prevention and sick days in a later chapter: Sick Day.

## Hyperosmolar hyperglycemic nonketotic syndrome (HHNS)

Hyperosmolar hyperglycemic nonketotic syndrome (HHNS) is very serious. It can happen to someone with Type 2 diabetes who is ill or stressed.

### Causes of HHNS include:

- Infection
- Illness
- Kidney failure
- Medicines like steroids or diuretics (water pills)
- Uncontrolled high blood sugar
- Bleeding stomach ulcer

### Signs of HHNS include:

- Drinking a lot
- Going to the bathroom often
- Weakness on 1 side of the body
- Confusion
- Dehydration. Some signs include increased thirst, dry or sticky mouth and dry skin.
- Blurry vision
- Hallucinations
- Shock
- Coma, if untreated

The best way to avoid HHNS is to check your blood sugar levels often.

- Call your doctor if your blood sugar is high and you do not respond to your usual insulin or medicine dose.
- If you are sick, the doctor will want you to check your blood sugar levels more often. Also, drink plenty of fluids.
- You may need to take more diabetes medicines. Only change the medicine dose if your doctor tells you to do so.





# Insulin

Millions of people with diabetes take insulin each day, either by shots or through an insulin pump. You cannot take insulin by mouth. This is because insulin is a type of protein that it is destroyed during digestion.

There are many types of insulin. The chart below lists some common types. It is only a general guide.

- Many things affect how insulin works and how long it lasts. This includes your own body's response, the time of day, exercise, stress, illness and what you eat.
- Your doctor will tell you what kind of insulin to take and when to take it.
- The type of insulin you use may change as you grow older and your body changes.

Type of insulin	When it starts working	When it works the hardest	How long it lasts	When to take it
<b>Rapid-acting</b>				
Humalog, Novolog and Apidra	5 to 15 minutes	1 to 2 hours	2 to 5 hours	Right before eating
<b>Short-acting</b>				
Regular	30 to 60 minutes	2 to 4 hours	6 to 8 hours	30 minutes before eating
<b>Intermediate-acting</b>				
NPH	1 to 2 hours	4 to 8 hours	10 to 20 hours	Varies. Take it at the same time each day.
<b>Long-acting</b>				
Lantus, Levemir and Basaglar	1 to 2 hours	No peak	Up to 24 hours	Varies. Take it at the same time each day.
Toujeo	6 hours	No peak	24+ hours (Steady state is reached at $\geq 5$ days)	Varies. Take it at the same time each day.
Tresiba	1 to 3 hours	No peak	24 + hours	Varies. Take it at the same time each day.
<b>Mixed insulin (intermediate- and rapid- acting)</b>				
Novolog 70/30 Humalog 75/25	5 to 15 minutes	1 to 6 hours	10 to 20 hours	Right before eating. Take it at the same time each day.

## Types of insulin

- Rapid-acting insulin (Novolog, Humalog, Apidra) is taken with meals and some snacks and used to fix a high blood sugar.
- This type of insulin works best if you take it right before eating. You can take it up to 10 minutes before a meal or with the first bite of food.
- Small children and picky eaters might have to take this insulin after the first bite of food. They can also take it 15 to 30 minutes after starting a meal.
- If you are carbohydrate counting or using an insulin pump, your doctor may refer to this insulin as your *bolus* insulin.

**Short-acting insulin (Regular)** is taken 30 minutes before eating.

**Intermediate-acting and long-acting insulin (NPH, Levemir, Lantus, Toujeo, Tresiba, Basaglar)** works between meals. Take this type of insulin at the same time each day. You may notice your doctor refer to this insulin as your *basal* insulin.

**Mixed insulin** contains both rapid-acting and long-acting insulin. Because it contains rapid-acting insulin, you need to eat right away.

- You usually take this insulin 2 times a day.
- This type of insulin is cloudy. You must gently roll the bottle between your hands to mix the insulin before you take it.

## Storing insulin

Insulin will not work if it is not stored properly. It is usually good for 28 to 30 days after you open the bottle as long as it is stored properly.

- Always check the expiration date on the vial before you use it. Throw it away if it is expired.
- Write the date that you open it on the bottle. Use it to remind you of when to throw it away.
- Store the insulin the way the manufacturer's instructions tell you to do so or as advised by your doctor.

Ask your diabetes team about the storage rules for insulin pumps and pens.

Some other tips for storing insulin are:

- Insulin will spoil if it gets too hot or too cold. Keep it between 36°F to 86°F.
- Keep insulin in the refrigerator until you are ready to open it. For best results, keep it in an area where it will not freeze or have big changes in temperatures.
- Keep opened bottles of insulin at room temperature. This will feel better when you inject it.
- Do not store in a hot or humid area, such as the bathroom or near a kitchen stove.
- Never leave insulin in a car, especially in the summer. It can get too warm and spoil.
- Store your insulin in a cooler or in a travel case with a cool pack in it if you plan to be in a hot place, like the beach, for several hours.

Always make sure your insulin is not spoiled before you use it.

- Mixed insulin or cloudy insulin, like NPH, clumps and sticks to the bottle when it goes bad.
- Clear insulin is cloudy or discolored when spoiled.
- Throw away any spoiled or outdated insulin.

## Syringes

Insulin is measured in units. The most common type of insulin made in the United States is U-100. This means there are 100 units of insulin per milliliter (mL). Milliliters are units of measurement.

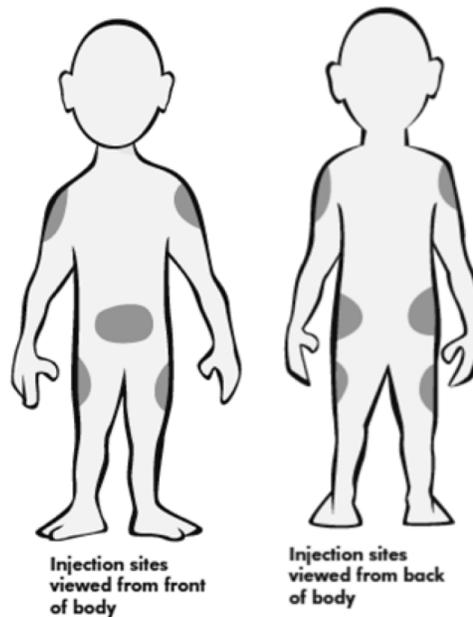
Remember to match the units you are taking with how much the syringe holds. Syringes come in different sizes: 30 units, 50 units and 100 units. **Note: Unit markings can be different on different syringes.**

Some tips for using a syringe are:

- Use a syringe 1 time only. Using a syringe again can cause infection. A needle also becomes dull after using it more than 1 time.
- Never share used syringes with another person.

## Where to inject insulin

Give yourself your insulin shot in a place where you have at least a half inch of fat under the skin. The main areas are the stomach, upper buttocks, outer thigh and the back of the upper arm. (See pictures below.)



**Injection sites**

Rotation:

- Change the site where you give the shots each time.
- Make up a chart or a simple system to keep track of the different places you use. For instance, you may want to use your right arm for breakfast insulin, your left arm for lunch insulin, your stomach for dinner and your buttock for bedtime.
- Rotate places within each site. If not, your body might make scar tissue, or lumps, under the skin. The scarring can keep insulin from being absorbed well.

Some tips for injecting insulin are:

- Inject insulin at least 2 inches away from your belly button.
- Do not give shots near moles or scars.
- Do not give a shot in the stomach to small and very thin children who do not have a half inch layer of fat.
- Choose 2 different places for each shot when taking 2 shots at one time.
- **Never mix** rapid-acting insulin (Apidra, Humalog and Lantus) **with** Lantus, Levemir, Toujeo, Tresiba and Basaglar.

**Note to parents:** Never force a fearful child to give his own shots. An adult needs to help until the child is old enough and emotionally ready. Even an independent teen needs help giving a shot sometimes.

## How to draw up insulin

### Getting ready

1. Place your insulin and supplies on a clean, flat surface.
2. Wash your hands well with soap and water.
3. Check the label to make sure the insulin has not spoiled, expired or been opened longer than 30 days.

### Drawing up the insulin

4. Clean the top of the insulin bottle with an alcohol swab. Let it dry. Do not touch the clean top while you get ready to give a shot. This helps prevent germs from getting on the needle or from being pushed down into the insulin.
5. Remove the cap from the needle. Pull back the syringe plunger to the number of units of insulin you need to take. You will pull air back into the syringe as you do this.
6. Push the needle through the rubber top of the insulin bottle while it sits on the flat surface. Push the plunger all the way down to push the air in the syringe into the bottle. This step makes it easier to draw out the insulin.
7. Keep the needle in the bottle of insulin, and turn the bottle upside down. Draw up the dose of insulin you need.
8. To remove air bubbles:
  - Push all the insulin back into the bottle, and draw up the dose again.
  - Or, try tapping the top of the syringe to make the bubbles rise to the top. Then, push the bubbles back into the bottle. If needed, pull back on the plunger until you have the correct amount of insulin in the syringe.
9. Remove the needle from the bottle once you have the dose of insulin you need. Put the cap on the needle if you do not give yourself the insulin right away.

### A note about air bubbles

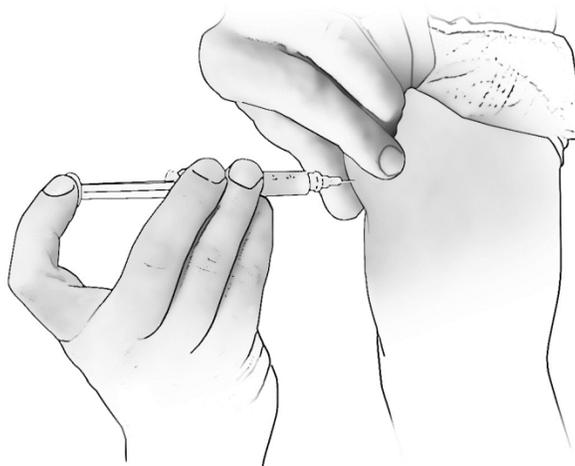
If you have a lot of air bubbles in your syringe, they take the place of insulin. This means that you will not get all the insulin you need. Other than being short on your insulin dose, having air bubbles in the syringe will not harm you.

## How to inject insulin with a syringe

Use these guidelines to inject insulin with a syringe:

1. Wash your hands well.
2. Clean your skin with an alcohol swab. Let it dry before giving the shot. This helps prevent stinging.
3. Pick up the syringe like you would hold a pencil. Take off the needle cap.
4. Use your other hand to gently pinch up the cleaned area. Do not squeeze hard—you might squeeze out the insulin.
5. Insert the needle into your skin at a 90-degree angle.
6. Push the plunger down until all of the insulin is gone from the syringe. **Wait 10 seconds**; then, pull needle out.
  - Holding the needle in keeps insulin from leaking.
  - Do not give yourself more insulin if any of it leaks out. Just make a note in your insulin and blood sugar log. Leaked insulin can cause higher blood sugar readings. If this continues to happen, tell your doctor.
  - **Do not rub the injection site. This can cause the insulin to be absorbed too fast.**
7. If you bleed, it may be because you broke a small blood vessel with the needle. Use a tissue to gently press down on your skin.
8. **How fast the body absorbs insulin depends on where you inject it. It is absorbed more quickly from the stomach area than any other spot. Some things can increase how fast insulin is absorbed. This is due to the increased blood flow to the area. They include:**
  - Taking a hot bath or shower.
  - Rubbing an injection site.
  - Exercising the body part where you just injected the insulin. This could happen if you gave yourself insulin shot in the upper arm or in the leg and then played tennis right away.

### Injecting insulin into fat

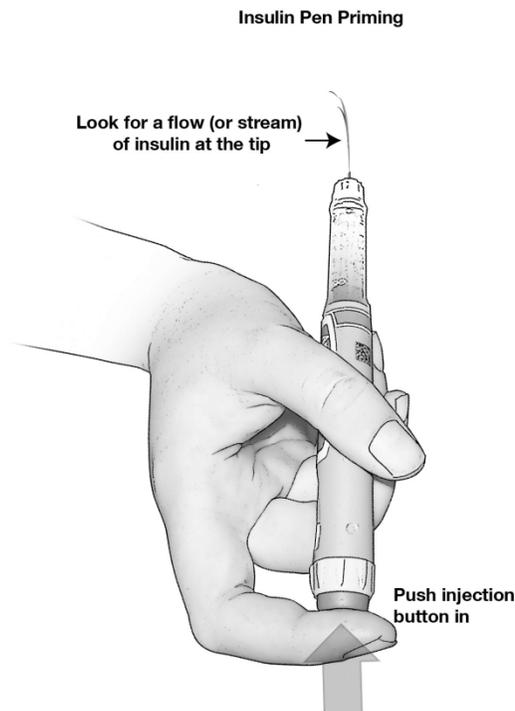


## How to inject insulin with a pen

An Insulin pen looks like a big writing pen. The pen combines an insulin bottle and a needle into one tool. When you are on the go, an insulin pen can be faster and easier than using a bottle and syringe.

Use these guidelines to inject with an insulin pen:

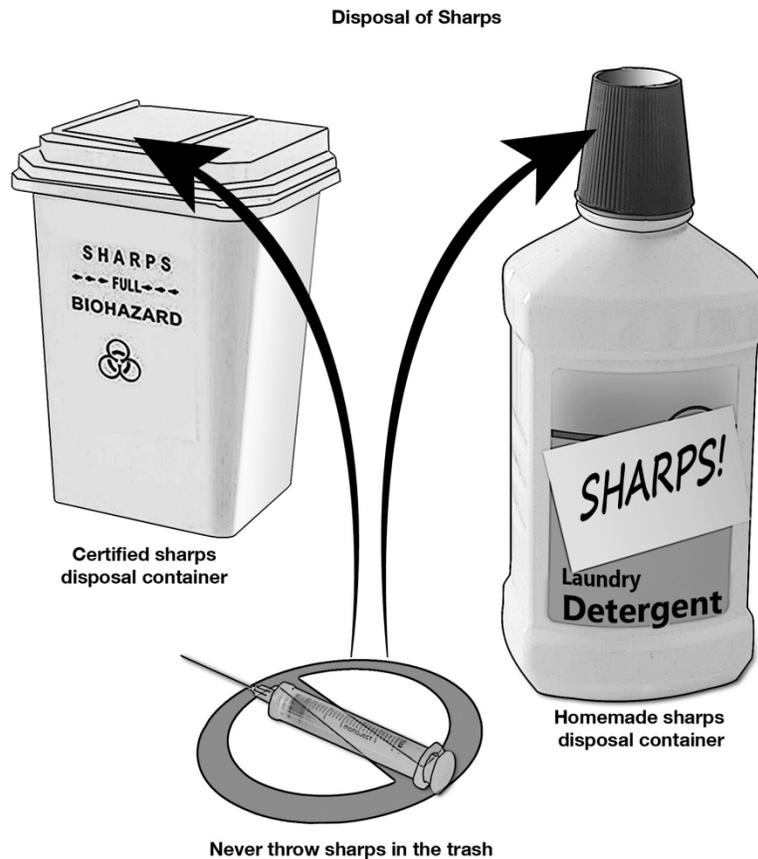
1. Wash your hands well.
2. Clean your skin with an alcohol swab. Let it dry before giving the shot. This helps prevent stinging.
3. Take off the outer cover of the pen, and wipe the top of the pen with an alcohol swab.
4. Pull off the paper tab on the needle cap. Screw the needle cap onto the insulin pen.
5. Dial the pen to 2 in the dose window.
6. Hold the pen with the needle pointing up. Push in the button. Look for a stream or drop of insulin at the top. If you do not see a drop or stream, dial to 2 again and repeat. This step is called **priming the pen**.
7. Once the pen is primed, dial the pen to the dose of insulin you need. Pinch up the cleaned skin.
8. Inject the needle into your skin at a 90-degree angle.
9. Use your thumb to press in the dose button. The dose button should go back to zero. **Count 10 seconds**. Pull the needle straight out of the skin.
  - Holding the needle in keeps insulin from leaking.
  - Do not take any more insulin if any of it leaks out. Just make a note in your insulin and blood sugar log. Leaked insulin can cause higher blood sugar readings. If this continues to happen, tell your doctor.
  - Do not rub the injection site. This can cause the insulin to be absorbed too fast.
10. Place outer needle cover on needle and turn counterclockwise to remove needle. **Never leave needle on pen when not in use**. Discard in sharps container. Pen needles are intended for single use only.



## Sharps disposal

Do not put the cap back on a used syringe—this can cause you to stick yourself. Put the used syringe and needle in a hard, plastic container that has a screw-on lid, like a bleach bottle.

- Check with your city or trash removal company about how to dispose your syringes and needles. You may also call your local health department.
- Do not recycle syringes and needles.
- Put the lancets you use for finger pricking in the same kind of plastic container as syringes.
- Check with your school about how to dispose of syringes and needles while there.



There are tools that can help you inject insulin. Always check with your diabetes team before using them.

- **Magnifying tool**—This helps if you cannot see the lines on a syringe when you draw up insulin.
- **Automatic injectors**—This helps push a needle through the skin. People who are afraid of needles can use them.

**If you accidentally stick yourself with another person's needle, you will need to have a blood test.**

**Let your doctor know right away if this happens.**

## Other diabetes medicines

Medicines, in the form of pills or injections, are normally used to manage type 2 diabetes in adults. Most of these medicines do not work for people with type 1 diabetes. Like insulin, a doctor must order these medicines.

Each diabetes medicine lowers blood sugar in a different way. You may take only one of these medicines or you may take more than one. When you take your medicine, make sure you take it the way it is prescribed. Some medicines work well for one person but may not work well for someone else. Some people may take these medicines with insulin.

Medicines commonly used in type 2 diabetes for adults are found on the next page. These medicines can cause side effects. Some common side effects of diabetes medicines include:

- Upset stomach
- Vomiting
- Diarrhea
- Loss of appetite
- Weight gain
- Headache
- Muscle aches
- Flu or cold symptoms

**Tell your doctor if you have any of these side effects.**

## Common diabetes medicines for treatment of type 2 diabetes

Brand name	Generic name	How it works	How to take it	Special notes
Glucophage Glucophage XR	Metformin	<ul style="list-style-type: none"> <li>▪ Slows down the release of sugar from the liver</li> <li>▪ Helps muscles use insulin better</li> <li>▪ Often used for children who are resistant to insulin. This means that their body cannot use insulin in the right way.</li> </ul>	By mouth (oral)	<ul style="list-style-type: none"> <li>▪ Does not cause low blood sugar unless you skip meals.</li> <li>▪ Take with food to avoid stomach pain or diarrhea.</li> <li>▪ Stop taking it if you vomit, and call your doctor.</li> </ul>
Micronase Diabeta Glucotrol Amaryl	Glyburide Glyburide Glipizide Glimepiride	<ul style="list-style-type: none"> <li>▪ Increases the release of insulin from the pancreas</li> </ul>	Oral	<ul style="list-style-type: none"> <li>▪ May cause low blood sugar</li> </ul>
Prandin Starlix	Repaglinide Nateglinide	<ul style="list-style-type: none"> <li>▪ Increases the release of insulin from the pancreas</li> </ul>	Oral	<ul style="list-style-type: none"> <li>▪ May cause low blood sugar</li> </ul>
Precose Glyset	Acarbose Miglitol	<ul style="list-style-type: none"> <li>▪ Slows the digestion of carbs after a meal</li> <li>▪ Slows down how quickly glucose is absorbed</li> </ul>	Oral	<ul style="list-style-type: none"> <li>▪ Does not cause low blood sugar</li> </ul>
Avandia Actos	Rosiglitazone Pioglitazone	<ul style="list-style-type: none"> <li>▪ Makes the body more sensitive to insulin</li> <li>▪ Decreases the release of sugar from the liver</li> </ul>	Oral	<ul style="list-style-type: none"> <li>▪ Does not cause low blood sugar</li> </ul>
Januvia Onglyza Tradjenta Nesina	Sitagliptin Saxagliptin Linagliptin alogliptin	<ul style="list-style-type: none"> <li>▪ Helps the pancreas continue to make insulin by blocking an enzyme</li> <li>▪ Slows digestion</li> </ul>	Oral	<ul style="list-style-type: none"> <li>▪ Low risk for low blood sugar</li> </ul>
Invokana Farxiga Jardiance	Canagliflozin Dapagliflozin Empagliflozin	<ul style="list-style-type: none"> <li>▪ Decreases sugar reabsorption in kidney</li> <li>▪ (excretion of sugar in urine)</li> </ul>	Oral	<ul style="list-style-type: none"> <li>▪ Low risk for low blood sugar</li> <li>▪ Can lower blood pressure</li> <li>▪ Risk of urinary tract infection (UTI)</li> </ul>
Byetta Bydureon Victoza Tanzeum Trulicity	Exenatide Exenatide Liraglutide Albiglutide Dulaglutide	<ul style="list-style-type: none"> <li>▪ Helps the pancreas make insulin</li> <li>▪ Slows digestion</li> <li>▪ Slows down the release of sugar from the liver</li> <li>▪ Helps control appetite</li> </ul>	Injection	<ul style="list-style-type: none"> <li>▪ Low risk for low blood sugar</li> <li>▪ May help with weight loss</li> </ul>
Symlin	Pramlintide	<ul style="list-style-type: none"> <li>▪ Slows digestion</li> <li>▪ Slows down the release of sugar from the liver</li> <li>▪ Helps control appetite</li> </ul>	Injection	<ul style="list-style-type: none"> <li>▪ May cause low blood sugar</li> <li>▪ Your doctor may need to lower your insulin dose before you take it.</li> </ul>





# Nutrition and diabetes

When you have diabetes, you need a healthy diet. This means that you must eat foods that contain many kinds of nutrients. Nutrients are the parts of food that nourish the body. Nutrients can help:

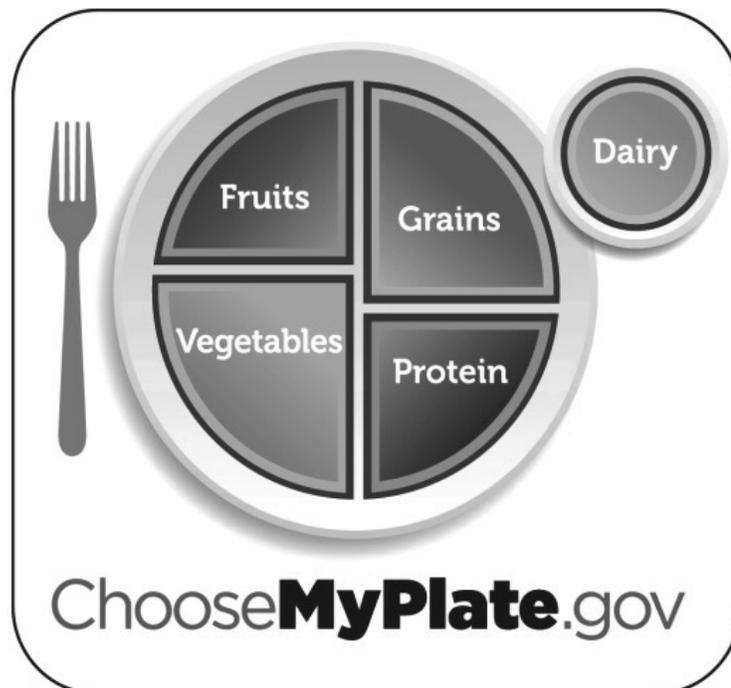
- Your body to grow strong and stay healthy.
- Provide fuel for exercise.
- Prevent heart disease, high blood pressure and obesity.

A balanced plate will provide these nutrients:

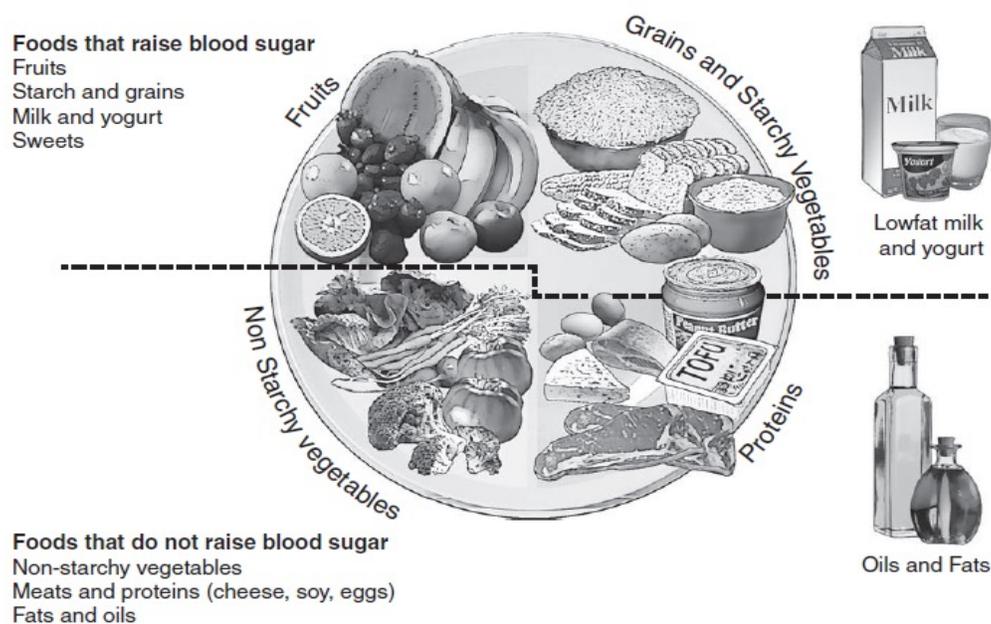
- Carbohydrates
- Protein
- Fats
- Fiber
- Vitamins
- Mineral

Current guidelines recommend getting nutrients by eating foods from the groups listed below:

- Breads, grains and starchy vegetables
- Non-starchy vegetables
- Fruit
- Milk and dairy
- Meats and beans



## How different foods affect blood sugar



### Healthy tips

**Grains:** Try to make half your grains whole grains.

**Vegetables:** Choose colorful, non-starchy vegetables often. Some vegetables contain more carbohydrates than others. These are called starchy vegetables.

**Fruit:** Eat a variety of fruit, and limit juice.

**Dairy:** Choose milk, yogurt and cheese when possible.

**Protein:** Lean protein, such as chicken and fish, are healthier choices.

## Energy nutrients

Carbohydrates, proteins and fats are nutrients that provide calories. Our body runs on the energy or fuel provided by calories.

Energy nutrients and food lists		
Carbohydrates	Proteins	Fats
<p><b><u>Starches</u></b> Bread, tortillas, pasta Pancakes, biscuits Cereal (hot and cold) Grains (rice, wheat, oats, quinoa, barley, rye)</p> <p><b><u>Legumes</u></b> Beans (pinto, black, lima) Peas, lentils</p> <p><b><u>Starchy vegetables</u></b> Corn, potatoes, green peas Mixed vegetables Winter squash</p> <p><b><u>Crackers and snacks</u></b> Chips, popcorn, pretzels</p> <p><b><u>Fruits</u></b> Fresh, dried or canned Fruit juice</p> <p><b><u>Milk</u></b> Milk, milk substitutes, yogurt</p> <p><b><u>Combination foods</u></b> Soup, chicken nuggets Casseroles, burrito Pizza, lasagna Macaroni and cheese</p> <p><b><u>Desserts and sweeteners</u></b> Cakes, cookies, pies, candy Ice cream, doughnuts Sugar, jam, jelly honey, syrup, agave</p> <p><b><u>Drinks</u></b> Sports drinks, regular soda Sweet tea, fruit punch</p> <p><b><u>Non-starchy vegetables</u></b> These contain small amounts of carbohydrate</p>	<p><b><u>Protein</u></b> Meat, fish and poultry Chicken Turkey Beef Pork Hot dogs Fish Shellfish Game Eggs</p> <p><b><u>Other proteins</u></b> Cheese Peanut butter (less than 2 tablespoons) Plant-based proteins, such as tofu</p>	<p><b><u>Fat</u></b> Avocado Bacon Butter, margarine Coconut, coconut milk Cream (heavy, light, whipped, half and half) Cream cheese Lard Mayonnaise Nuts, seeds Oil Salad dressing Shortening Sour cream Salt pork</p>

## Carbohydrates

Carbohydrates are also called carbs, starch and sugar. Carbs help your body because they:

- Give you energy and help you grow.
- Contain other nutrients your body needs like vitamins, minerals and fiber.

Carbs raise your blood sugar more than any other nutrient. When your body digests carbs, they turn into blood glucose (blood sugar). Your body needs insulin to use the carbs you eat. Your carb goals depend on:

- The insulin you use
- Your body weight
- Your age
- How active you are

Your diabetes team will work with you to create a meal plan that works best for you.

To control your diabetes and stay healthy, you will need to limit how often you eat high-sugar foods or drinks. Sugary foods are:

- Low in other nutrients
- High in calories
- May cause you to gain weight from the extra calories

## Protein

The body uses protein to grow and repair cells. High protein foods include meats and meat substitutes. Protein is sometimes used for energy.

Protein foods do not have a large effect on your blood sugar. If protein foods are breaded, you have to count the carb grams.

Eat mostly lean protein foods – bake, broil, roast or grill meat, fish, and poultry. See the list below to guide you.

Lean	Medium fat	High fat
Poultry: white meat Shellfish Fish Cottage cheese Low-fat cheese Beef: round, loin, ground round Pork: loin, center pork chop Egg white / substitute Tofu	Poultry: dark meat w/skin Pork: top loin, chop, cutlet Fried fish Beef: ground beef, prime rib Egg Cheese: mozzarella, string Beef jerky	Peanut butter Pork ribs, Sausage Cheese: Cheddar, American, Swiss Hot dog, bacon, bologna, salami Pepperoni Chicken wings Slim Jims Nuts and seeds

## Fats

Fat is used for energy and other purposes.

- Fat does not raise your blood sugar, but it does keep it high for a longer time.
- Fats have 2 times as many calories as carbs and protein.
- Eating too much fat may lead to weight gain and other health problems, such as heart disease, high blood pressure and high cholesterol.

For better health, eat more “heart healthy” fats. These include monounsaturated and polyunsaturated fats. Unhealthy fats include saturated and trans fats.

See the table below to guide you.

Monounsaturated	Polyunsaturated	Saturated	Trans
Canola oil Olive oil Olives Nuts Avocado	Corn oil Soybean oil Sunflower oil Omega-3 (fish) Mayonnaise Salad dressings Seeds	Skin of poultry Marbling in red meat Cheese Bacon, salt pork Butter Cream Cream cheese Lard Shortening Palm oil Coconut Oil Sour cream	Partially hydrogenated oils Baked desserts Hard margarines

## Fiber

Fiber is a carbohydrate in plant foods that our body does not completely digest. Foods that contain fiber provide volume and bulk and help keep you full. They also help to keep your intestines (the lower part of your digestive tract) healthy.

High fiber foods include:

- Fruits and vegetables
- Starchy beans, peas, nuts, seeds
- Whole grains, breads and cereals made with whole grains

Fiber affects blood sugar by slowing digestion. This slows the release of sugar into the blood. Fiber can help you better control your diabetes, cholesterol and weight.

## Carbohydrate counting methods

The amount of carbs you eat affects how high your blood sugar rises. Eating the same types of meals and snacks can help you have better blood sugar control. You can help your blood sugar stay within your target range when you:

- Manage the size of your portions.
- Know the number of carb grams in food and drinks.

There are many steps to carb counting: measuring your food, reading food labels and using food lists.

### Measuring Food

Use one of these methods to measure your food:

- Measuring cups and spoons
- Food scale
- Helpful Hands method

## PORTION SIZES WHEN YOU CAN'T MEASURE YOUR FOOD

### Your Helpful Hands...

The best way to find out how much of a food you are eating, or your portion size, is to use measuring cups, spoons or a scale. Sometimes, such as when you eat out, you can't do this. Here are a number of ways you can use your hands to help you find out about how much you are eating. \*The portion sizes in each food group use an adult woman's hand as a guide.



One fist clenched = 8 fluid ounces  
• Cold and hot beverages



Two hands, cupped = 1 cup  
• Breakfast cereal  
• Soup  
• Green salads (lettuce or spinach)  
• Mixed dishes (chili, stew, macaroni and cheese)  
• Chinese food



One hand, cupped = 1/2 cup  
• Pasta, rice  
• Hot cereal (oatmeal, farina)  
• Fruit salad, berries, applesauce  
• Tomato or spaghetti sauce  
• Beans (cooked or canned)  
• Cole slaw or potato salad  
• Mashed potatoes  
• Cottage cheese  
• Pudding, gelatin



Palm of hand = 3 ounces  
• Cooked meats (hamburger patty, chicken breast, fish fillet, pork loin)  
• Canned fish (tuna, salmon)



Two thumbs together = 1 tablespoon  
• Peanut butter  
• Salad dressing  
• Sour cream  
• Dips  
• Whipped topping  
• Dessert sauces  
• Margarine  
• Cream cheese  
• Mayonnaise

\*Adapted from MyPyramid.gov. This handout is only a guide. The amounts of foods in your meal plan may be different.

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## Reading food labels

The food label allows you to see how many carbs and other nutrients are in a serving size of food. For carb counting, the 3 most important areas on a food label are **servicing size**, **total carbohydrate grams** and **servings per container**.

- Look at the **servicing size**.
  - All of the information on the label is for the serving size listed.
  - If you eat  $\frac{1}{2}$  serving or more than a serving, multiply or divide accordingly.
- Look at the **total carbohydrate grams**.
  - Total carbohydrate includes sugar, starch, sugar alcohols and fiber.
- Look at the **servicing per container**.
  - There are often several servings in one container.

### Advanced label reading:

- If a food has *6 or more grams of fiber*, subtract half the grams of fiber from the total carbohydrate grams to get the new total carbohydrate grams.
- If a food has *6 grams or more of sugar alcohols*, subtract half the grams of sugar alcohol from the total carbohydrate grams to get the new total carbohydrate grams.

<b>Nutrition Facts</b>	
Serving Size 1 cup (228g)	
Servings Per Container 2	
Amount Per Serving	
<b>Calories</b> 260	Calories from Fat 120
% Daily Value*	
<b>Total Fat</b> 13g	<b>20%</b>
Saturated Fat 5g	<b>25%</b>
Trans Fat 2g	
<b>Cholesterol</b> 30mg	<b>10%</b>
<b>Sodium</b> 660mg	<b>28%</b>
<b>Total Carbohydrate</b> 31g	<b>10%</b>
Dietary Fiber 0g	<b>0%</b>
Sugars 5g	
<b>Protein</b> 5g	
Vitamin A 4%	Vitamin C 2%
Calcium 15%	Iron 4%
* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:	
	Calories: 2,000      2,500
Total Fat	Less than 65g      80g
Sat Fat	Less than 20g      25g
Cholesterol	Less than 300mg      300mg
Sodium	Less than 2,400mg      2,400mg
Total Carbohydrate	300g      375g
Dietary Fiber	25g      30g
Calories per gram:	
Fat 9	Carbohydrate 4      Protein 4

**How many carbs should I have? See chart below for general guidelines based on age.**

Age	Breakfast carbs (in grams)	Lunch carbs (in grams)	Dinner carbs (in grams)
5 to 6	30 to 45	30 to 45	30 to 45
7 to 9	45 to 60	45 to 60	45 to 60
10 to 13	45 to 60	60 to 75	60 to 75
14 to 16	60 to 75	60 to 75	75 to 90
17 to 18	75 to 90	75 to 90	75 to 90

## Using food lists

Another way to count carbs is using a food list. A sample food list with some common serving sizes is provided in the resource section of this handbook.

There are many other carb counting resources:

- Carb counting apps for your phone
- Books
- Websites – fitness, health, nutrition

## Sweeteners

You do not have to eat special diabetic or sugar-free foods. Sugar-free does not mean carb-free. These foods often cost more than regular versions and contain carbs from natural sugars and sugar alcohols.

### Sweeteners with calories and carbs:

#### Natural sweeteners

- Provide the same amount of calories and carb grams as table sugar.
  - Sucrose- table sugar, brown sugar, raw sugar, cane juice
  - Fructose - fruits & fruit juice
  - Lactose- cow's milk, human milk, goat milk
  - Honey/Agave nectar
  - Maple syrup, Pancake syrup
  - Molasses
  - Corn syrup, high fructose corn syrup
  - Brown rice syrup
  - Dextrose, maltose

#### Sugar alcohols (polyols)

- They contain carbs but are lower in calories than sugar.
- Usual names are erythriol, isomalt, lactitol, maltitol, mannitol, sorbitol and xylitol.
- They are used in many foods advertised as “no sugar added”, “sugar-free”, or “natural sweeteners”.
- Eating too much of these sweeteners may cause diarrhea, gas and stomach cramps.

### Sweeteners with little or no calories and carbs (artificial sweeteners and sugar substitutes):

- They contain little to no calories and carbs and do not raise blood sugar.
- They are 200 to 7000 times sweeter than sugar.
- **Limit children to 2 sugar-free drinks a day, such as 1 Crystal Lite packet and 1 can diet soda.**

## Artificial sweeteners and sugar substitutes

Name	Brand names	Heat stable for cooking/baking	Benefits
Aspartame (Blue Packet)	Equal NutraSweet	No –loses sweetness	<ul style="list-style-type: none"> <li>▪ Long lasting flavor</li> <li>▪ Only 1 calorie per packet</li> </ul>
Sucralose (Yellow Packet)	Splenda	Yes	<ul style="list-style-type: none"> <li>▪ Does not add calories or raise blood sugar</li> </ul>
Saccharin (Pink Packet)	Sweet N' Low Weight Watchers Sugar Twin	Yes	<ul style="list-style-type: none"> <li>▪ Does not add calories or raise blood sugar</li> </ul>
Stevia (Green, Green and White, or Orange packet)	Stevia Truvia* (a blend) PureVia Sweetleaf Monk Fruit Nectresse	Yes	<ul style="list-style-type: none"> <li>▪ Does not add calories or raise blood sugar</li> <li>▪ Made from a plant</li> </ul>
Acesulfame Potassium (Acesulfame K or ace -K)	Sunett Sweet One	Yes	<ul style="list-style-type: none"> <li>▪ Does not add calories or raise blood sugar</li> <li>▪ Clean taste</li> </ul>





# High blood sugar: hyperglycemia

Your blood sugar level is not always the same. It will not stay in your target range all the time. You will have periods of high blood sugars. High blood sugar is also called hyperglycemia. It happens when your blood sugar level rises above your target range.

Some causes of high blood sugar include:

- Not taking enough insulin
- Less exercise than normal
- Eating or drinking too many carbs
- Stress
- Being sick
- Emotions, such as excitement or anger
- Growth and hormones

## Symptoms of high blood sugar

Some symptoms you might have if your blood sugar is high include:

- Drinking a lot
- Going to the bathroom often
- Headache
- Feeling tired or irritable
- Blurred vision
- Hunger
- Dry skin
- Weight loss
- Upset stomach
- Vomiting

## Treating high blood sugar

You cannot always tell your blood sugar is high just by the way you feel. Some of the signs of high blood sugar and low blood sugar are alike.

If you have signs of high blood sugars take these steps:

1. Always check your blood sugar before you take any action.
2. Check for ketones:
  - If your blood sugar level is more than 300 mg/dL.
  - If you have an insulin pump and your blood sugar level is more than 250 mg/dL.
3. Call your doctor if you have moderate to large ketones.

If you do **NOT** have ketones and your blood sugar level is:

1. 240 mg/dL or higher 3 times in one day – call your doctor. The doctor may need to change your insulin dose.
2. Above your target range – use your correction formula or sliding scale the next time you take rapid-acting insulin. This should help bring your blood sugar reading down.

## Insulin dosing for high blood sugar

You will learn how to adjust your insulin dose to help correct high blood sugars.

Example:

- Your target blood sugar range is 70 to 150.
- You check your blood sugar level before a meal, and it is 200.
- You will need to take extra insulin PLUS your mealtime insulin to help lower your blood sugar.
- Your doctor will let you know which formula you should use – a correction factor or a sliding scale formula.
- Your diabetes team will teach you how to use these formulas.

# Hyperglycemia

## High blood sugar

### Symptoms of hyperglycemia include:



Extreme thirst



Need to urinate often



Vomiting



Dry skin



Hunger



Blurry vision



Drowsiness



Slow-healing wounds

Hyperglycemia often starts slowly, but it may lead to a medical emergency if not treated.

### Causes

- Too little insulin
- Too much food
- Illness
- Stress

### Take action:

- Check your blood sugar regularly.
- Check ketones if blood sugar levels are over 300.
- If moderate to large ketones are present, call your diabetes provider.
- If your blood sugar levels are higher than 240 three times in one day, call your diabetes provider.





# Insulin dosing

Most children with diabetes use a basal/bolus regimen to manage diabetes.

## Basal insulin dosing:

Basal insulin refers to a dose of long-acting (Lantus, Levemir, Basaglar, Toujeo, Tresiba) or intermediate-acting insulin (NPH, Humalog 75/25, Novolog 70/30) that is typically taken one or two times a day. It is a set dose chosen by your provider.

## Bolus insulin dosing:

Bolus insulin refers to a dose of rapid-acting insulin (Humalog, Novolog, Apidra) that is typically taken to cover food and to correct a blood sugar that is above target.

### ▪ Food insulin

There are 3 basic approaches for dosing food insulin: a fixed dose method, carb counting with fixed dose, and advanced carb counting. You and your doctor will decide what will work best.

#### 1. Fixed dose method

With this approach, a set amount of insulin is given at each meal. While this method may be easy to use, if your food intake varies, your blood sugar patterns may be erratic (not regular).

#### 2. Carb counting with a fixed dose

With this approach, a set amount of insulin is given at each meal as well. However, this method requires you to eat a fixed number of carb grams. The foods can vary, but the total carb grams remain the same.

#### 3. Advanced carb counting

With this approach, you will use an **insulin to carbohydrate ratio**. The *insulin to carbohydrate ratio* specifies how many grams of carbs are covered by each unit of insulin. You will use this ratio to decide how much rapid-acting insulin (Humalog, Novolog or Apidra) is needed for the amount of carbs you eat. This approach allows more flexibility with carb intake.

For example, assume your insulin to carbohydrate ratio is 1 unit for every 10 grams of carbs. This means 1 unit of insulin covers 10 grams of carbs eaten.

If your blood sugar is over your target, you may need correction insulin. If so, you will use a **blood glucose correction factor or a sliding scale formula**.

### ▪ Correction insulin

#### The correction factor/Insulin Sensitivity Factor (ISF)

A *correction factor* (or insulin sensitivity factor) is how much 1 unit of rapid-acting insulin will lower your blood sugar. In this method, your doctor will give you a number called your correction factor or sensitivity factor.

For example, assume your correction factor is 50. This means that 1 unit of insulin will drop your blood sugar 50 points.

## The sliding scale formula

The sliding scale formula is based on blood sugar ranges. Based on this chart, if your blood sugar level is over 200 before a meal, you would need to take extra units of rapid-acting insulin.

If your blood sugar level is between	Take this many extra units of rapid-acting insulin
200 to 299	Take ___ extra units
300 to 399	Take ___ extra units
More than 400	Take ___ extra units

**Note:** This is just an example. Do not use this formula to adjust your insulin dose. Always follow your doctor's orders.

# Insulin dosing worksheet: correction factor

Insulin to carbohydrate ratio 1 unit : \_\_\_\_\_ grams carb

Correction formula: (Blood sugar - \_\_\_\_\_) ÷ \_\_\_\_\_

## 1. Insulin for food

Add up all the carbs in your meal.

Total carbs \_\_\_\_\_

Divide the total carbs by the Insulin : Carb ratio.

÷ \_\_\_\_\_

Insulin needed to cover the carbs

Units of insulin =

## 2. Insulin to correct a high blood sugar

If pre-meal blood sugar (BS) is greater than \_\_\_\_\_,

Take the BS reading and subtract (BS \_\_\_\_\_ - \_\_\_\_\_)

= \_\_\_\_\_

Divide what is left by the correction factor.

÷ \_\_\_\_\_

Insulin needed to correct the high BS

Units of insulin =

## 3. Total insulin

Add the number of units needed for **FOOD** plus **CORRECTION** to get your total dose of insulin (Humalog/Novolog/Apidra).

Food insulin +  Correction insulin =  Total insulin

\_\_\_\_\_ + \_\_\_\_\_ =

**Note:** Your doctor may give you different correction instructions for pre-bedtime.

# Insulin dosing worksheet: sliding scale

Insulin to carbohydrate ratio 1 unit : \_\_\_\_\_ grams carb

## 1. Insulin for food

Add up all the carbs in your meal.

Total carbs \_\_\_\_\_

Divide the total carbs by the Insulin : Carb ratio.

÷ \_\_\_\_\_

Insulin needed to cover the carbs

Units of insulin =

## 2. Insulin to correct a high blood sugar (over \_\_\_\_\_)

Mealtime sliding scale

Blood sugar \_\_\_\_\_ to \_\_\_\_\_ give \_\_\_\_ extra units of \_\_\_\_\_

Blood sugar \_\_\_\_\_ to \_\_\_\_\_ give \_\_\_\_ extra units of \_\_\_\_\_

Blood sugar more than \_\_\_\_\_ give \_\_\_\_ extra units of \_\_\_\_\_

Bedtime sliding scale

Blood sugar \_\_\_\_\_ to \_\_\_\_\_ give \_\_\_\_ extra units of \_\_\_\_\_

Blood sugar \_\_\_\_\_ to \_\_\_\_\_ give \_\_\_\_ extra units of \_\_\_\_\_

Blood sugar more than \_\_\_\_\_ give \_\_\_\_ extra units of \_\_\_\_\_

## 3. Total insulin

Add the number of units needed for **FOOD** plus **CORRECTION**.

Food insulin +  Correction insulin =  Total insulin

\_\_\_\_\_ + \_\_\_\_\_ =



# Low blood sugar: hypoglycemia

Low blood sugar is also called hypoglycemia. Almost every person using insulin needs treatment for low blood sugar at some time. Low blood sugar happens quickly and needs to be treated right away.

You need to know the signs of low blood sugar so you can treat it quickly. Your family, friends, teachers and sitters need to know the signs of low blood sugar, too. When they know what to look for, they may notice the signs before you do. They also need to know what to do in case you need help.

In general, a blood sugar level below 70 is considered low. For you, a blood sugar level below your target range might be considered low. Ask your diabetes team what a low blood sugar level is for you.

Some things that cause low blood sugar include:

- Too much insulin or medicine
- Exercise
- Not eating enough food to cover a dose of insulin
- Skipping meals and snacks if you are on insulin that peaks several hours after you take it

## Symptoms of low blood sugar

Mild symptoms of low blood sugar include:

- Shakiness
- Fast heartbeat
- Sweating
- Blurred or double vision
- Headache
- Confusion, slow thinking or trouble doing simple things
- Slurred speech
- Hunger
- Feeling moody or cranky
- Numbness
- Feeling weak or sleepy
- Having a pale, gray color to your skin
- Crying or feeling nervous
- Not being able to move right (poor coordination)

Low blood sugar needs to be treated **right away**. If you do not treat the early signs, you may have more severe problems like:

- Passing out
- *Seizures*



# Hypoglycemia

Low blood sugar

Symptoms of hypoglycemia include:



Shakiness



Fast heartbeat



Sweating



Dizziness



Anxiety



Hunger



Blurry vision



Weakness  
or fatigue



Headache



Irritability

Hypoglycemia often comes on suddenly and may lead to a medical emergency if not treated immediately.

## Causes

- Too much insulin
- Too little food
- Skipped meal
- More activity than usual
- Vomiting

## Take action:

- Check your blood sugar. If you can't check, treat anyway.
- Treat by eating three to four glucose (sugar) tablets, or by drinking 4 ounces of fruit juice or half a can of regular soda.
- Check your blood sugar again after 15 minutes. If it is still low, treat again. If symptoms don't stop, call your healthcare provider.

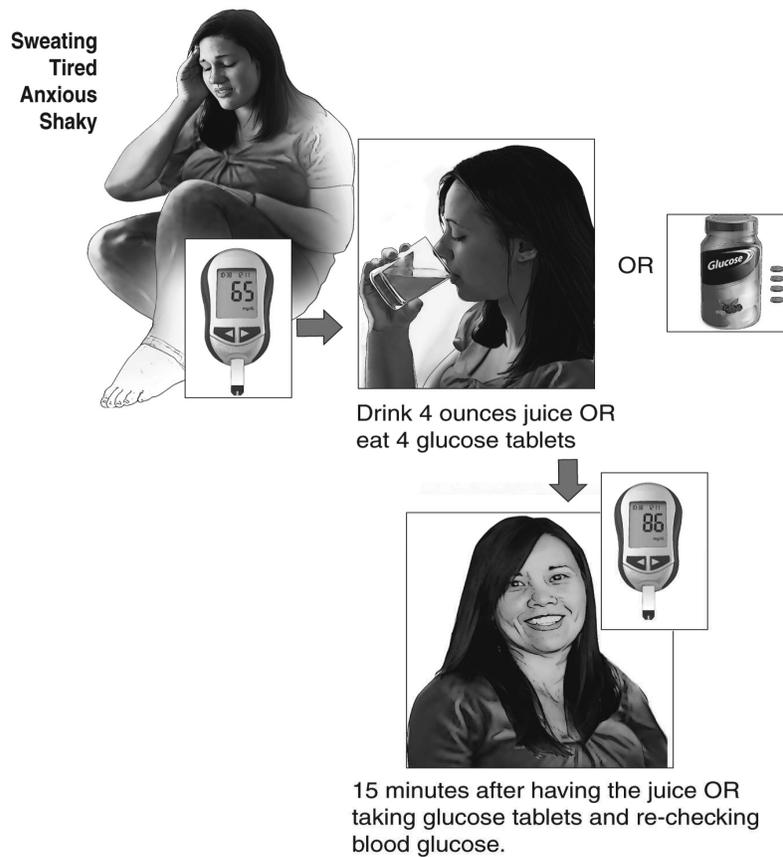


# Treating low blood sugar

## Treatment when you are alert (conscious)

1. Always check your blood sugar level first. Do not assume it is low just by the way you feel.
2. If you have signs of low blood sugar and find out it is below your target range or slightly above it, use the “Rule of 15” to treat yourself. This means that you eat or drink 15 grams of carbs, such as:
  - 3 or 4 glucose tablets
  - 4 ounces of juice
  - 1 Tablespoon of sugar (3 sugar packets)
  - 5 ounces of regular soda—not diet
  - 8 ounces of low-fat milk
  - Glucose gel—you may get it over-the-counter at most drug stores.
3. Wait 15 minutes, and test your blood sugar level again.
4. If blood sugar is still below 70 or below your target range, eat another 15 grams of carbs.
5. Wait 15 minutes after eating, and test your blood sugar level again.
6. If your blood sugar level is above 70, resume your regular routine.
7. If after 3 checks your blood sugar level is still below 70, call your doctor.

### Hypoglycemia



## **Avoid these foods when you treat low blood sugar:**

- Chocolate has a lot of fat and takes a long time to digest.
- Other foods that contain cornstarch, fat or protein may take longer to work, too.
- Hard candy, like mints or Lifesavers, takes a long time to dissolve and could also be a choking hazard.

## **Treatment if you become confused**

Low blood sugar can sometimes cause you to become confused. If this happens, your parent or another adult can squirt glucose gel into the side of your mouth.

- They should squirt it between the gum and cheek, and rub it in.
- This will help raise your blood sugar level.
- You can buy glucose gels at your local drug store.

## **Treating severe low blood sugar**

### **Treatment if you are not alert (unconscious) or have a seizure**

If you ever have a very low blood sugar level and pass out, someone will need to give you medicine called *glucagon*. Make sure that you, your family and any caregivers, such as teachers and sitters, know how to use glucagon. You need a doctor's prescription for this medicine.

**Glucagon** is a natural hormone made by the pancreas.

- It has the opposite effect of insulin.
- It raises blood sugar.
- If you ever have a seizure or are not alert, someone will need to give it to you by injection (shot) under your skin or into the muscle.

Glucagon comes in an emergency kit with 2 parts: a vial of powdered medicine and a syringe of liquid. Someone needs to mix the powder with the liquid just before giving the injection. The package has instructions for mixing and giving it.

**Anyone taking insulin should carry glucagon with them. You will need a new glucagon prescription from your doctor every 12 months.**

## **How to use glucagon**

### **For parents or other adults**

You will only give glucagon to your child if he is not conscious or is having a seizure. If this happens, never give him food or drinks. It could cause him to choke.

You should:

1. Get the glucagon ready to inject. Follow the package instructions.
2. Give the proper dose as advised by your child's doctor.
3. Glucagon may cause vomiting. Place your child on his side to prevent choking.
4. Call 911 or your local emergency service immediately after giving glucagon.
5. If there is no response to the glucagon in 10 minutes, call the doctor. He may advise another dose.
6. When your child wakes up, give him sips of a regular soda, juice or sweetened drink even if he has an upset stomach.
  - He may not want to drink, but give sips of fluids with carbs anyway.

- This helps to prevent another low blood sugar reaction.
- 7. If your child is able to keep the drink down after 10 minutes, have him eat something solid. You may use a sandwich or crackers with peanut butter.
- 8. Check his blood sugar often.
- 9. If he vomits, check for ketones.
- 10. Always call his doctor for further instructions after using glucagon. His next insulin dose may need to be changed.
- 11. Discard unused mixed glucagon after 24 hours.

You also can find these instructions on the sheet titled “Care for low blood sugar” on the next page. You may want to make extra copies for teachers, school nurses, babysitters, grandparents and anyone else who may need it.

## Preventing low blood sugar

- Talk with your diabetes team any time you have low blood sugar levels for no known reason. You may need a change in your insulin or medicine dose.
- Learn to offset the effect exercise has on blood sugar by adjusting your insulin or eating extra carbs.
- Check your blood sugar level before any physical activity. Carry extra snacks and sports drinks if your blood sugar is near the low end of your target range.
- Recording your blood sugar level is the best way to find out how activity affects your blood sugar.
  - Record the times, intensity and length of exercise.
  - Record your blood sugar levels before, during and after the activity. This can help your diabetes team decide what you can do to help prevent low blood sugar levels when you exercise.
- Talk with your doctor or diabetes team about how to adjust your insulin if you have low blood sugar levels during the night. They may suggest changes to your insulin.

## How to help prevent low blood sugar at night

- Always measure your blood sugar level before you go to bed. Your bedtime target blood sugar will be individualized.
- If your bedtime blood sugar level is less than your bedtime target blood sugar, eat a carbohydrate snack. Do not take insulin to cover the snack.
- If you were extra active during the day, you may need a higher bedtime target blood sugar. Make sure to discuss this with your doctor.
- After a day of extra activity, measure your blood sugar level at 2 a.m.
- One time a month, check your blood sugar level at 2 a.m.

## Safety tips

You cannot completely prevent low blood sugar levels. Being prepared for it is the most important thing you can do. Be sure to:

- Wear identification (ID) saying you have diabetes.
- Carry some form of carbohydrate with you at all times.
- Check your blood sugar levels before driving any type of vehicle.
- Check your blood sugar levels at the first sign of low blood sugar.
- Keep glucagon in a handy place so your family can find it in a hurry.
- Get a new glucagon prescription every 12 months when it expires.



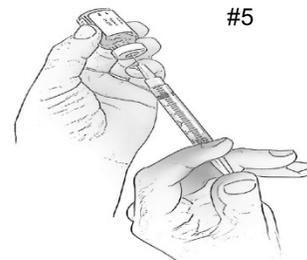
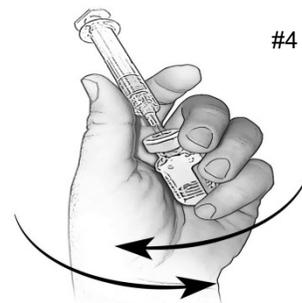
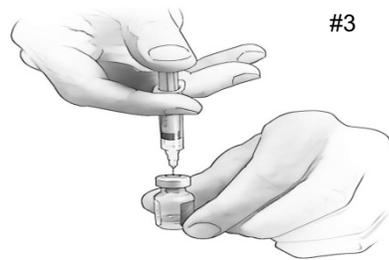


# Care for low blood sugar

Treatment for a child who is conscious	Treatment for a child who is unconscious or having a seizure
<p><b>Use the 15:15 rule.</b></p> <ol style="list-style-type: none"><li>Eat or drink 10 to 15 grams of carbs. Examples include:<ul style="list-style-type: none"><li>3 to 4 glucose tablets</li><li>4 ounces of juice</li><li>1 Tablespoon of sugar</li><li>5 ounces of regular soda—not diet soda</li><li>1 Tablespoon of honey or maple syrup. Do not give honey to children under the age of 2.</li><li>8 ounces of low-fat milk or yogurt</li><li>Glucose gel - available over-the-counter at most drug stores</li></ul></li></ol> <p><b>Avoid these foods:</b></p> <ul style="list-style-type: none"><li>Chocolate, which has a lot of fat and takes a long time to digest.</li><li>Hard candy like mints or Lifesavers, which take a long time to dissolve.</li><li>Foods that contain cornstarch, fat or protein, which may take longer to work.</li></ul> <ol style="list-style-type: none"><li>Wait 15 minutes before testing your blood sugar again.<ul style="list-style-type: none"><li>If it is still below 70 or your target range, eat another 15 grams of carbs. Wait 15 minutes after eating, and test your blood sugar again.</li><li>If blood sugar is above 70, continue your regular routine.</li><li>If after 3 tries, your blood sugar is not above 70, call your doctor.</li></ul></li></ol>	<p><b>Use glucagon.</b></p> <ol style="list-style-type: none"><li>Never give food or fluids to an unconscious child, as it may cause choking.</li><li>Prepare glucagon injection (red emergency kit) as you were trained and as advised by the package instructions. This is a hormone that raises blood sugar level.</li><li>Give the injection in the amount advised by the doctor.</li><li>Place the child on his side to prevent choking, as glucagon may cause vomiting.</li><li>Call 911 or the local emergency medical service immediately after giving glucagon.</li><li>Wait several minutes for the glucagon to work. Check blood sugar after 10 minutes.<ul style="list-style-type: none"><li>If child does not respond to the glucagon in 10 minutes, call the doctor. He may advise another dose.</li></ul></li><li>As soon as the child wakes up, give sips of a regular soda, juice or sweetened beverage.<ul style="list-style-type: none"><li>Child may have an upset stomach and may not want to drink. Give the fluid anyway in small sips to prevent another low blood sugar reaction.</li></ul></li><li>If the child can drink without problem after 10 minutes, give him something solid to eat like a sandwich or crackers with peanut butter.</li><li>Check blood sugar often.</li><li>If child vomits, check for ketones.</li><li>Always call the child's doctor after giving an injection of glucagon for more instructions. The next insulin dose may need to be changed.</li><li>Discard unused mixed glucagon after 24 hours.</li></ol>

# Glucagon resource sheet

1. Lay child on his side.
2. Remove cap from glass vial.
3. Take the needle cover off the syringe. Inject the entire liquid of the syringe into the vial.
4. Swirl bottle to dissolve.
5. Withdraw the glucagon solution back into the syringe, and remove the needle from vial. Glucagon dose is advised by the doctor.
6. Insert the needle at a 90-degree angle. Inject in the upper arm, thigh or upper outer area of buttocks.
7. Withdraw the needle from the skin, and apply slight pressure to the injection site.
8. Keep child on his side.  
Wait with the child until Emergency Medical Service arrives.





# Being active

Regular activity and exercise can help you stay healthy and lower your blood sugar level. Exercise can also:

- Help control your weight.
- Improve the way you look and feel.
- Keep your bones strong.
- Tone and strengthen your muscles.
- Raise your energy level.
- Reduce stress.
- Help you to have a positive attitude.

Exercise is a special help for people with diabetes because it:

- Helps insulin work better by making it easier for blood sugar to get inside the cells.
- May reduce insulin dose needs.
- Helps protect against many health problems, such as heart disease.

Ask your diabetes team what type of exercise is right for you.

- Health experts advise 30 to 60 minutes of *aerobic* exercise at least 5 times a week for all people.
- Aerobic exercise makes your heart work harder and makes you breathe deeper and faster.
- Non-aerobic exercise does not cause your heart to work as hard, but it does help keep muscle and joints strong and active.

The chart below lists some examples of aerobic and non-aerobic exercises. Both kinds of activities are fun and good for your health.

Aerobic activities	Non-aerobic activities
Aerobic dancing	Softball*
Step aerobics	Bowling
Stair climbing	Golfing
Bicycling	Football*
Dancing	Doubles tennis
Hiking or backpacking	Sit-ups and push-ups
Basketball	Weight-lifting**
Jumping rope	Walking
Soccer	
Singles tennis	
Swimming	
Running or jogging	
Video fitness programs (Wii, Xbox or others)	
Continuous free-play	

\*Team practice may be aerobic.

\*\* Moderate to intense resistive exercise may also lower blood sugar levels particularly in type 2 diabetes

## Ways to be active

Being active can be fun, especially when you are with family or friends. The chart below lists some examples of activities you can do together.

Outdoor activities	Indoor activities
Go for a walk after dinner. Play at a park. Clean the yard, or plant a garden. Ride bikes. Go swimming. Take a trip to the zoo or a farm. Go hiking. Sign up to do a walk for charity. Buy pedometers, and have a contest to see who can walk the farthest.	Go walking at the mall. Join a gym, and exercise indoors. Work out to exercise videos, DVDs or games. Help around the house by doing active chores. Buy a stationary bike or treadmill.

## A message to parents

You have the power to promote good health habits for your children by being a role model and by being active yourself.

- Limit screen time, such as TV, computer games, computers and video games, to no more than 2 hours each day. This goes for both you and your child.
- For every 30 minutes you and your child spend in front of the TV, match that with doing physical activity for the same amount of time.

## Staying hydrated

Dehydration means your body is too dried out. Dehydration can happen when you sweat a lot and you do not drink enough fluid to replace what you have lost.

- The simplest way to know you are drinking enough is to check the color of your urine (pee). It should be the same color as straw or hay.
- If your blood sugar has been running high, you may start off dehydrated because you are losing water through your urine.
- Dehydration makes your blood become “thicker”. This can make your blood sugar level appear higher.

What to drink:

- Water - plain, cool water is best for less strenuous activities.
- If you like flavored drinks, try flavored seltzer water, sports drinks with no added carbs.
- Drinks with carbs - for longer or more strenuous activities, drink sports drinks or diluted juices. Start with a drink that contains 15 carbs for each 30 to 60 minutes of strenuous exercise.

## Adrenaline effect

Some people have high blood sugar levels right before a big activity.

- When you get excited about something, your body may release a hormone called adrenaline. This raises your blood sugar.
- The high blood sugar level often only lasts a short time. **Do not give yourself insulin.** As your excitement wears off and you complete the activity, your blood sugar will come down.
- Keep a log of what happens to your blood sugar before, during and after activities. This can help you find out if this happens to you.

## Type 1 diabetes exercise guidelines

The most common problem you may have when you are active is low blood sugar (*hypoglycemia*), but there are things you can do to help prevent low blood sugar on days that you exercise.

1. Check your blood sugar more often.
  - Check your blood sugar before exercise.
  - During heavy exercise, check your blood sugar every hour.
  - Stop the exercise and check your blood sugar **right away** if you become light-headed, dizzy or have other signs of low blood sugar. Begin treatment if it is low.
  - Check your blood sugar more often after exercise. Exercise can cause low blood sugar levels for up to 12 to 24 hours afterward.
2. Use extra carbs for exercise.
  - Your doctor may aim for a higher target blood sugar level before exercise.
  - He may suggest that your blood sugar be more than 120 before exercise. (Exercise targets are different for each person.)
  - This means that a carbohydrate snack may be needed before exercising to reach this target blood sugar level.

**Example:** let's say your target blood sugar range before you exercise is 120-200 mg/dL.

- When you check your blood sugar, you find it is 110 mg/dL.
- This means you may need to eat a snack that contains 15 or 30 grams of carbohydrate to raise your blood sugar before you start.

**Important note:** do not take insulin when you eat a snack meant to raise your blood sugar before exercise.

All snacks are not equal:

- A snack that combines healthy carbs and fats with protein provides sustained energy and may help to stabilize blood sugar levels.
- A fast-acting carbohydrate snack, such as juice, will help when you:
  - Need to raise a low blood sugar quickly

If you use a fast-acting carb, be sure to follow it with a snack that contains fiber, protein or fat.

The amount you eat will depend on the:

- Type of exercise.
- Duration of exercise (how long you do it).
- Intensity of exercise (how hard you work at it).

3. Adjust insulin for exercise.
  - Another way to avoid low blood sugar with exercise is to work with your doctor to adjust your insulin dose.
    - Your dose may need to be lower on days you exercise.
    - This method is more involved, and you will need your doctor's help to make sure your insulin dose is correct.
    - Consult with your doctor when you have developed a pattern and are ready to adjust the insulin dose before exercise.
  - Choose your insulin site carefully to avoid the area that will be used the most during an upcoming exercise session. The insulin may be absorbed faster than desired. For example, you may choose to inject your abdomen to avoid your legs before running.
4. Adjust bedtime rules for days with exercise.
  - Exercise can decrease blood sugar for 12 to 24 hours after the activity.
  - After a day of strenuous activity, eat extra carbs (without insulin) to raise your bedtime blood sugar.
  - Your diabetes team will help you identify your bedtime targets after exercise.
  - You may want to set your alarm for 2 a.m. to check that your level does not drop while you sleep.

### **Exercise tips:**

- Always carry some carbs with you when you plan to exercise.
- Eat extra carbs if your blood sugar level is less than what your target level should be before exercise. If your blood sugar was less than 100, check your blood sugar again after you eat to make sure it is in your target range prior to exercising.
- The type of insulin, timing and type of carb taken can affect blood sugar level.
- If your blood sugar is less than 100 after exercise, you may need to eat a 15 gram snack to prevent a low blood sugar.
- You may be able to predict how exercise will impact your blood sugar level if the duration and intensity of the exercise are consistent.

### **Write down your blood sugar levels during and after exercise.**

- No matter what method you use to adjust your blood sugar, you will need to check your blood sugar levels before and after exercise initially in order to identify a pattern. Write these blood sugar levels down on an Exercise Log. (See a sample log at the end of this section.)
- Record what you eat or drink before or during exercise. It also helps to document the time and amount of the last insulin dose given.
- Do this several times when you start a new exercise until you find out what works best. It usually takes 7 to 10 exercise sessions of the same intensity and duration.
- This will help you and your diabetes team notice patterns of how an exercise affects your blood sugar.
- As you do this you may need to adjust food intake. Compare the results to find out what works best for you.

### **When not to exercise**

There are certain times when you should not exercise. This includes when you:

- **Are positive for ketones.** Positive ketones mean your body is using fat or muscle for energy. Check for ketones anytime your blood sugar is over 300. If you exercise when you have ketones, you could make your blood sugar and ketones go even higher.

- **Feel shaky, weak or dizzy or have a headache.** You might have low blood sugar. Stop and check your blood sugar **right away**. If it is low, begin treatment for low blood sugar.
- **Are sick.** If you have a fever, you may have an infection. Rest and start exercise slowly when you are well. Check your blood sugar closely when you start again. See the Sick Days section for more information.

Exercise with caution if your blood sugar is over 300 and you do not have ketones. Be sure to drink enough to avoid getting dehydrated when your blood sugar is high.

## Type 2 diabetes exercise guidelines

If you have Type 2 diabetes, your body may still make insulin but just not use it well.

- The good news is that exercise makes your body more sensitive to insulin, so it uses it better.
- This means that if you exercise on a regular basis, you can reduce or stop your need for insulin shots.

People with type 2 diabetes often need to maintain or lose weight. Exercise can help you meet this goal.

- If you need to maintain or lose weight and do not take insulin, **do not** eat extra carbs when you exercise unless you have signs of low blood sugar.
- If you have low blood sugar during or after exercise, talk with your doctor about reducing your insulin or medicine dose.

## Tell your coaches

Tell your coaches and physical education (PE) teachers about your diabetes. This helps them to learn about how to help if you should ever need it. Have a parent or guardian fill in the form letter for coaches at the end of this section, or they can use it as a guide to write their own letter.

## Adjusting carbohydrates for exercise



**Children's**<sup>SM</sup>  
Healthcare of Atlanta

Use the table below as a guide to help you avoid low blood sugars during and after exercise.

Extra Food to Cover Moderate Exercise			
How long do you expect to exercise?	Blood sugar (mg/dL) (right before exercise)	Suggested grams of carbohydrate (needed before you can safely exercise)	Snack ideas
Short – 15 to 30 minutes	Less than 120	15 grams	4 peanut butter crackers or 1 piece of fruit
	120 to 150	15 grams	1 slice bread with peanut butter
	Over 150	0	none
Longer - 30 minutes to 120 minutes	Less than 120	30 grams	8-ounce milk and ½ granola bar
	120 to 150	30 grams	8-ounce sports drink and ½ sandwich
	Over 150	15 grams	1 piece fruit
Longest 2 to 4 hours	Less than 120	45 grams	1 energy bar and 4-ounce juice
	120 to 150	45 grams	4 to 8-ounce milk and 1½ cup unsweetened cereal
	Over 150	30 grams	Whole sandwich

- This is a general guideline. If activity is heavier, a bigger snack may be needed. For longer periods of activity, frequent small snacks or drinks may be needed. The amount of carbs needed is different for each person.
- If blood sugar is over 200, you do not need extra carbs before exercise.
- Remember to check blood sugar every hour for long periods of activity.

Check for ketones if blood sugar is over 300 mg/dl.

- **If positive** for ketones, call your doctor and do not exercise.
- **If negative** for ketones, exercise with caution. You do not need extra carbohydrates before exercise. Check blood sugar again in one hour.
- Adrenaline can raise blood sugar temporarily if you get excited at a sporting event you are in. Eventually blood sugar will come back down. Keep records of how your blood sugar responds so you can determine patterns. This will help you determine the best way to handle that activity.

Table adapted from Understanding Diabetes by Peter Chase 11<sup>th</sup> edition 2006  
Barbara Davis Center for Childhood Diabetes.

# Aerobic exercise program

Aerobic exercise program has 3 parts:

1. Warm-up and stretching
2. Aerobic activity
3. Cool down and stretching

Warming up your muscles before you begin to exercise is important. For example:

- Before walking or running, warm up by marching in place, doing jumping jacks, and stretching your front and back thigh and calf muscles.
- Before tennis, do arm circles, do shoulder shrugs, and stretch your chest and upper back muscles.

Cooling down is important, too. It helps your muscles unwind after exercise. You can do the same kinds of things to cool down as you did to warm up.

## Your target heart rate

Your heart rate is the number of times your heart beats during 1 minute.

- Check your heart rate before, during and after exercise. This will help you exercise at the right pace.
- For best results, keep your heart beating at your target rate for **at least 20 minutes**.

A math formula is used to decide your target heart rate. It is based on 60 to 85 percent of your upper heart rate. See the chart below to find out what your target heart rate is.

You measure your heart rate by taking your pulse. To take your pulse:

1. Use 2 fingers to feel your pulse. Do not use your thumb. Your thumb has its own pulse.
2. You will find your pulse:
  - On the radial artery (on the underside of your wrist, just below the base of your thumb).
  - On the carotid artery (on either side of your neck).
3. Count the number of beats you feel in 10 seconds. Time it by using a watch with a secondhand.
  - Multiply this by 6 to get the number of beats per minute. (See the “Target Heart Rates for Ages 5 to 18” chart.)

## Target heart rates for ages 5 to 18 years

Age	60% to 85% training heart rate	Number of heart beats in 10 seconds
5	129 to 183	22 to 31
6	128 to 182	21 to 30
7	128 to 181	21 to 30
8	127 to 180	21 to 30
9	127 to 180	21 to 30
10	129 to 179	21 to 30
11	125 to 178	21 to 30
12	125 to 177	21 to 30
13	124 to 176	21 to 29
14	123 to 175	21 to 29
15	122 to 174	21 to 29
16	122 to 173	20 to 29
17	122 to 173	20 to 29
18	121 to 172	20 to 29



# For coaches

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Dear Coach,

This letter is about \_\_\_\_\_, who has diabetes. His/her diabetes should not interfere with his/her ability to play \_\_\_\_\_. In fact, many people with diabetes are good athletes and are able to perform the same as any other player.

Exercise is very important for people with diabetes because it lowers blood sugar levels. The amount of insulin and food must be adjusted for exercise. People with diabetes learn how to manage exercise, food and insulin by testing their blood sugar and talking with their diabetes educator or doctor.

At times, the blood sugar can become too low, and he/she may need your help. You should be familiar with the signs of low blood sugar and how to treat them.

Signs of low blood sugar include:

- Shakiness
- Extreme hunger
- Tiredness
- Paleness
- Dizziness
- Sweating
- Double vision
- Headaches
- Sudden drop in performance or an irritable mood

If signs of low blood sugar occur, he/she needs to stop immediately and check his/her blood sugar. If it is low, he/she will need to eat or drink something to raise it. He/she should carry testing supplies and food for this purpose. Some of the ways to raise blood sugar are to:

- Drink a 4-ounce can of fruit juice, or take 3 to 4 glucose tablets or 4 teaspoons of sugar. Follow any of these with a solid food, such as cheese and crackers or a sandwich.
- Test blood sugar to make sure it is back in the target range. Physical activity can be resumed once blood sugar increases.

Quickly responding to the first signs of low blood sugar can help avoid a severe reaction, such as loss of consciousness or seizures. Your understanding and support will help ensure continued athletic success.

Thank you,



# Managing diabetes at school

# Managing diabetes at school

You will need help taking care of your diabetes at school, just like you do at home.

## Diabetes Medical Management Plan (DMMP)

Your doctor and diabetes team will make a diabetes medical management plan for your school to follow. The plan can keep you safe while you go to class and take part in activities like gym, field trips and after-school programs.

This plan will tell the staff at your school what they need to do to help you manage your diabetes. This plan includes the following:

- A list of your medicines, including your dose and when you take them
- When to check your blood sugar and ketones
- Your meal plan and snacks
- Guidelines for exercise
- How to treat high or low blood sugar levels
- Emergency contact numbers, including parents' number and diabetes doctor
- Where your diabetes supplies will be kept

Your parents need to share the plan with all people involved in your classes and activities. This includes teachers, principals, school nurses, counselors, coaches, bus drivers and cafeteria managers.

Look in the resource section of this handbook for an example of a ***diabetes medical management plan***. Your doctor will complete and sign one before you go back to school.

## School staff training

Your care at school will be a combined effort between the school and your parents. The school needs to be sure they have staff trained in:

- Knowing the signs of high and low blood sugar and what action to take.
- How to use your blood glucose meter.
- How to give insulin and glucagon.
- How to test for ketones.
- How to prevent low blood sugar during gym class or sports activities.
- How to count carbs at meals and snacks.

The **Tips for Teachers** handout at the end of this section can help school staff learn how to better manage your needs.

## Diabetes supplies needed at school:

- Insulin, syringes and alcohol swabs
- Blood sugar meter, test strips, lancet holder and lancets
- Ketone strips
- Glucose tablets, juice and glucose gel for treatment of low blood sugar
- Glucose logs
- Glucagon kit

## Laws and diabetes

There are federal and state laws that protect children with diabetes from discrimination in schools.

They include:

- Section 504 – Rehabilitation Act of 1973
- Individuals with Disabilities Education Act
- Americans with Disabilities Act
- Safe at School – Georgia HB 879

These laws state that any school receiving federal funds must provide accommodations for a child with diabetes. These laws also assure that you have an equal chance for all of the activities and opportunities in school.

This means that the school should:

- Provide as little disruption to your usual routine as possible.
- Plan for you to safely and fully take part in all school activities.
- Create a written plan stating how they will help you. Some examples of different plans include:
  - *Individualized Healthcare Plan (IHP)*: a care plan developed by the school nurse for students who require health services on a daily basis.
  - *504 plan*: a plan that outlines how the school will help you remain medically safe and have the same access to education as other children. Your parent, school nurse, teachers and principal are all involved in creating this plan. Each plan is individualized, and all schools vary in their approach. Talk to your school about this type of plan.
  - *Individual Education Plan (IEP)*: a document that is developed for a public school child who is eligible for special education.
- Georgia HB 879 – Safe at School: states that additional school personnel, who have completed training coordinated by the school nurse and who provide care under the supervision of the school nurse or other health care professional, needs to be prepared to perform diabetes care tasks at school when a school nurse or other health care professional is not available.

## School accommodations

Your school can help by allowing the following accommodations:

- Unrestricted water and bathroom breaks
  - When your blood sugar is elevated, you may need to use the bathroom more often. Teachers should allow unrestricted bathroom breaks. You may also feel more thirsty during periods of elevated blood sugar and may need to keep a water bottle with you.
- Meals/snacks
  - You will need access to regular, scheduled meals.
  - You will need access to snacks whenever and wherever needed.
  - You will need enough time to check your blood sugar, take insulin and finish your meals.
  - The school will provide nutrition and carbohydrate information for the school menu. Each school district in a public school setting has a school nutrition director who oversees this process.
- Prompt treatment of low blood sugars
  - This may mean having your blood sugar meter with you so you can limit the amount of class time you miss.
  - If your supplies are kept in another part of the school, you will need an adult to go with you to make sure you get there safely.
- Excused absences
  - You will need to be excused for medical appointments and diabetes classes.
  - You may need to make up missed days of school.
- Special arrangements for tests
  - If you have signs of a high or low blood sugar level, the school needs to give you extra time to check your blood sugar and treat it.
  - If the test is a standardized test given by someone other than the local school system, your school must tell them about your special needs.
- Participation in all school activities: sports, physical education (PE) and field trips
  - The school needs to provide trained staff that can help with your diabetes care as needed.
  - There should be a system in place to tell substitute teachers and bus drivers that you have diabetes.

### Some other ways your parents can help are to:

- Sign paperwork giving permission for trained staff to give you insulin and medicines.
- Provide the school with an updated diabetes medical management plan (DMMP) from your doctor every year and with every medicine/insulin dose change.
- Tell your school if you are having out-of-range blood sugar levels.
- Talk regularly with the nurse about your diabetes management and blood sugar levels.
- Provide the school with your needed diabetes supplies.
- Let your school know when you will be absent for appointments with your diabetes doctors.

## Daycare and preschool

The child's healthcare team, parents/guardians and child care staff all play a role in making sure that proper care is given to the child with diabetes in a child care program.

### Your doctor and diabetes team should provide:

- A written diabetes medical management plan (DMMP). This should be provided by the diabetes care provider.

### Parents should:

- Schedule a diabetes planning meeting with the daycare center director.
- Provide written authorization for diabetes-trained staff to inject insulin and do blood sugar monitoring.
- Provide/maintain appropriate diabetes supplies.
- Inform daycare (director and teachers) of any changes in diabetes management.
- Inform daycare (director and teachers) if the child is having out-of-range blood sugars at home.
- Have the child wear a Medical-Alert ID at all times.

### Child care staff should:

- Receive **basic** diabetes training and know who to contact in an emergency. (This training should be provided to ALL child care staff and may be provided by a healthcare professional or a specially-trained, non-medical staff member. Parents may wish to be involved in the training.) Training should include:
  - What is diabetes? – type 1 and type 2
  - Signs and symptoms of hyperglycemia (including treatment and emergency procedures)
  - Signs and symptoms of hypoglycemia (including treatment and emergency procedures)

***ALL staff must be aware of the identity of the child with diabetes.***

- A small group of child care staff members should receive **specialized** training from a qualified health care professional, such as a doctor or a nurse with expertise in diabetes. Training should include:
  - Testing blood sugar levels
  - Knowing symptoms of hypoglycemia and hyperglycemia
  - Treating hypoglycemia and hyperglycemia
  - Administering insulin and glucagon (Child-specific dosing will be covered in detail by parent.)
  - Testing ketones
- The child care center should keep a poster displayed showing the signs and symptoms of hypoglycemia and hyperglycemia.
- Keep a notebook that includes all care and communication. This should be kept with the child at all times and should include:
  - A diabetes medical management plan (DMMP). This includes emergency contact information.
  - A diabetes management log
  - A food diary and menus
  - Information about signs and symptoms of hypoglycemia and hyperglycemia

**Your diabetes team can help you coordinate care and training.**

## College and diabetes

### Prepare for college

- Standardized testing and diabetes: You may need to request special accommodations during testing sessions. For example, you will need your meter and access to snacks and water during your standardized testing session. You may need to take a bathroom break or an extended break to manage your blood sugar.
- Scholarships: Look for scholarships for students with diabetes.

### Things to consider at college

- Dining services: Consider hours of operation and access to food when dining halls are closed.
- Housing:
  - Explore on campus and off campus options.
  - Can you choose your roommate?
  - Is there access to a kitchen in the dorms?
  - Are refrigerators allowed in the dorms?
  - Is there a network available for students with diabetes?
- Health care services: What is available for students with diabetes?
- Accommodations/auxiliary services: You may never need accommodations, but if problems arise, you want to be prepared. You might need to reschedule an exam, or you might have a professor that does not understand your needs. Register as soon as you get to campus to avoid losing the opportunity.
- Access to supplies:
  - How and where will you get your supplies?
  - Where is the closest pharmacy?
  - How does the mailroom handle packages that need to be refrigerated like insulin?

**For more information on diabetes in the school  
and at child care, see the following chart:**

Resource	Tool
American Diabetes Association	Diabetes Care Tasks at School: What Key Personnel Need To Know – download for free, or order the DVD/CD to share with staff.  Sample 504 Plan – download free sample.
Bright from the Start: Georgia Department of Early Care and Learning	Bright from the Start: Georgia Department of Early Care and Learning Policy for Diabetes Management
Children’s Healthcare of Atlanta	Diabetes Services
College Diabetes Network	Prepare for College – Helpful Tips
Juvenile Diabetes Research Foundation	JDRF Advisory Tool Kit – download for free or order the book to share with staff.
National Institute of Health	Helping the Student with Diabetes Succeed – download for free or order the book to share with staff.

# Tips for teachers

(Used with permission from the American Diabetes Association)



**1. EVERY CHILD WITH DIABETES IS DIFFERENT.**

Each and every child with diabetes may have different symptoms of low blood sugar. Although many of the symptoms may be similar, they will not always be the same. Situations that can affect your student's blood sugar are: insulin, food intake, exercise, illness, stress and/or any changes in routine. Soon you will get to know your own student's unique individuality and their typical reactions to low blood sugar.

**2. DON'T DRAW UNNECESSARY ATTENTION TO YOUR STUDENT'S CONDITION.**

Your student with diabetes may have to eat snacks periodically in the classroom. In addition to your student's designated snack time, remember that he or she **MUST** eat whenever they feel low. This is imperative, especially if the student is unable to have his or her blood sugar level checked first. This is **NOT** a choice for the child with diabetes, but a necessity!

**3. PROVIDE INCONSPICUOUS AND GENTLE REMINDERS.**

Pay close attention to your student's regular snack time. Not all children (especially the very young) can tell time, or are going to remember their snack time. If you haven't noticed them eating, pass them a note or work out a special "password" between the two of you that reminds them of their snack time.

**4. DO NOT PUT A "LABEL" ON THE STUDENT WITH DIABETES.**

Never single a child with diabetes out as the "diabetic" kid. First and foremost, the child with diabetes needs and wants to feel unique and special, just like every other student in your class.

**5. DO NOT SYMPATHIZE: EMPATHIZE.**

A child with diabetes does not want or need your sympathy. These children need understanding, acceptance and support. Educate yourself in every way possible about diabetes. Learn how it may affect them and have compassion for how they must live their lives each and every day.

**6. ALWAYS BE PREPARED.**

Always carry a quick and portable snack **WHENEVER** you and your student with diabetes leave the classroom or the school grounds. This is especially important during fire drills, earthquake drills, field trips, special presentations and/or assemblies. A small can of juice together with crackers may work best.

**7. USE THE BUDDY SYSTEM.**

If your student with diabetes tells you he or she feels low, then give the student a quick-acting carbohydrate snack such as fruit juice, regular soda, or glucose tabs. If your student needs to see the nurse, **ALWAYS** send a "buddy" (someone who won't object) with them. **Never leave a child alone or sent anywhere alone when experiencing low blood sugar.**

**8. ALLOW UNRESTRICTED BATHROOM BREAKS.**

When given the opportunity, let the child with diabetes know that it's okay to go to the bathroom **WHENEVER** necessary and have a water bottle when blood sugar is high. If their blood sugar is running high, their body's natural response is to eliminate the extra glucose by using the bathroom. Don't make them feel embarrassed by having to ask you for permission.

**9. BE PATIENT.**

Be patient if the student with diabetes has minor problems with organization. High and/or low blood sugar levels may make it difficult for them to concentrate at times. You may have to repeat some things, especially if they've been to the nurse's office during class time.

**10. KEEP THE LINES OF COMMUNICATIONS OPEN.**

Always work as a team with the student, caregivers, school nurse and other educators. If there is a special school party or occasion where "treats" are to be served, let the family know in advance, if possible. This allows the family to discuss the options with the child so that he or she can make responsible choices. Often, many treats can be worked into the child's meal plan.

**11. KNOWLEDGE IS POWER.**

Learn as much as you can about diabetes in children. Consider completing a training to enable you to perform essential key diabetes care tasks such as blood glucose monitoring and insulin and glucagon administration. Your willingness to learn about diabetes and being prepared to perform care tasks or provide supervision as necessary will ensure a safe classroom environment and enable your student to attain optimal academic performance.



# Back to school with diabetes

– use this checklist to ensure a safe return to school



**Children's**<sup>SM</sup>  
Healthcare of Atlanta

- Make an endocrinologist appointment:
  - Refill prescriptions (for example - Glucagon).
  - Update the Diabetes Medical Management Plan (DMMP).
  - Discuss your child's readiness to carry supplies and perform his own care.
  
- Plan a meeting for those involved in your child's care at school.
  - School nurse (or clinic aid/trained personnel)
  - Principal, teachers, coaches and P.E. staff
  - School bus driver
  - After school staff, if child participates in extracurricular activities
  
- Topics for discussion at school meeting:
  - Review the Diabetes Medical Management Plan (DMMP).
  - Daily schedule – Breakfast? Lunch? Dismissal? After school activities?
    - WHO will supervise? Is self-care involved?
    - WHERE and WHEN will blood sugar monitoring and insulin administration be performed?
  - Communication between school and parent
    - Reporting blood sugars and doses of insulin. Daily? Weekly?
    - Class parties with unexpected snacks
    - Field trips
  - Home concerns: any observed patterns of highs and lows? Was morning insulin given?
  - 504 plan (if applicable)
  
- Gather diabetes supplies for school:
  - Blood sugar meter, logbook, test strips, lancets, lancing device and control solution
  - Insulin (vials or pens), syringes or pen needles and alcohol swabs
  - Ketone test strips
  - Low blood sugar treatment (glucose tablets, juice boxes, glucose gel and glucagon kit)
  - Extra snacks for P.E. or recess
  - Extra insulin pump supplies (reservoirs/cartridges, infusion sets, batteries, insulin and syringes or pens as a backup)
  - *Most supplies have expiration dates and will need to be replenished:*
    - *Insulin (vials or pens)- expire 1 month after opening*
    - *Ketone strips- expire 6 months after opening*
    - *Control solution- expires 3 months after opening*
    - *Glucagon- expires after 1 year*
  - Keep enough supplies to last at least 72 hours in case of an emergency.
  - Even if your child is carrying his own supplies, keep back-up supplies in the school clinic.
  
- Keep a list of current phone numbers where you or another caregiver can be reached.
  
- Obtain a medical alert tag for your child to wear while at school (bracelet, necklace, shoelace or backpack).





# Diabetes supply list

Here is a list of supplies you will use to take care of your diabetes. This list may be useful when you first have diabetes to help remind you of supplies you will need to bring to school, on overnight stays and for traveling.

A √ means that your diabetes doctor (endocrinologist) needs to prescribe these items.

**Diabetes Medical Management Plan** – signed form from the doctor √

## For shots:

- Insulin √
- Syringes √
- Alcohol swabs
- Safe container to dispose of syringes and needles

## For blood sugar monitoring:

- Monitor √
- Blood glucose strips √
- Control solution
- Lancet (finger stick) device √
- Lancets √
- Monitoring log

## For ketone monitoring:

- Ketostix √

## For low blood sugar (hypoglycemia):

- Glucagon kit √
- Carb source: glucose tablets, 4 oz. juice box
- Glucose gel
- Snacks

## Other important supplies:

- Medical ID bracelet or necklace
- Other medicine √





# Problem solving

Despite great planning, situations may arise that are out of your control. A person with diabetes has to have good problem-solving skills. On any given day, a high or low blood sugar or getting sick will require you to make quick, informed decisions about food, activity and medicine.

Here are some ideas for goals to keep your child safe:

- Know when to call the doctor.
- Put together a sick day box with supplies before you need it. That way you will be ready.
- Always carry supplies to use for low blood sugar and ketone strips with you.
- Do not wait to refill or pick up prescriptions. It does not hurt to have extra supplies around.
- Get a caregiver trained in diabetes care as soon as you can. More than one is even better.

## When to call the diabetes doctor (endocrinologist)

Call the doctor if your child:

- Has signs and symptoms of **too little insulin**. This may include:
  - High blood sugar (3 blood sugars over 240 in one day)
  - Moderate to large ketones in the urine
    - Check for ketones when blood sugar is over 300 or your child is sick.
    - Remember that ketones are a danger sign – a time to call for help.
  - Vomiting
    - Think Diabetic Ketoacidosis (DKA)! DKA occurs when there is not enough insulin.
    - Remember that nausea and vomiting are the first signs of DKA. Test for ketones.
- Has a low blood sugar that does not come up with carbs
  - Or, you have to give glucose gel or glucagon.
  - Or, your child has a seizure.
- Is sick and cannot control blood sugars.
  - Or, he vomits or has diarrhea more than one time in a day.
- Has missed a dose of long-acting insulin (Lantus, Levemir, NPH, 70/30, Toujeo or Tresiba, Basaglar).
- Is prescribed steroids. (This may increase insulin needs.)

**Call 911** if your child is less alert or having trouble breathing.

Remember to call your child's primary care doctor for all other health concerns. Your endocrinologist will manage your diabetes concerns.

# Tips for families from families

- Make up a “sick day” box before you need it. Include Gatorade or Powerade, Pedialyte, ginger ale or other soda with sugar and saltines. Keep Jell-O and popsicles, both diet and with sugar, in the sick day box. This will help prevent your child’s blood sugar from dropping too low and will help maintain hydration.
- Check for ketones if your child’s blood sugar is over 300 or if he is sick. Call the doctor if moderate to large ketones are present.
- Make sure your child wears his Medic Alert diabetes tag or bracelet at all times. Order an extra one in case it gets lost.
- Call your insurance company to make sure you have prescriptions for preferred insulin and testing strips.
- Insulin is temperature sensitive. Keep it between 36°F– 86°F so it will not spoil, and discard after 28 days.
- Refill prescriptions and supplies well before you run out. Start saving extra diabetes supplies.
- Diabetes supplies should stay with your child at all times. Make a backup kit of supplies in case one gets lost.
- Call your child’s school right away to let them know your child will need help with diabetes care.
- You may want to contact support groups like JDRF (Juvenile Diabetes Research Foundation) and Camp Kudzu. They have people who understand what you are going through and want to help. You may want to download diabetes apps to help track your child’s care.
- Every child is different, and every day is different. No two children will react the same to insulin, carbs or exercise, even from day to day. This is normal.



# Checklist for diabetes caregivers

**Schedules change. Be prepared! Train all caregivers.**

**Plan:** Meet with all caregivers who will help supervise your child during your break or travels to review diabetes care. Use this checklist as your guide.

## Review your child's diabetes care:

- Blood sugar testing should be done before meals and at bedtime. Watch and record!
- Insulin administration: who is in charge?
  - Review dosing – write down doses and formulas.
  - Review carb counting – provide tools.
  - Remember to give Lantus, Levemir, Basaglar, Toujeo, or Tresiba at the same time every day.
- Signs and symptoms of low blood sugars
  - Does everyone know how to treat low blood sugar? – use the rule of 15.
  - Supplies (juice, glucose tabs and glucagon) – are they available at all times?
  - Remember that low blood sugars need to be treated **right away**.
- Signs and symptoms of **too little insulin**
  - High blood sugar
  - Ketones in the urine (Check for ketones when blood sugar is over 300 or your child is sick.)
  - Remember that ketones are a danger sign – a time to call for help.
  - **Vomiting:** think Diabetic Ketoacidosis (DKA)! DKA occurs when there is not enough insulin.
- Emergency contact numbers: who to call for help
  - Parents/guardian
  - Endocrinologist
  - Pediatrician
  - Pharmacy

## Supplies:

- Pack a diabetes survival kit for your child. Include:
  - Insulin and supplies
  - Blood sugar monitor, strips and lancets
  - Carb source for low blood sugars like juice boxes and sugar tablets
  - Glucagon kit
  - Water and snacks

**Check in:** Plan and schedule routine check in calls with your child and adult caregiver.





# Reducing risks

You will feel much better if you keep your blood sugar as close to normal as possible. You will also feel better doing the things you enjoy.

- If you have high blood sugars often, you are at risk for having other health problems.
- Research shows that good blood sugar control helps to delay or prevent these problems.
- Learning good health habits now can help prevent many health problems later.

There are different ways to measure blood sugar control. Since you cannot test your blood sugar each minute of the day, your doctor relies on a test called *Hemoglobin A1C* (Hgb A1C).

## Hemoglobin A1C test (Hgb A1C)

- This test shows what your average blood sugar level has been during the past 2 to 3 months.
- The number is reported as a percent (%).
- Research has shown that keeping an A1C of a child or adolescent with diabetes at 7.5% or lower can help prevent or delay health problems.
- A Hgb A1C of 7 may not be your goal. Talk with your doctor about your specific goal.

## Comparing your A1C with your blood sugar levels

You can use a formula to change your Hgb A1C percent to the same units your blood glucose meter uses. This allows you to compare these 2 levels. The formula changes your A1C to an “estimated Average Glucose” or eAG.

Here is how the formula works:

- Multiply your Hgb A1C by 28.7.
- Then subtract 46.7, and round up.
- This gives you your eAG.

### Example:

Your doctor tells you your Hgb A1C is 8.

$$8 \times 28.7 = 229.6$$

$$229.6 \text{ minus } 46.7 = 182.9. \text{ Round up to } 183.$$

So, if your Hgb A1C is 8, that means your average blood sugar has been 183.

You can use this chart on the right to assist you.

A1C %	eAG (mg/dL)
6%	126
6.5%	140
7%	154
7.5%	169
8%	183
8.5%	197
9%	212
9.5%	226
10%	240
11%	269
12%	298
13%	326

## Prevention: short-term problems

If your blood sugar level is high too often, you can be prone to certain infections. Infections usually raise your blood sugar level, which means your insulin needs will go up, too.

### Skin health

Your skin helps to protect you from infections, so you must take good care of it. You can help prevent skin problems, such as excess dryness, rashes, boils and other infections, when you keep your blood sugar level within your target range.

When you have a cut, keep it clean and dry. Cover it with a bandage if needed. Watch for signs of infection, such as fever (temperature over 100.3<sup>0</sup>F) or these signs around the cut:

- Redness
- Pus
- Swelling
- Excess warmth

Call your doctor if you see any signs of infection. Get treatment as soon as possible.

### Flu

The flu is an infection of the nose, throat and lungs. It is contagious, which means you can catch it from another person.

- All people with diabetes need a flu shot each year.
- Get your flu shot early in the fall so it will be working when flu season begins.
- Preventing the flu can help prevent diabetic ketoacidosis (DKA).

### Pneumonia

Pneumonia is an infection of the lungs. A virus or germ can cause it. Like the flu, pneumonia can be serious for someone who has diabetes. Talk with your doctor about getting a pneumonia vaccine.

### Dental health

When blood sugar levels are high, the saliva (spit) in your mouth has more sugar in it. The extra sugar invites germs to grow, which can cause cavities and gum problems. Some tips to help prevent gum infections and teeth problems include:

- Keep your blood sugar level within your target range.
- Brush your teeth at least 2 times a day with a soft-bristle brush.
- Floss your teeth at least 1 time a day.
- Use mouthwash after brushing your teeth.
- Go to the dentist every 6 months. Make sure your dentist knows you have diabetes.

## Prevention: long-term problems

Diabetes can put you at risk for long-term problems. Most long-term problems are due to high blood sugar levels day after day, sometimes for years. You can reduce these risks when you manage your diabetes well.

### Eye health

Diabetes can affect your vision. If you have diabetes, you are at risk for certain eye problems, such as:

- **Cataract** – this occurs when the lens of the eye gets cloudy and you cannot see through it. The treatment for a cataract is surgery.
- **Glaucoma** –this happens when the fluid pressure inside the eyes gets too high. The increased pressure can damage the nerves in the eye. If not treated, it can cause blindness. Treatment for glaucoma is medicines or surgery.
- **Retinopathy** –diabetes can damage the tiny blood vessels inside your retina.
  - The retina is the tissue that lines the back of the eye. It acts like film in a camera to capture images that we see.
  - Retinopathy can cause the blood vessels in the eye to leak and can cause blindness.
  - Treatment for retinopathy is laser surgery.
  - Glasses do not help restore eyesight lost from retinopathy.

### You can reduce the risk of serious eye problems when you:

- Keep your blood sugar in your target range.
- Get a dilated eye exam each year. Go to an eye doctor (ophthalmologist) or optometrist who specializes in diabetes care.
- Keep your blood pressure within normal limits.

### Heart health

Diabetes can increase the risk for heart disease.

- High blood sugar can damage your blood vessels, including those that carry blood to your heart and brain.
- High blood sugar makes it easier for fat deposits to form in your vessels. These deposits can affect blood flow and lead to what is called coronary heart disease.
- High blood sugar also puts you at risk for high blood pressure, which can cause both heart disease and stroke.

### You can reduce the risk of heart disease when you:

- Keep your blood sugar level in your target range.
- Eat a healthy diet low in fat and high in fiber.
- Exercise each day.
- Maintain a healthy body weight.
- Do not smoke.
- Keep your blood pressure within a normal range.
- Keep your blood fats (lipids), such as cholesterol, LDL and HDL, within a normal range.

## Kidney health

Diabetes can cause kidney disease, also known as *nephropathy*. Kidney failure can occur if kidney disease is not treated. This means your kidneys no longer remove waste from your body. Kidney failure can cause waste products and toxins to build up in your blood.

### You can reduce the risk of kidney disease when you:

- Keep your blood sugar level in your target range.
- Keep your blood pressure within a normal range.
- Have a yearly urine test for a protein called albumin or as advised by your doctor.
- This **urine test** is used to check for signs of early kidney problems.
  - If the kidneys are working well, the albumin stays in the blood.
  - If the kidneys are damaged, albumin will start spilling into the urine. This condition is called *microalbuminuria*. (“Micro” means small, and “uria” means urine, so it means small amounts of albumin in the urine.) It is important to detect kidney problems early because it will likely progress to later stages of kidney disease if not treated.

Your doctor may order a medicine called an ACE inhibitor. It may help to slow the course of kidney disease.

See a doctor **right away** if you think you have a urinary tract infection (UTI). Signs of UTI include:

- Pain or burning when you pass urine
- Feeling an urge to pass urine often
- Pain in your bladder area, even when you do not pass urine. The bladder is below your belly button and between your hip bones.
- Cloudy urine that may contain blood
- Fever (temperature over 100.3°F) with no other signs of illness
- Sometimes, you may just feel bad all over—tired, shaky and ill.

## Nerve health

Over time, high blood sugar levels can damage the nerves in your legs, feet, stomach, intestines and sex organs. Signs of nerve damage include:

- Pain
- Burning
- Tingling or loss of feeling in your feet and hands
- Trouble swallowing
- Trouble going to the bathroom

### You can reduce the risk of nerve disease when you:

- Keep your blood sugar level in your target range.
- Have regular foot checks by a doctor.
- Take care of your feet.

## Foot health

People with diabetes can have problems with their feet if they do not take care of them. High blood sugar levels make your feet more at risk for dry skin and fungus infections.

High blood sugar also can harm the blood vessels and nerves in your body. This includes the ones in your feet. The loss of feeling in your feet makes it hard for you to tell if they are injured. If you do not treat foot injuries, they can get infected and cause serious health problems.

To help prevent problems, check your feet each day. Look for these things:

- Cuts
- Cracks
- Sores
- Red spots
- Swelling
- Ingrown toenails
- Splinters
- Blisters
- Calluses

### **Taking care of your feet**

- Always wear shoes and socks to keep your feet from getting hurt.
- Wear aqua shoes in the water to protect your feet while swimming and playing at the beach or pool. Take them off when you are done in the water, dry your feet, and put on dry shoes and socks.
- Do not wear shoes that hurt your feet and cause blisters.
- Break in new shoes slowly by wearing them 1 or 2 hours each day for a few weeks.

### **Keep your feet clean**

- Wash your feet in warm—not hot—water, and dry them well. Dry between your toes to reduce the chance of fungus.
- Once a week and as needed, cut your toenails to the curve of the toe. Cut them even with the end of the toe. Do not cut them too short. Cut toenails when they are soft from washing.
- Rub lotion on the top and bottom of your feet to help prevent cracking and drying. Do not rub it between your toes.
- Be careful when getting a pedicure since cuts on your foot can get infected. Infections of the foot are often hard to treat. You may want to bring your own tools or just do pedicures at home.

### **See a doctor if needed**

- See a podiatrist (foot doctor) for any foot problems, such as fungus infections and ingrown nails.
- Call your doctor if any foot problems do not heal after 3 days.

# American Diabetes Association

## Screening Recommendations

### Eye health:

- Dilated eye exam
  - Type 1 – dilated eye exam performed within 3 to 5 years of onset and then yearly if 10 or older
  - Type 2 – dilated eye exam performed at the time of diagnosis and then yearly

### Heart health:

- Cholesterol and lipid panel – as advised by the doctor
- Blood pressure – checked at every office visit. Screening for hypertension.

### Kidney health:

- Microalbumin – as advised by the doctor

### Nerve health:

- Yearly regular foot exams

### Dental health:

- Dental cleaning and exam every 6 months

### Thyroid screening:

- Every 1 to 2 years

### Celiac screening:

- As advised by the doctor

### Immunizations (vaccines)

- Routine childhood immunizations as advised by the doctor
- Flu vaccine yearly
- Pneumonia vaccine as advised by the doctor

# Diabetes health record

	Date:	Date:	Date:	Date:
<b>Every visit:</b>				
Weight				
Height				
Blood pressure				
Blood sugar				
Bring records and meter				
Inspection: injection sites				
Foot inspection				

<b>Every 3 months:</b>				
A1C				

<b>Every 6 months:</b>				
Dental exam				

<b>Yearly exams:</b>				
Dilated eye exam				
Flu shot				
Urine microalbumin				
Total cholesterol				
LDL (below 100)				
HDL (m >40, f >50)				
Triglycerides				

<b>Per doctor:</b>				
Nutrition visit				
Diabetes education				

<b>Other exams:</b>				
Thyroid test				
Celiac				



## Other autoimmune diseases

There appears to be a link between type 1 diabetes and other **autoimmune** diseases. Having type 1 diabetes can put you more at risk for having one or more of these other problems. Ask your doctor or diabetes team for more information or if you have questions.

### Celiac disease

Celiac disease is an allergy to a protein called gluten. Gluten is found in grains, such as wheat, rye and barley.

- Celiac disease can cause problems with keeping your blood sugar level within your target range.
- It is treated by eating a gluten-free diet. Your dietitian can tell you what the diet includes.

Signs of celiac disease include:

- Excess gas and bloating
- Stomach pain
- Diarrhea
- Short height for age
- Weight loss or unable to gain weight

If you have any of these signs, talk to your doctor.

### Thyroid problems

Your **thyroid** is a small gland in the lower part of your neck. It makes hormones that control how fast your body uses energy. These hormones also help you grow.

Thyroid disease is common in people with type 1 diabetes. Your doctor will check the size of your thyroid gland for signs of problems at office visits. You also may need a blood test to check your thyroid level.

Some thyroid problems are thought to be caused by **antibodies** in the blood. These antibodies can cause an allergic reaction that can damage the thyroid. This is like the autoimmune process that happens with type 1 diabetes when antibodies harm the beta cells in the pancreas.

If your thyroid does not work correctly, it can affect your:

- Weight
- Energy level
- Muscle strength
- Memory
- Heart rate
- Cholesterol level

There are 2 types of thyroid problems:

- **Hyperthyroidism** or overactive (too much) thyroid. Your body has more energy than normal. Your metabolism speeds up, and you often lose weight.
- **Hypothyroidism** or underactive (too little) thyroid. Your body has less energy than normal. Your metabolism slows down, and you often gain weight.

Medicines are used to treat thyroid problems. The type of medicine depends on whether your thyroid is overactive or underactive.





# Sick days

Having diabetes means you need to take special care of yourself when you get sick. The stress of being sick can raise your blood sugar level.

- Colds, fever, vomiting and diarrhea can cause your blood sugar to rise.
- Low blood sugar can happen if you vomit or have diarrhea and cannot eat.

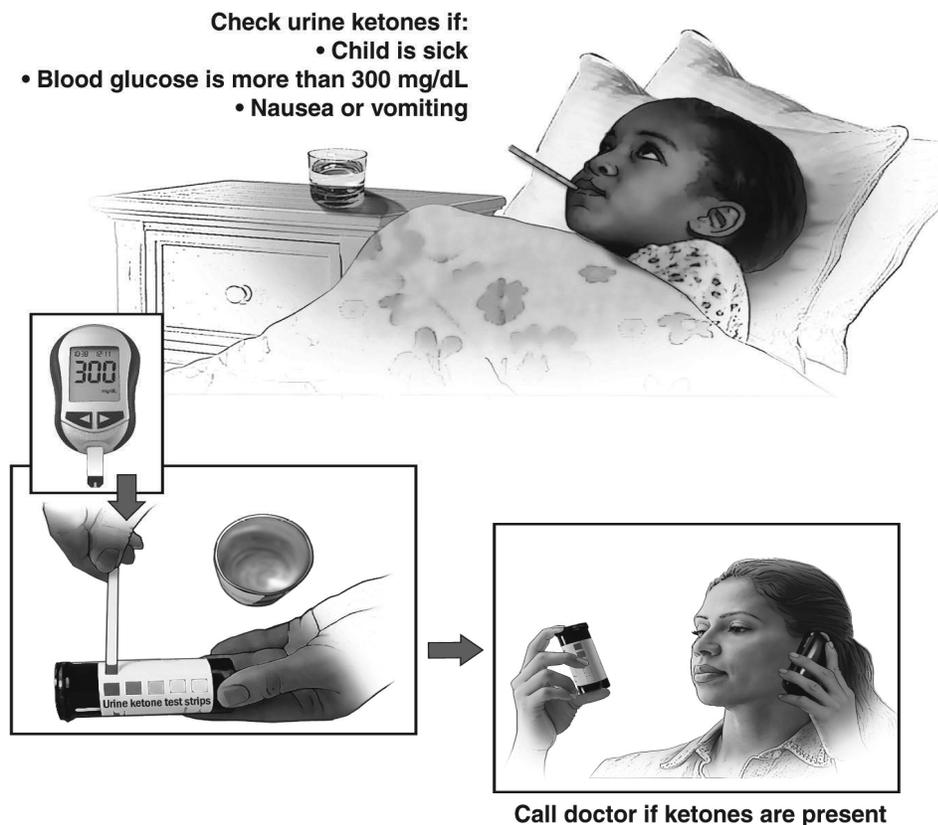
## Guidelines for sick day management

When your child is sick, he will need your help and he will need extra care. The rest of this chapter is written for you, so you will know what to do when your child is ill.

While caring for your child when he is sick:

- Check your child's blood sugar every 2 to 4 hours when he is sick.
- Check for ketones every 4 hours. When your child is sick, ketones can show up even if his blood sugar levels are low.
- Illness and infection cause the body to make stress hormones. Hormones cause the liver to release extra sugar. This can lead to diabetic ketoacidosis (DKA).
- **Nausea and vomiting are the first signs of DKA. Test for ketones anytime your child has nausea and vomiting.**

## Hyperglycemia and Ketones



### **Call your child's diabetes doctor if he:**

- Vomits or has diarrhea more than 1 time in 24 hours (a single day).
- Has a blood sugar level of more than 240 for 3 times in 24 hours (a single day).
- Has moderate to large ketones.
- Has a temperature higher than 101.5°F.
- Does not respond to his usual dose of insulin, and you do not know how much insulin to give.
- Cannot eat or drink.
- Has low blood sugar, and you cannot get it to come up by giving him carbs to eat.

### **When you call the doctor, he will want to know your child's:**

- Blood sugar levels for the last 24 to 48 hours.
- Ketone levels for the last 24 to 48 hours.
- Current temperature.
- Symptoms, such as sore throat, earache, nausea, diarrhea or vomiting.
- Last insulin or diabetes medicine dose.

### **Also, tell the doctor these things about your child:**

- What other medicines he takes
- What and how much food and drink he has had in the past 24 hours
- The last time he urinated

### **Call 911 right away if your child:**

- Is less alert.
- Has trouble breathing, such as:
  - Is working **very** hard to breathe or finds it hard to take a breath
  - Grunts when breathing
  - Has chest retractions (skin pulling in around the ribs and chest when breathing)
  - Has a blue or dark purple color to the nail beds, lips or gums
  - Stops breathing for more than 10 seconds
  - Cannot speak while trying to breathe

## **Insulin**

**Your child should not stop taking his insulin or diabetes medicine when he gets sick unless the doctor tells you to stop.** Your child's dose may need to change on sick days though.

- Your child may need more insulin to help keep his blood sugar in his target range.
- Or, he may need less insulin if he cannot eat.
- If your child takes metformin and he is vomiting, do not give it. Call his doctor.

Your diabetes doctor or a member of your diabetes team will help you decide how much insulin your child should have when he is sick.

## **Food**

When your child is sick:

- He may not feel like eating, even though his body needs more energy to fight illness.
- If he is too sick to eat, his body will get energy from sugar stored in the liver.
- This can make his blood sugar level rise.

You can better manage your child's blood sugar level when he is sick by making sure that he takes his insulin or diabetes medicine. This is true even if he does not eat at all or eats less than usual.

- Check his blood sugar, and call the doctor to see how much insulin he needs to take and when to take it.
- As soon as he feels like it, offer him soft foods in small amounts.

## Liquids

People who are sick can get dehydrated (dried out), especially with fever, vomiting and diarrhea. When the body does not have enough water, blood sugar levels can rise.

- Have your child drink plenty of liquids so he stays hydrated.
- Try to get him to drink ½ cup to 1 cup an hour.
- Avoid drinks that have caffeine since caffeine can increase fluid loss.

## General guidelines for vomiting

- **Call the diabetes doctor if your child vomits more than 1 time in 24 hours.**
- Allow your child's stomach to rest 15 to 30 minutes after he vomits the first time.
- After this, start with a 1 teaspoon of clear liquid every 5 minutes.
- Offer 1 teaspoon of liquid or a few ice chips every 5 minutes for 20 to 30 minutes if he can keep it down.
- Increase the amount to 1 ounce (5 to 6 teaspoons) every 10 to 15 minutes if he can keep it down.
- Slowly increase the amount until your child can drink as much as he wants.

## Types of liquids to use

- If your child's blood sugar is within his target blood sugar range or higher, give him sugar-free clear liquids.
- If your child's blood sugar level is lower than his target range and he has had insulin, call his diabetes doctor. The doctor may tell you to use liquids with sugar.

## Carbs can help

If your child cannot eat regular meals, try giving him soft foods or drinks that equal 15 grams of carbs each hour. The table below gives you some examples of food and drinks that equal 15 grams of carbs. Be sure to write down what your child eats so you can tell the doctor.

Food	Amounts
Regular soda made with sugar, such as ginger ale and cola	½ cup (4 ounces)
Juice	½ cup (4 ounces)
Gatorade	1 cup (8 ounces)
Milk	1 cup
Corn syrup	1 tablespoon
Tapioca pudding	1/3 cup
Custard	½ cup
Fruit-flavored yogurt	½ to 1/3 cup
Regular Jell-O	½ cup
Steamed rice	1/3 cup
Toast	1 slice
Saltine crackers	4 to 6 crackers
Vanilla wafers	5 wafers
Graham crackers	3 square crackers
Soup	1 cup

## Medicines

Medicines can also affect blood sugar levels. Ask your child's diabetes doctor or pharmacist how the medicine affects his blood sugar level. This includes any medicines, herbs or supplements that are sold over the counter without a prescription.

- Prescription medicines, such as steroids for treating asthma and poison ivy, can raise blood sugar levels. This increases your child's insulin needs.
- You do not need to buy sugar-free cough syrups and liquid over-the-counter medicines. The small amount of added sugar is not enough to affect blood sugar levels when taken in the dose advised by your child's doctor.
- Your doctor may prescribe Zofran (ondansetron) for nausea and vomiting. Zofran is usually prescribed as a tablet that dissolves on the tongue. The tablet usually dissolves in a few seconds and can be swallowed with saliva. Talk with your doctor before you give this medicine.



# Tips for sick days

## Be sure that your child is receiving enough insulin!

### Always take your insulin.

- Take Lantus, Levemir, NPH, 70/30, Toujeo, Tresiba, or Basaglar as scheduled.
- Call the diabetes doctor to adjust insulin when your child cannot eat.

### Check blood sugar

- every 2 to 4 hours or more often, depending on the severity of the infection.

### Check urine or blood ketones every 4 hours.

- Ketones can form when your child is sick.
- Extra insulin is needed if ketones are increased.
- Finding ketones early can help prevent hospital stays.
- When sick and not able to eat or drink, ketones can be positive with normal or low blood sugars.

### Stick to a regular meal plan.

- Check blood sugars every 4 hours.
- Give insulin (Humalog, Novolog, or Apidra) to correct high blood sugars even if your child is not eating!

### Prevent dehydration.

- Give plenty of fluids. Depending on blood sugar, use regular or sugar-free fluids.
- Avoid caffeine as it can increase fluid loss.
- Make sure your child uses the restroom at least 1 time every 4 hours.
- Items to keep on hand for sick days:
  - Jell-O (regular and sugar-free), broth, popsicles, Sprite (regular and sugar-free), Gatorade, toast, applesauce, soda crackers, rice and other bland foods

### Before calling the diabetes doctor, know the following:

- Temperature and symptoms (vomiting or diarrhea)
- Current blood sugar and ketone results
- The last time your child urinated

**Please call the doctor before giving any medicine for nausea or vomiting!**





# Healthy coping

Managing diabetes is a team effort. It requires support from the whole family and the diabetes care provider. Even if your child is a teenager he still needs your constant support and guidance to help manage his diabetes.

## Age appropriate diabetes care

Children mature and develop at different ages. Some children are ready to be involved in their own diabetes care at an early age, while others may be much older. Talk with your child's doctor, dietitian, diabetes educator or social worker for more advice.

Below are some examples of the things children might do at different ages.

### Younger than age 3

When it is time for a blood test or shot your child may:

- Run away.
- Throw a temper tantrum and act out.
- Cry and act afraid.

### What you can do to help

- Stay calm. Ignore tantrums and poor behavior when you can.
- Prepare supplies away from your child's view.
- Tell your child right before you are going to do something. Do not tell a young child ahead of time.
- Have a certain place in your home for diabetes care.
- Keep your child's bedroom or play area a "safe place".
- Give hugs, kisses and praise when your child cooperates with his diabetes care.
- Allow your child to "act out" his care with a favorite doll, or stuffed animal.
- Give small rewards, such as stickers and sticker charts, after care is done.

### Ages 3 to 7

Your child may:

- Want to help with his care but is not able to do certain things yet.
- Not always eat food you prepare.
- Resist care.

### What you can do to help

- Explain things in simple terms. Tell your child several minutes before you are going to do something.
- Allow your child to help gather supplies, clean a finger, or choose the site for the insulin shot.
- Offer 2 or 3 food choices when you can—let your child pick one.
- Allow your child to set the table or help prepare part of the meal to make him feel included.
- Help your child meet other children who have diabetes through school, the JDRF and diabetes day camps.

## Ages 8 to 11

Your child may:

- Be eager to help and learn.
- Have hand and eye coordination that is good enough to begin doing some self-care.

### What you can do to help

- Even though your child wants to do things, **be sure to watch or supervise him with blood sugar levels, insulin shots and taking medicines.** He is not yet ready to be on his own.
- A child younger than age 11 should not inject insulin alone.
- Allow your child to begin doing some things, such as pricking his finger, gathering supplies, keeping a journal and helping plan or prepare meals.
- Teach your child about how food and exercise affect blood sugar levels.
- Praise your child's efforts to learn diabetes care—do not praise blood sugar results. It is best to call a reading low, high or okay rather than good or bad.
- Send your child to a diabetes summer camp.

## Ages 12 to 18

Your teen may:

- Be ready to begin caring for himself.
- Want to be independent but may not be responsible. He may not check his blood sugar levels or take his medicine the way he should.
- Go through a time of rapid growth, increased thinking ability and self-discovery.
- Find friends and peers very important.
- Rebel or take risks with alcohol, tobacco or drugs. These activities are more of a problem to someone with diabetes. They can raise or lower blood sugar levels and increase the risk of heart and kidney problems.

### What you can do to help

- Your teen can check his own blood sugar level and take his own insulin shots or medicines, but he still needs your help and guidance. You will still need to be involved with his care.
- Make an agreement with your teen about what you will continue to check. For example, you could allow him to check his own blood sugar levels each day, but you could agree to have him leave his monitor on the table each night so you can check his levels for that day.
- Praise your teen for being responsible and for managing his diabetes.
- Tell your teen ahead of time about doctor's appointments and changes in his treatment plan.
- Arrange for your teen to speak with another teen with diabetes. Support groups, such as the JDRF at [www.jdrfgeorgia.org](http://www.jdrfgeorgia.org), can help. They allow your teen to meet and share with others who may be going through the same issues.

## Driving tips for teens

Adapted from recommendations by the American Diabetes Association (ADA)

**Plan:** We recommend that every family has a safety plan for highs and lows and established consequences if teen is not checking blood sugars before driving.

**Pass the test:** Check your blood sugar (BS) before getting into the car every time; no exceptions. Remember to regularly check BS during long drives.

**Stop for a diabetes red light:** Treat low blood sugars, and then, recheck in 15 minutes. Do not get behind the wheel until BS is in the target range.

**Slow down:** Treat BS even if it means being late. It is never OK to drive with a low BS. Call whomever is waiting for you, and explain why you will be a little late.

**Always have enough fuel:** Stock the car with healthy, non-perishable snacks and fast acting sugars. Keep your diabetes supplies within easy reach. Do not inject or bolus until you arrive at your destination.

**Pull over:** Pull over immediately if you are feeling sick or low while driving. Check your BS, treat yourself, wait 15 minutes, and then, recheck.

**ID, please:** Do not leave home without a driver's license and medical ID bracelet or necklace. Always wear medical ID.

### Drive only if blood sugar is greater than 100

- If BS is greater than 60 but less than 100, treat low and wait 15 minutes before driving.
- If BS is less than 60, treat low and wait 30 minutes before driving.
- If BS is greater than 300, please check for ketones.

## Diabetes and feelings

You may have many different feelings when you find out you have diabetes. You may feel shocked, scared, angry or sad. You may be thinking:

- **Why me?** I cannot believe this is happening to me.
- **I am afraid.** Shots scare me. I am afraid of being sick.
- **I do not want to learn all this stuff.** I do not care about diabetes. Maybe it will go away if I ignore it.
- **I am really mad that I have diabetes.** I am angry with my friends and family—they just do not understand.
- **What did I do wrong?** What did I do to cause this?
- **I feel so sad and alone.** No one else I know has diabetes. No one knows how I feel.

All of these feelings are normal. Many other people with diabetes have felt them too. Know that in time you will learn to accept and manage it.

- You may not be the only one who has these feelings. Your family may be upset too.
- Diabetes affects the whole family. Each person in your family might feel differently about it. They may need time to figure out what helps them cope with it.

Talk with your family and friends about your feelings. Listen to each other and help one another. It is easier when you have help and support from those around you, especially your family.

Here are some ways your family members can help each other adjust:

- Support one another by eating the same foods.
- Exercise together.
- Thank and praise each other when someone makes a change to adjust to diabetes.
- Allow everyone to express their feelings. Listen to what they have to say and ask how you can help.
- Be flexible and willing to change.

You can also talk with other families and children who live with diabetes. There are support groups and websites where you can meet other parents and children living with it. Most people with diabetes do not let it limit their lives. Managing diabetes will become a part of your daily routine. You and your family may still have days when you wish there was no such thing as diabetes, but you will also find that you have the strength to handle it.

## Siblings and diabetes (from the American Diabetes Association)

- **Diabetes is a family affair.**

Children with type 1 diabetes will naturally require more time and attention from their parents while learning about diabetes care. At first, a sibling (brother or sister) can adjust for a short period; however, feelings of stress, resentment, jealousy and anger can become a problem as the family adjusts to the “new normal” as time goes on.

- **What is a parent to do?**

When a child is diagnosed with diabetes, the whole family is affected. If you have more than one child, keep in mind that each of them is different and will handle the diagnosis differently.

Here are some ways you can help each child adjust to life with diabetes:

- **Ask questions about feelings and fears.** Show affection to your other children by asking questions that help them open up to you.
- **Teach siblings about diabetes, but limit the amount of responsibility you give them.** It is really important to teach all of your children about diabetes to calm their fears. It is equally important not to give too much responsibility to them. Too much responsibility can be stressful – even for teens.
- **Talk about other things.** Declare a time of day – after dinner or on the way to school are great options – when you make a point to talk about other stuff. This helps all of your children remember that you are living with diabetes, but life is not all about diabetes.
- **Listen and observe changes in your child.** Be sure all of your children know that you are there to listen and really listen when they come to you. Pay careful attention to what your child shares. Not every comment or feeling needs a solution or response. Just listen with your full heart.
- **Let siblings be siblings.** Your kids will still want to play, argue and compete with one another. They will have their private jokes, conversations and secrets that all siblings have together. Diabetes does not change that – neither should you.
- **Seek help, when needed.** There may be a time when you have done all you can do. You are not alone – your diabetes care team can help you find an expert who has helped families deal with stress.

### Tips:

- Include the sibling in diabetes care and appointments when possible and appropriate.
- Treat your child with diabetes as you treat any other child:
  - Avoid defining your child with diabetes as being sick or ill.
  - Relate to each child’s unique qualities.
  - Focus on buying and preparing healthy foods, and model healthy eating.
  - Limit junk foods and sugary snacks. This concept of “**healthy for all**” is an effort to reduce feelings of being deprived and assigning blame for changes in the family’s food choices for your child with diabetes.
- Give siblings a way to help with small tasks of diabetes care that provide ways to be successful and proud for pitching in.
  - Siblings **should not** be responsible for diabetes care, as this causes friction.
- Address emotional and behavioral issues right away with all of the children in the home.
- Regularly scheduled, uninterrupted special time with the child that does not have diabetes is very important and should not be cancelled or changed unless there is an emergency.
- Regularly scheduled family time is important where all family members take part.

- Play board games or video games, watch a family-friendly movie, spend time outdoors, or play sports.
- Plan and cook healthy meals together.

## Stress and diabetes

Having diabetes may cause extra stress for you and your family. Stress can be both good and bad for you.

- The good kind of stress makes you get something done. This is the kind of stress you might feel when you have to give a report in front of your class or play in a soccer game.
- The bad kind of stress can overload your body and mind.

You can make yourself sick by feeling stressed out about having diabetes all the time. That is because stress raises your blood sugar level. Stress can also make you feel like not taking care of yourself.

Everyone responds to stress differently. The way you respond to stress is called coping. You can find ways to make stress work **for** you instead of **against** you.

To cope with stress, you have to know how your body reacts to stress. Some signs to look for include:

- Headaches
- Tight muscles
- Changes in how much you eat or sleep
- Feeling angry or tense

You cannot remove stress from your life, but there are things you can do to help prevent or manage it. Make a list of things you like to do to help ease stress when you feel it. Here are some ideas to start with:

- **Exercise:** Exercise is a great way to reduce stress. Walking, swimming, dancing, biking and playing basketball are great ways to “blow off steam”.
- **Talk about it:** Talking with someone can help you decide what to do. Knowing when to ask for help can ward off problems. Join a support group, or talk to a family member, friend or counselor.
- **Know your limits:** Sometimes you may feel overwhelmed by stress. Learn to accept things the way they are. Do not take on more than you can handle.
- **Take care of yourself:** Get enough rest, and eat well to stay strong and healthy. This can help you stay relaxed during stressful times.
- **Relax:** Do some deep breathing, and stretch your muscles. Picture yourself in a place that is beautiful, peaceful and carefree. Give your mind time to relax every day. It can relax your body and help improve your diabetes control.
- **Do less:** Cut the number of demands on your time. Do fewer things, and do them better.
- **Have fun:** Do things that are fun and make you forget about stressful things. Do something you enjoy, like listening to music, reading a book or working on a hobby.
- **Reflect:** Think about how you have handled stress in the past. That can help you find ways to deal with it now.
- **Pat yourself on the back for all you do. You are your own best friend. Think positive thoughts.**

## People just like you

You are not alone. Sometimes it is helpful to meet or know other people who have diabetes, too. There are more than 20 million children and adults with diabetes in the United States. The disease affects all kinds of people, even singers, movie stars, athletes and historical figures like:

- **Arthur Ashe**, first African-American to be ranked No. 1 in the world in tennis (type 2 diabetes)
- **Nicole Johnson Baker**, winner of the 1999 Miss America pageant, who found out she had diabetes the same year she won her title (type 1 diabetes)
- **Halle Berry**, actress who played Storm in the X-men movies (type 2 diabetes)
- **Crystal Bowersox**, 2010 American Idol semi-finalist (type 1 diabetes)
- **Nick Boynton**, plays defense for the Boston Bruins hockey team (type 1 diabetes)
- **Will Cross**, high school principal and the first person with diabetes to reach the top of Mount Everest (type 1 diabetes)
- **Chris Dudley**, former NBA player for the Phoenix Suns and New York Knicks (type 1 diabetes)
- **Thomas Edison**, inventor who created many things during his life, including the first successful electric light bulb (type 2 diabetes)
- **Gary Hall**, Olympic swimmer (type 1 diabetes)
- **Nick Jonas**, teen idol and band member of the Jonas Brothers (type 1 diabetes)
- **Zippora Karz**, professional ballerina for the New York City Ballet (type 1 diabetes)
- **Charlie Kimball**, drives the No. 83 car for Novo Nordisk Chip Ganassi Racing in the IZOD IndyCar Series and is the first licensed driver with diabetes in the history of INDYCAR (type 1 diabetes)
- **Patti LaBelle**, jazz singer (type 2 diabetes)
- **George Lucas**, writer and director who created the Star Wars movies (type 2 diabetes)
- **Mary Tyler Moore**, actress who has been active with the Juvenile Diabetes Research Foundation (type 1 diabetes)
- **Jackie Robinson**, first African-American baseball star in the Major Leagues (type 1 diabetes)
- **Ron Santo**, Chicago Cubs broadcaster and former All-Star third baseman (type 1 diabetes)
- **Sonia Sotomayor**, first Latino Supreme Court Justice, who has had type 1 diabetes since age 8
- **Elliott Yamin**, singing contestant on the fifth season of American Idol (type 1 diabetes)





# Research

Diabetes research is the key to better diabetes treatment and improved monitoring. It is a path toward a cure.

Participation in research is not for everyone, and not every child with diabetes will be eligible. All patients and families should be aware that diabetes research studies are taking place in the U.S. and around the world. We encourage you to be your child's advocate and seek details.

## What are some of the diabetes research focus areas?

1. Stop or slow progress of type 1 diabetes by protecting or preserving the remaining beta cells in people who are newly diagnosed (stopping the autoimmune destruction).
2. Prevent or reverse complications in those who have been living with diabetes for years.
3. Prevent diabetes and identify those at risk.
4. Improve the treatment of type 1 and type 2 diabetes. (Develop new insulins and new medicines.)
5. Provide better tools to achieve tight glucose control. (Develop new innovative technologies, such as insulin pumps, continuous glucose sensors, and artificial pancreas.)
6. Develop therapies for islet cell replacement and regeneration.
7. Prevent obesity in children.

## What is a clinical trial?

It is a health-related research study that decides how well a medicine or medical device works for treating or preventing a condition in a large group of people. Volunteers are usually recruited to participate in these trials.

## Why should newly diagnosed diabetes patients and families learn about the complex subject of clinical trials?

The answer is simple. Clinical trials are the only road toward making diabetes treatment better. It is a path toward prevention and even a cure. When diabetes researchers come up with a new treatment, they must prove to others that the new treatment is better or at least equal to existing treatments. The only way to prove it is to run a clinical trial to show how the new treatment compares to the standard treatment. Participants in clinical studies may gain access to new research treatments before they are available.

## Does timing matter?

If you think you may wish to join a study, call as soon as possible because many studies need to start soon after diagnosis.

## Where do I start?

Choosing to take part in a clinical trial is an important personal choice and can be overwhelming.

- Start by speaking with your child's endocrinologist about the different trials. Your diabetes care team may have a research department.
- Then, contact the trial research staff directly to ask specific questions.

## How do I stay informed?

Children's Healthcare of Atlanta Diabetes Program	<a href="http://www.choa.org/Childrens-Hospital-Services/Diabetes/Diabetes-Research">http://www.choa.org/Childrens-Hospital-Services/Diabetes/Diabetes-Research</a>
Emory Children's Pediatric Research Center	<a href="http://www.pedsresearch.org">http://www.pedsresearch.org</a>
The JDRF Type 1 Diabetes Clinical Trials Connection	<a href="http://jdrf.org/clinical-trials-connection">http://jdrf.org/clinical-trials-connection</a>
Type 1 Diabetes TrialNet	<a href="https://www.diabetestrialnet.org/">https://www.diabetestrialnet.org/</a>
U.S. National Institute of Health	<a href="http://www.clinicaltrials.gov">http://www.clinicaltrials.gov</a>
U.S. National Institute of Health - Learn about Clinical Trials	<a href="http://www.clinicaltrials.gov/ct2/info/understand">http://www.clinicaltrials.gov/ct2/info/understand</a>
Center for Information and Study on Clinical Research Participation (CISCRP)	<a href="http://www.ciscrp.org">www.ciscrp.org</a>

## What questions should I ask before taking part in a clinical trial?

From the Center for Information and Study on Clinical Research Participation (CISCRP) [www.ciscrp.org](http://www.ciscrp.org)

1. What is the main purpose of this study?
2. Does the study involve a placebo or a treatment that is already on the market?
3. How will the treatment be given to me?
4. How long is the study going to last and what will I be asked to do as a participant?
5. What has been learned about the study treatment, and are any study results published?
6. Do I have to pay for any part of the study? Will my insurance cover these costs?
7. Is there any reimbursement for travel costs or childcare?
8. Will I be able to see my own doctor?
9. If the treatment works for me, can I keep using it after the study?
10. Can anyone find out whether I am participating in the clinical trial?
11. Will I receive any follow-up care after the study has ended?
12. What will happen to my medical care if I stop participating in the study?
13. Does the physician/investigator have any financial or special interest in the clinical study?
14. What are the credentials and research experience of the physician and study staff?



# Pumps and sensors

## Insulin pump therapy

### What is an insulin pump?

An insulin pump is an insulin delivery system. It replaces the need for multiple daily shots. An insulin pump is a small, computerized device that is worn on the body and gives insulin through a cannula (a small catheter) inserted into the fatty tissue.

The basic parts of an insulin pump include:

- Battery powered pump
- Reservoir (cartridge) –a reservoir/cartridge is filled with insulin and loaded inside the pump.
- Infusion set – an adhesive (sticky) patch, a cannula and tubing. (Not all pumps require tubing.)

Insulin travels from the reservoir in the pump through an infusion set. The infusion sets need to be changed every 48 to 72 hours.

### How does a pump give insulin?

Insulin pumps give insulin like a human pancreas. It uses rapid acting insulin only. The pump replaces the need for multiple daily shots, offering flexibility.

- **Basal rate:** a basal rate is a tiny amount of insulin given as a continuous delivery that is programmed as units per hour. The basal rate replaces the long-lasting insulin.
- **Meal bolus:** a larger dose of insulin given for meals or snacks that is based on the amount of carbs eaten.
- **Correction bolus:** an extra dose of insulin given to correct a high blood sugar.

Remember that pumps do not do everything. You will still have to test blood glucose levels, count carbs and adjust insulin dosing for exercise, stress and illness. It is not automatic – you must push the button to give meal and correction boluses.

### Who is a good pump candidate?

A person with diabetes who needs insulin replacement *may* be a candidate for an insulin pump. Things to consider when thinking about getting a pump include:

- Strong knowledge about diabetes self-management:
  - Six to 12 months of multiple daily shots is most often needed to have the knowledge for safe pumping. (This timeframe is unique for each care team and family.)
- Child (if age appropriate) must have a strong interest in wearing a pump, not just the parents.
- Good carb counting skills are required. You will need to input the amount of carbs you are eating in the pump.
- Good trouble-shooting skills.
- Child must be willing to let others know about diabetes. A pump can be a visible reminder, although it can be worn inside clothing or in a case.
- Health insurance coverage.
- A very young child who needs very small doses of insulin.

## How do I get started with an insulin pump?

Starting pump therapy requires time, the ability to pay for the pump and supplies, and education on how to use the pump safely and effectively.

Schedule a visit with your healthcare provider or your diabetes educator to see if insulin pumping is right for your child.

## Continuous glucose monitors

### What is a continuous glucose monitor (CGM)?

A continuous glucose monitor (CGM) is a device that measures blood sugar levels every few minutes. Like a fingerstick, a CGM can give you a single reading, but it can also give you details about the direction your blood sugar is heading. Knowing when your blood sugar is rising, falling or staying steady will help you reach diabetes control.

The components of a continuous glucose monitor include:

- **Sensor:** the sensor is the small probe that sits under the skin and measures the sugar level in the surrounding fluid.
- **Transmitter** (attaches to the sensor): the transmitter is the part of the CGM that wirelessly sends blood sugar readings from the sensor to the receiver.
- **Receiver:** the receiver receives the details from the transmitter and reports a real time blood sugar reading. The receiver may be a standalone device or may be built in to an insulin pump or even a smart phone. The receiver may also have alarms that warn you of highs, lows, fast drops and fast rises.

### What is the wear time?

Sensors have an approved wear time from 3 to 7 days depending on the brand. Some newer systems, not yet approved in the U.S. by the FDA, are approved to be worn up to 14 days.

### Are fingerstick blood sugar checks needed when using a CGM?

A CGM does not replace blood glucose checking, yet.

- Calibration is required daily: Typically two blood glucose checks are needed (every 12 hours) to calibrate the CGM systems currently on the US market. Some newer systems, not yet approved in US by FDA at this time, no longer require any calibration.
- Some sensors continue to require a traditional fingerstick blood sugar test to verify a sensor reading *before* making any treatment decisions.
- Always use your blood sugar meter if symptoms do not match the sensor reading.

### How do I get started on the CGM?

Initiating continuous glucose monitoring requires time, an ability to pay for the CGM system, and education on how to use the CGM safely and effectively.

Schedule a visit with your healthcare provider to see if a CGM system is right for your child. They will discuss all your options.

### Closing the loop between CGM and insulin pump

The “artificial” or “bionic” pancreas refers to a mix of a continuous glucose monitor (CGM) and an insulin pump working together. The complete artificial pancreas is not yet available. Many parts for an “artificial” or a “bionic” pancreas already exist with some clinical trials planned. With more research and trials, this automated system will become a reality.



# Other diabetes topics

## Traveling and diabetes

If you and your family plan ahead, there is no reason for diabetes to get in the way of your vacation plans.

### Talk to your doctor

See your doctor for a checkup before you go on a trip to make sure your diabetes is in good control. Tell your doctor how you will travel and where you will go. If you go through different time zones, you may need to adjust your insulin dose or timing.

Your doctor also can:

- Decide how and where you can get emergency medical help.
- Write a letter stating that you have diabetes and include your care needs. You may need to give this letter to airport security before boarding an airplane.
- Write a prescription for insulin, syringes and other diabetes supplies.

### Things you can do to make your trip easier and more enjoyable:

- Make a checklist of the supplies you will need on your trip.
- Pack more of each item than you really need. It is better to have more supplies than not enough.
- Divide the supplies into 2 separate bags.
  - One bag will be a backup in case one gets lost.
  - If you are traveling with someone, have the other person carry 1 of the bags, and keep 1 bag with you.
- Bring non-perishable snacks in case meals are delayed:
  - Crackers
  - Bread
  - Pretzels
  - Low-fat crackers
  - Small jar of peanut butter
  - Nuts
  - Juice or fruit (single servings)
  - Dried fruit
  - Dry cereal, granola bars or trail mix

### Travel by plane

Check with the airline you will be flying with to find out their rules about taking medical supplies, such as syringes and insulin.

When you arrive at the airport, tell airport security that you have diabetes and that you have your supplies with you. Do not check your diabetes supplies with your other bags. Always keep your diabetes supplies with your carry-on luggage.

## If you wear a pump

Tell the security guard that you have an insulin pump and that you cannot remove it. Tell him that it is connected to a catheter that goes under your skin.

- If you are concerned about going through the metal detector with your pump, tell the security guard about it.
- Let him know that you want a visual check instead. The check may involve a “pat-down”.
- You must have insulin with you to go with the pump.

Please refer to the transportation and security administration website at [www.tsa.gov](http://www.tsa.gov) for more details.

These diabetes supplies are allowed through the checkpoint once they are screened:

- Insulin (vials or pens)
- Unlimited number of unused syringes or pen needles, as long as you also have insulin or other injectable medicine
- Lancets
- Blood sugar meters, strips and meter test solutions
- Alcohol swabs
- Insulin pump and supplies, such as cleaning agents, batteries, reservoir, plastic tubing, infusion kit and insertion device. You must have insulin to go with them.
- Glucagon emergency kit. You must label it clearly and keep it in the original box.
- Ketone test strips
- Used syringes that are inside a disposal container
- Insulin in any form or in a dispenser must be clearly identified.

## Foreign travel

If you travel outside the United States, know that other countries might not have the type of insulin you use.

- Insulin used in the United States is U-100 strength. This means there are 100 units of insulin per milliliter (mL).
- Other countries do not always have U-100 insulin. Insulin may come in U-40 or U-80 strength in other countries.
- If you must use their insulin, you will need to buy new syringes to match the new insulin. Plan for this change before you go, and ask your doctor about it.

Other things to keep in mind if you are out of the country:

- Plan to get any vaccines (shots) you need well in advance.
- Learn how to say, “I have diabetes,” and “Sugar or orange juice, please,” in the language of the country you visit.
- Wear a medical identification alert (ID necklace or bracelet).

In some foreign countries, you need to be careful about the quality of the water. You can get sick by drinking it.

- You can drink bottled water, or boil local water for 5 minutes before you drink it.
- Use the bottled or boiled water to brush your teeth.
- Be careful not to get water inside your mouth when you shower or wash your face.

If you get sick or need help while away, know that prescription laws may be different in other countries.

There are some groups that can help:

- Diabetes Federation Group: [www.idf.org](http://www.idf.org)
- International Association for Medical Assistance to Travelers: [www.iamat.org](http://www.iamat.org)
- U.S. Consulate in the country you are visiting

## **Be prepared for travel**

**Make a checklist of the supplies you will need on your trip. Be sure to pack more of each item than you actually need.**

- Insulin or diabetes pills
- Syringes
- Container for getting rid of lancets and needles
- Prescriptions for insulin, syringes and diabetes supplies
- Medicine for motion sickness, nausea and diarrhea
- Blood glucose monitor and all tools you need for testing
- Extra batteries for your blood glucose monitor
- Ketone testing strips
- Glucagon emergency kit
- Insurance card
- Medical identification - MedicAlert is known around the world
- Emergency phone numbers and addresses
- Glucose tablets or other items to treat low blood sugar
- Supply of prepackaged snacks and food in case meals are delayed
- Gauze dressing, paper tape and antibiotic ointment

**Bring a 2 day supply of insulin and insulin syringes on board the plane with you.**

- Divide your supplies into 2 separate bags. This will give you a backup in case one gets lost.
- If traveling with someone, have the other person carry 1 of the bags, and keep 1 bag with you.
- Do not check these bags with other baggage at the airport.

**Be prepared to take extra time when passing through airport security**

## Alcohol and diabetes

Most adults with diabetes can safely drink alcohol in moderation as long as you take the following precautions:

- Maintain good blood sugar control.
- Ask your diabetes doctor if it is OK to drink moderate amounts of alcohol.
- Know that alcohol lowers blood sugar.
- Always eat a meal or snack when you drink alcohol.
- Check your blood sugar more often when drinking alcohol.
- Check your blood sugar before going to bed if you have had alcohol that evening. You may need a carb snack before bed.
- Friends must know about your diabetes and how to treat low blood sugars.
- Wear a Medic Alert ID.

### How does alcohol affect blood sugar?

Alcohol is processed in the liver. If your liver is busy with processing alcohol, it cannot send sugar into your bloodstream. This puts you at risk for having a low blood sugar.

### Warning signs

Early warning signs of low blood sugar can seem like drunken behavior. This could cause friends to overlook your low blood sugar. Make sure your friends know you have diabetes and that they know the signs of low blood sugar.



# Goal setting

Having diabetes can be challenging and complex. To help you better manage it at home, the American Association of Diabetes Educators has agreed upon the following 7 key areas to focus on:

- **Healthy eating**

- Eating healthy does not mean giving up your favorite foods or never eating at a restaurant again. When you have diabetes, you need to know how certain foods can affect your blood sugar so you can be prepared. Your diabetes team will help you choose the meal plan that best fits your needs.

- **Being active**

- Being active can help lower your blood sugar, improve mood and lower stress. Aim for 30 minutes of physical activity every day.

- **Monitoring**

- Regular monitoring of your blood sugar can help you know if your diabetes care plan is on track or if changes need to be made. A person with diabetes should check his blood sugar at least 4 times a day (before meals and at bedtime).

- **Taking medicine**

- Taking medicine as your doctor prescribes is the best way to help keep your blood sugar in check.
  - A person with type 1 diabetes will have at least 4 insulin shots a day.
  - A person with type 2 diabetes may have a mix of insulin shots and oral medicines.

- **Problem solving**

Despite great planning, situations may arise that are out of your control. A person with diabetes has to have good problem-solving skills. On any given day, a high or low blood sugar or getting sick will require you to make quick, informed decisions about food, activity and medicine.

**Here are some ideas for goals to keep your child safe:**

- Know when to call the doctor.
- Put together a sick day box with supplies before you need it. That way you will be ready.
- Always carry supplies to use for low blood sugar and ketone strips with you.
- Do not wait to refill or pick up prescriptions. It does not hurt to have extra supplies around.
- Get a caregiver trained in diabetes care as soon as you can. More than one is even better.

- **Reducing risk**

Having diabetes can put you at risk for other health problems. You can reduce these risks by keeping your blood sugar, cholesterol and blood pressure in check.

- **Healthy coping**

Diabetes can be overwhelming and stressful at times. Having diabetes can feel like a full time job. It never goes away. It is OK to feel frustrated or angry at times. But, remember, you are not alone. Reach out to a diabetes support group (Georgia JDRF), or get involved in diabetes camp (Camp Kudzu). There are plenty of resources for people living with diabetes.

If you or your family is having trouble coping, seek help. Talk with your diabetes team about your feelings so they can help you find the best resources.

# Diabetes self-care behaviors

Goal setting is an effective way to break down diabetes care into manageable steps. Please review the list of goals. **CHOOSE ONE GOAL OR CREATE YOUR OWN** for your family.

## Healthy eating

- Keep fast food guide in car for quick access when dining out.
- Portion carbs with measuring cups.
- Include 2 sources of fiber at each meal.

## Being active

- Sign child up for after-school activity (like dance class, basketball or others).
- Do 30 minutes of active play at least 3 times per week.

## Taking medicine

- Determine insulin dose with a calculator.
- Teach relative how to calculate and give insulin.
- Take fast acting insulin before eating.
- Take basal insulin at the same time every day.

## Monitoring

- Record blood sugars, and bring to endocrinologist.
- Carry blood sugar monitor at all times.
- Log A1C on health record.

## Problem solving

- Carry low blood sugar supplies at all times.
- Check ketones when blood sugar is over 300 or when ill.

## Reducing risks

- Order and wear medical alert tag every day.
- Post emergency phone numbers in a visible place at home.
- Check for ketones when ill.
- Call endocrinologist when unable to eat.

## Healthy coping

- Join diabetes support group.
- Read "Diabetes Resource Packet" from social work department.
- Create your own \_\_\_\_\_



# Glossary

**504 plan:** A plan that outlines how a child's specific needs are met with accommodations. These accommodations or actions remove barriers to learning.

***Acanthosis nigricans:*** A skin condition characterized by darkened skin patches in the neck and groin area. Common in people with Type 2 diabetes with insulin resistance.

***Acesulfame K:*** An artificial sweetener that is 200 times sweeter than sugar. This sweetener has no calories. Brand names include Sunett and Sweet One.

***Aerobic exercise:*** Any activity that keeps the heart beating at its target rate.

***Antibody:*** A protein the body makes to protect itself from "foreign" substances like bacteria or a virus. People who get Type 1 diabetes make antibodies that destroy the insulin-making cells in the pancreas, called beta cells.

***Aspartame:*** An artificial sweetener that is 200 times sweeter than sugar. Brand names include Equal and NutraSweet.

***Autoimmune:*** Occurs when the body's immune system mistakenly attacks and destroys body tissue that it believes to be foreign.

***Basal insulin:*** The "background" insulin taken to sustain energy between meals (Lantus and NPH).

***Beta cell:*** A cell that makes insulin. Beta cells are located in the islets of the pancreas.

***Bolus insulin:*** The extra amount of quick-acting insulin taken to cover the expected rise in blood sugar after a meal or snack. This insulin also is used to correct a high blood sugar reading (NovoLog, Humalog, Apidra).

***Carbohydrates:*** One of the three nutrients in food that provides calories, changes to sugar in the blood and gives your body energy.

***Cataracts:*** A clouding of the eye lens that can cause decreased vision.

***Cholesterol:*** A kind of fat made by the body that is in some foods we eat. It is found in foods that come from animals, including eggs, dairy products, meat and poultry.

***Clinical trial:*** A research study that involves human volunteers and answers questions about how well a medicine or medical device works.

***Continuous Glucose Monitor (CGM):*** A system that uses a tiny sensor inserted under the skin to check glucose (sugar) levels in tissue fluid.

***Correction factor:*** How much one unit of rapid acting insulin will lower your blood sugar. This may also be called your insulin sensitivity factor.

***Diabetes:*** A disease that occurs when the body does not produce insulin or when the body does not use insulin the way it should, causing blood sugar to rise.

***Diabetes educator:*** A healthcare worker who teaches people how to manage their diabetes. Some are certified diabetes educators (CDE). They work in hospitals and doctors' offices, and for managed care companies.

***Diabetic ketoacidosis (DKA):*** A life-threatening condition that happens when there is extreme high blood sugar and severe lack of insulin, causing the body to break down fat for energy. Signs of DKA are nausea, vomiting, stomach pain, rapid breathing and fruity odor to the breath. If untreated, DKA can lead to coma and death.

***Diabetes Medical Management Plan (DMMP):*** A medical plan signed by your healthcare provider that details the diabetes needs of your child.

**Dietitian:** A healthcare worker who specializes in nutrition and meal planning.

**Endocrinologist:** A doctor who cares for people with endocrine gland problems, such as diabetes.

**Fat:** One of the three main nutrients that provides calories in foods such as oils, butter, margarine and nuts. Fat has little to no effect on blood sugar levels.

**Fiber:** A part of food that cannot be digested. It helps clean out the intestines. Fiber is found in fruits, vegetables, whole grains, breads and cereal.

**Fructose:** A natural sugar found in fruit.

**Glucagon:** A hormone made in the pancreas. It raises blood sugar by causing stored sugar (glucose) to be released from the liver.

**Glucose:** The medical word for sugar. The body uses glucose (sugar) from the food you eat for energy.

**Hemoglobin A1c test:** A blood test that measures the average blood sugar level over two to three months. Also called a glycosolated hemoglobin test.

**Honeymoon phase:** When some insulin secretion occurs for a short time after someone is newly diagnosed with Type 1 diabetes. It causes normal blood sugar with very little to no outside source of insulin.

**Hyperglycemia:** A high blood sugar (glucose) level.

**Hyperosmolar hyperglycemic nonketotic state (HHNS):** A serious condition that happens in people with Type 2 diabetes. Warning signs include high blood sugars above 600, dehydration, fever, weakness, sleepiness or confusion and seizures.

**Hypoglycemia:** A low blood sugar (glucose) level.

**Individual Education Plan (IEP):** a document that is developed for a public school child who is eligible for special education.

**Individualized Healthcare Plan (IHP):** a care plan developed by the school nurse, for students who require health services on a daily basis.

**Insulin:** A hormone made in the pancreas that helps the body use sugar for energy.

**Insulin to Carbohydrate ratio:** This specifies how many grams of carbs are covered by each unit of rapid acting insulin.

**Ketoacidosis:** An emergency condition when blood sugar levels are high from not enough insulin. The body uses fat for energy and causes ketones to build up in the blood.

**Ketone:** A product made when there is a shortage of insulin, causing the body to use fat for energy.

**Kussmaul breathing:** Rapid or deep breathing that can happen with diabetic ketoacidosis.

**Ketostix:** Strips used to check urine for ketones.

**Mannitol:** A sugar alcohol that is half as sweet as sugar and has 4 calories per gram.

**mg/dL:** Milligrams per deciliter. A unit of measure that is used to show the concentration of sugar in the blood. Other countries use millimoles per liter (mmol/L). To convert mmol/L to mg/dL, multiply mmol/L by 18. For example: a glucose reading of 18 mmol/L = 324 mg/dL.

**Microalbumin :** small proteins called "albumin" that escape through the kidneys filtering system and passes into the urine – having higher than average microalbumin in the urine is an early sign of kidney disease. A urine test is used to detect this.

**Nephropathy:** Kidney disease caused by diabetes. This happens when diabetes damages the small blood vessels in the kidneys, allowing protein to leak out of the kidneys and into the urine.

**Nutrient:** A substance in food that is needed for life. Nutrients include carbs, proteins, fats, vitamins and minerals.

**Pancreas:** The organ in the body that makes insulin.

**Physical therapist:** A healthcare worker who specializes in movement and exercise.

**Protein:** A nutrient that helps the body grow and heal. Many foods contain protein, but the best sources are beef, poultry, fish, eggs, dairy products, nuts, seeds and legumes (peas, beans).

**Retinopathy:** A condition caused when diabetes damages the blood vessels inside the retina of the eye.

**Saccharin:** An artificial sweetener that is 300 to 500 times sweeter than sugar.

**Social worker:** A healthcare worker who cares for the social and emotional needs of people.

**Seizure:** Involuntary jerking of the muscles that can occur with a low blood sugar level.

**Sorbitol:** A sugar alcohol half as sweet as sugar with 4 calories per gram.

**Sucrose:** Table sugar.

**Sucralose:** An artificial sweetener that is 600 times sweeter than sugar. The brand name is Splenda.

**Thyroid:** A gland at the base of the neck that makes hormones. The hormones control how much energy the body uses.

**Triglycerides:** Fat found in the blood.

**Xylitol:** A sugar alcohol used as a sugar substitute that has 4 calories per gram. It is often found in mints and chewing gum.





# Resources

## **The Egleston Family Resource Library at Children’s Healthcare of Atlanta at Egleston**

The library has books and videos about diabetes for patients and their families. 404-785-1611

## **The Children’s Healthcare of Atlanta Max Brown Family Resource Library**

The library has books and videos about diabetes for patients and their families. 404-785-2192

## **Other resources**

### **American Diabetes Association (ADA)**

This nonprofit organization works to prevent and cure diabetes and to improve the lives of all people affected by the disease. The ADA has an information hotline, advocacy assistance, local activities, educational programs and summer camps. Annual membership includes a monthly magazine and a network of diabetes support and information.

404-320-7100 (Georgia affiliate) or 800-342-2383

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

### **Camp Kudzu**

This summer camp is open to children with type 1 diabetes. Other activities for children and families are available throughout the year.

404-250-1811

[www.campkudzu.org](http://www.campkudzu.org)

### **Children’s Medical Services (CMS)**

This is a statewide public health program that provides supplemental funds for medical care to children with chronic diseases like diabetes.

404-463-3478

<http://health.state.ga.us/programs/cms>

### **Diabetes Association of Atlanta (DAA)**

This provides early detection, screening and education for at-risk and low-income populations in metro Atlanta.

404-527-7150

[www.diabetesatlanta.org](http://www.diabetesatlanta.org)

## Diabetes Exercise and Sports Association

This is a nonprofit service organization that helps people with diabetes improve their quality of life through exercise and physical fitness.

800-898-4322

[www.diabetes-exercise.org](http://www.diabetes-exercise.org)

## JDRF

Parents of children with diabetes created this foundation to raise money for diabetes research.

404-420-5990 or 800-925-5533

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

## National Diabetes Information Clearinghouse

<http://diabetes.niddk.nih.gov>

## Support groups

Go to the Georgia chapter Juvenile Diabetes Research Foundation website at [www.jdrf.org](http://www.jdrf.org). Select "Georgia Chapter", and then select "Find Support."

Additional online resources:

- <http://wdd.quickcompliance.net/> - This site shows different videos produced by kids for World Diabetes Day.
- <http://typeonenation.org/> - This site is a social networking website run by JDRF and geared toward teens living with Type 1 diabetes.
- [www.childrenwithdiabetes.com](http://www.childrenwithdiabetes.com) - This site provides chat rooms for children with diabetes.
- [http://www.joslin.org/phs/parent\\_discussion\\_board.html](http://www.joslin.org/phs/parent_discussion_board.html) - This site provides a discussion board for parents.
- [www.medtronicdiabetes.com/lenny-carb-app](http://www.medtronicdiabetes.com/lenny-carb-app) - Medtronics carb counting app for iPhone.
- <http://www.dlife.com/dlifeTv/c987206439rn-Kids-Teens.html> - See videos from Nick Jonas and other teens - like professional snowboarders - living with Type 1

*Children's Healthcare of Atlanta has not reviewed all of the sites listed as resources and does not make any representations regarding their content or accuracy. Children's Healthcare of Atlanta does not recommend or endorse any particular products, services or the content or use of any third party websites, or make any determination that such products, services or websites are necessary or appropriate for you or for the use in rendering care to patients. Children's Healthcare of Atlanta is not responsible for the content of any of the above-referenced sites or any sites linked to these Sites. Use of the links provided on this or other sites is at your sole risk*

# Resource sheets: table of contents

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2. **Insulin calculation weekly worksheet – a good resource for writing down calculations for insulin doses**
3. **Mixing clear and cloudy insulin – a resource for people on clear and cloudy insulin**
4. **Ketone resource sheet – a resource to help you identify when and how to check for ketones.**
5. **Blood sugar log – a log for maintaining records of blood sugars**
6. **Foods that raise blood sugar and foods that do not raise blood sugar – an illustration of foods that raise blood sugar and foods that do not raise blood sugar**
7. **Food lists – a list of foods, their serving sizes and carbohydrate grams**
8. **Hyperglycemia and hypoglycemia sheet – symptoms and treatment of hyperglycemia and hypoglycemia**
9. **School plan – a sample diabetes medical management plan (DMMP) for school**
10. **Sick day management – a reference sheet on management of your child when sick and when to call the doctor**
11. **MYchart – a reference sheet on how to access your child’s medical chart**



# Caring for a child with diabetes

Child: \_\_\_\_\_  
Home address: \_\_\_\_\_  
Parents/guardians: \_\_\_\_\_  
Will be at: \_\_\_\_\_  
Will be home by: \_\_\_\_\_ a.m. / p.m.  
Cell phone number: \_\_\_\_\_

Alternate contact: \_\_\_\_\_  
Phone number: \_\_\_\_\_  
Doctor's name: \_\_\_\_\_  
Phone number: \_\_\_\_\_  
Emergency number: \_\_\_\_\_

Meals & snacks	Insulin dose	Time given
_____	_____	_____ a.m./p.m.

Anything eaten that was not on the usual meal plan: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Activities: \_\_\_\_\_ a.m. / p.m.  
Bedtime at: \_\_\_\_\_  
Other instructions: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

My child's blood sugar level before I left was: \_\_\_\_\_ at \_\_\_\_\_ a.m. / p.m.

Check blood sugar levels at the following times:  
\_\_\_\_\_ a.m./p.m. Result: \_\_\_\_\_  
\_\_\_\_\_ a.m./p.m. Result: \_\_\_\_\_  
\_\_\_\_\_ a.m./p.m. Result: \_\_\_\_\_

Blood sugar level should not go below: \_\_\_\_\_  
*See below for emergency instructions if blood sugar level goes too low.*

Check my child's blood sugar level and give \_\_\_\_\_ immediately if you notice any of these symptoms:

- Feels weak, shaky or light-headed
- Sweats or feels clammy
- Acts crabby or confused
- Has a fast heartbeat
- Has numbness or tingling
- \_\_\_\_\_

Checked at: \_\_\_\_\_ a.m./p.m. Result: \_\_\_\_\_  
Checked again at: \_\_\_\_\_ a.m./p.m. Result: \_\_\_\_\_

## Treating Low Blood Sugar

It is normal for blood sugar levels to go up and down throughout the day. If blood sugar level goes below 70 mg/dl, my child has low blood sugar.

### The symptoms of low blood sugar include:

- Feels weak, shaky or light-headed
- Sweats or feels clammy
- Acts crabby or confused
- Has a fast heartbeat
- Has numbness or tingling
- \_\_\_\_\_

### If you think my child has low blood sugar, immediately do the following:

1. Check blood sugar level.
2. If the level is too low, have my child eat or drink 15 grams of carbohydrates. This could be:
  - Three glucose tablets
  - ½ cup of orange juice or apple juice
3. Wait 15 to 20 minutes and check blood sugar level again.
4. If the level is still low, have my child eat or drink another 15 grams of carbs.

Once blood sugar level is back in its normal range, my child needs to eat or drink a snack with carbs and protein, such as:

- Crackers with cheese or peanut butter
- Cup of milk

## Be sure to keep me informed.

### Call 911 if:

- My child's blood sugar level is low after two treatments and you cannot reach me.
- My child is lethargic, unresponsive or unconscious.
- Tell the 911 operator that my child has diabetes and takes insulin. Give this sheet to the emergency workers when they arrive.

*Source: American Diabetes Association*



**Children's**<sup>SM</sup>  
Healthcare of Atlanta



# Insulin calculation worksheet

*\*Use for figuring out rapid acting insulin doses before meals.*

Insulin : carb ratio: \_\_\_\_\_

Correction factor: \_\_\_\_\_

Or sliding scale:

BG \_\_\_\_\_ to \_\_\_\_\_ = \_\_\_\_\_ extra units  
 BG \_\_\_\_\_ to \_\_\_\_\_ = \_\_\_\_\_ extra units

Date/time: \_\_\_\_\_ Blood glucose \_\_\_\_\_

Food/drink	Serving size	Carb grams
Total carbs for meal:		
Divide total carbs by _____ = _____		
Insulin : Carb Ratio		
Add correction formula:		
(BG) _____ -100 = _____ divided by _____ = _____		
<b>OR</b> add sliding scale:		
Total insulin:		
Units of insulin given:		

Date/time: \_\_\_\_\_ Blood glucose \_\_\_\_\_

Food/drink	Serving size	Carb grams
Total carbs for meal:		
Divide total carbs by _____ = _____		
Insulin : Carb Ratio		
Add correction formula:		
(BG) _____ -100 = _____ divided by _____ = _____		
<b>OR</b> add sliding scale:		
Total insulin:		
Units of insulin given:		

Date/time: \_\_\_\_\_ Blood glucose \_\_\_\_\_

Food/drink	Serving size	Carb grams
Total carbs for meal:		
Divide total carbs by _____ = _____		
Insulin : Carb Ratio		
Add correction formula:		
(BG) _____ -100 = _____ divided by _____ = _____		
<b>OR</b> add sliding scale:		
Total insulin:		
Units of insulin given:		

Date/time: \_\_\_\_\_ glucose \_\_\_\_\_

Food/Drink	Serving size	Carb grams
Total carbs for meal:		
Divide total carbs by _____ = _____		
Insulin : Carb Ratio		
Add correction formula:		
(BG) _____ -100 = _____ divided by _____ = _____		
<b>OR</b> add sliding scale:		
Total insulin:		
Units of insulin given:		

Date/time: \_\_\_\_\_ Blood glucose \_\_\_\_\_

Food/drink	Serving size	Carb grams
Total carbs for meal:		
Divide total carbs by _____ = _____		
Insulin : Carb Ratio		
Add correction formula:		
(BG) _____ -100 = _____ divided by _____ = _____		
<b>OR</b> add sliding scale:		
Total insulin:		
Units of insulin given:		



# How to draw up and mix clear and cloudy insulin

Only mix 2 types of insulin together if your doctor tells you to do this. Examples of 2 insulins that can be mixed together are NPH insulin with Humalog or NovoLog. **Note: Never mix Lantus, Levemir, Tresiba, Toujeo, or Basaglar with another kind of insulin.**

1. Place your insulin and supplies on a clean, flat surface.
2. Wash your hands well with soap and water.
3. Check the label to make sure the insulin has not spoiled, expired or has been opened longer than 30 days.

## First, add air to the cloudy insulin vial.

4. Gently roll the bottle of **cloudy** insulin between your hands. The insulin is mixed when it looks cloudy all the way through the bottle. Do not shake the bottle to mix it as this will make air bubbles.
5. Clean the tops of both the **cloudy** and clear insulin bottles with alcohol. Let them dry.
6. Remove the cap from the needle. Pull back the syringe plunger to the number of units of **cloudy** insulin you need to take. You will pull air back into the syringe as you do this.
7. Push the needle through the rubber top of the **cloudy** insulin bottle while it is sitting on the flat surface. Push the plunger all the way down. This pushes the air in the syringe into the bottle. This step makes it easier to draw out the insulin.
8. Pull the needle out of the **cloudy** insulin bottle without any insulin in it.

## Next, draw up the clear insulin

9. With the **clear** insulin bottle, repeat Steps 6 and 7. Draw up air equal to the amount of **clear** insulin you need. Do not pull the needle out of the bottle.
10. Keep the needle in the bottle of **clear** insulin, and turn the bottle upside down. Draw up the dose of insulin you need.
11. To remove air bubbles:
  - Push all the insulin back into the bottle, and draw up the dose again.
  - Or, try tapping the top of the syringe to make the bubbles rise to the top. Then, push the bubbles back into the bottle. Pull back on the plunger until you have the correct amount of insulin in the syringe, if needed. Remove the syringe from the clear insulin bottle.

## Now, draw up the cloudy insulin

12. Push the needle back through the rubber top of the **cloudy** insulin bottle while it sits on a flat surface.
13. Keep the needle in the bottle of **cloudy** insulin, and turn the bottle upside down. Draw up the dose of insulin you need. For example: your insulin dose is 5 units of rapid acting (clear) insulin, and your cloudy dose is 20 units. When you are finished, your syringe will have 25 units of insulin ( $5 + 20 = 25$ ) At this point, throw away the syringe and insulin and start over if you pull up too much **cloudy** insulin into the syringe.
14. Remove the needle from the bottle once you have the dose of **cloudy** insulin you need.
15. Put the cap back on the needle if you do not give yourself the insulin right away.



# Ketone resource sheet

---

## What are ketones?

When there is not enough insulin to move sugar into the cells, your body looks for other forms of fuel to use as energy. It uses fat as a fuel source.

- As fats break down, acids called ketones build up in your blood and urine.
- Ketones in the blood and urine are a sign that your body is out of balance.
- Ketones often happen when someone first finds out he has diabetes.
- Ketones can occur when someone with diabetes:
  - Has an illness like a fever, stomach virus or the flu - called illness ketones.
  - Does not eat enough carbs - called starvation ketones.
  - Does not get enough insulin, such as by missing insulin doses - called insulin-deficiency ketones.

## When should I check my child for ketones?

Ketones can make someone with diabetes very sick. Excess ketones can lead to a condition called *ketoacidosis*. It is important to test for ketones when:

- Your blood sugar level is more than 300 *mg/dL* or as advised by your doctor.
- You feel sick, especially if you vomit or have an upset stomach.
- Your blood sugar levels have been high for 2 to 3 days and do not come down after taking insulin.
- Your child is sick in any way.
- Your child wears an insulin pump and his blood glucose level is more than 250 *mg/dL*.

## What are the warning signs of diabetes ketoacidosis (DKA)?

Signs of excess ketones in the blood include:

- Dry mouth and skin
- Increased thirst
- Passing extra urine
- Nausea and vomiting
- Stomach cramps or pain
- Sweet, fruity odor on the breath
- Feeling weak or sleepy
- Breathing hard and deep
- Pain in the back and side

## How do I test for ketones?

There are 2 ways to test for ketones—either a urine test using a ketone test strip or a blood test.

To check for urine ketones:

1. Remove 1 test strip from the bottle. Replace the cap tightly.

2. To collect a urine sample:
  - Boys can usually urinate (pee) directly on the strip. Cover the colored test pad on the end of the strip.
  - Girls usually need to urinate (pee) into a clean, dry container. Dip the ketone test strip in the urine sample. Cover the colored test pad on the end of the strip.
  - If you have a baby, put a cotton ball in the diaper. Squeeze urine from the cotton ball directly onto the test pad. Always use fresh urine.
3. Touch the edge of the strip to a tissue or paper towel to remove excess urine.
4. Lay the strip on a flat surface, and start timing. Wait 15 seconds or as your bottle label directs. Be sure to wait the right amount of time to get a correct reading.
5. Hold the strip close to the color chart on the bottle. Compare the color on the test pad to the color guide on the label.
  - Ketone levels can be small, moderate or large.
  - Always call your doctor if you have moderate or large ketone levels.
6. Wash your hands well when you are done.
7. Write the results in your log book.

### **To check for blood ketones:**

There are a couple of blood sugar meters that come with test strips to measure blood ketone levels.

To use them:

- Put a drop of blood on a blood ketone strip.
- While the strip is in the meter, read the results.

Blood ketones are measured in mmol/L.

- Normal blood ketones measure at 0.6 mmol/L or below.
- If your child's blood ketone measures above 0.6 mmol/L, call his endocrinologist.
- Your diabetes team can give you more information if you would like to use this meter.

### **When should I call the doctor?**

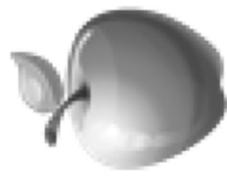
Call your child's **doctor right** away if:

- The urine ketone results show a moderate or large amount of ketones.
- The blood ketone result is higher than 0.6 mmol/L.
- Your child vomits more than once.
- Your child has any signs of DKA, such as increased thirst, passing extra urine, nausea, vomiting, stomach cramps or pain, sweet fruity odor on the breath, feeling weak or sleepy, dry mouth and skin, or breathing hard and deep.



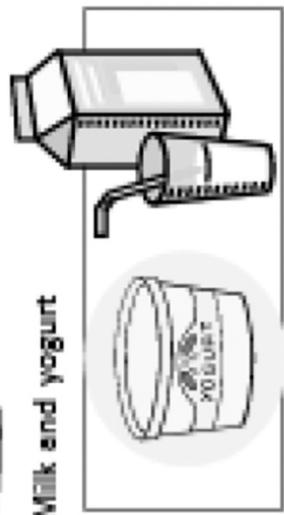


# Foods that raise Blood Sugar (need insulin) Bread, cereal, rice, pasta



Fruit and fruit juice

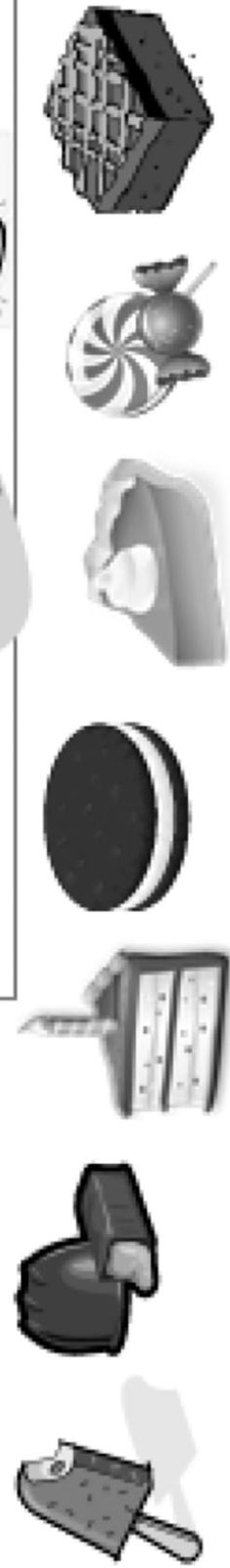
Milk and yogurt



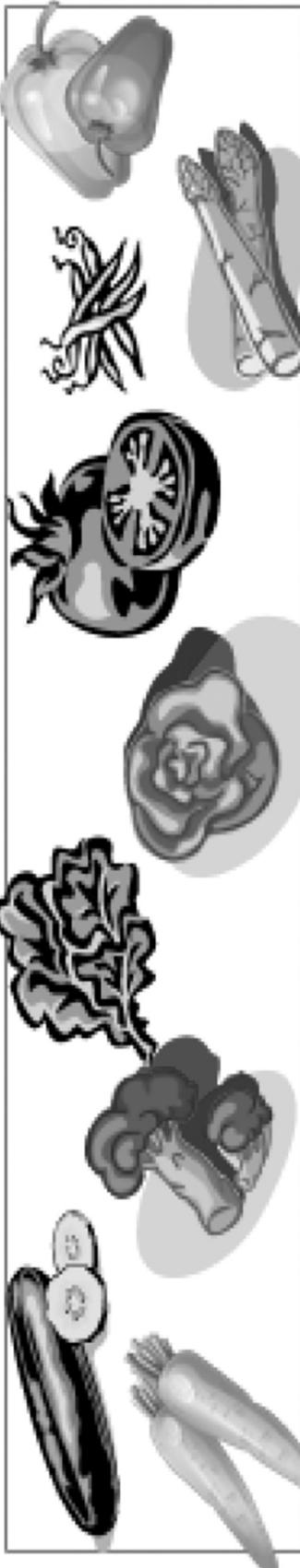
Starchy vegetables



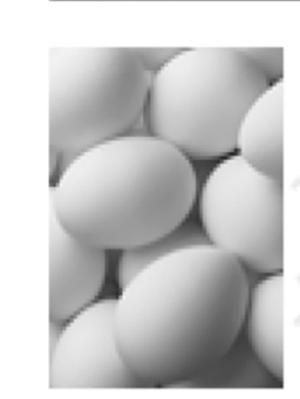
Dessert and treats



# Foods that don't raise Blood Sugar (no insulin) Non-starchy veggies

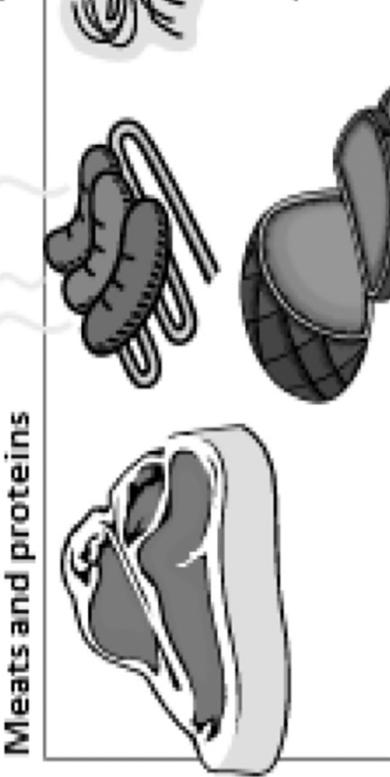
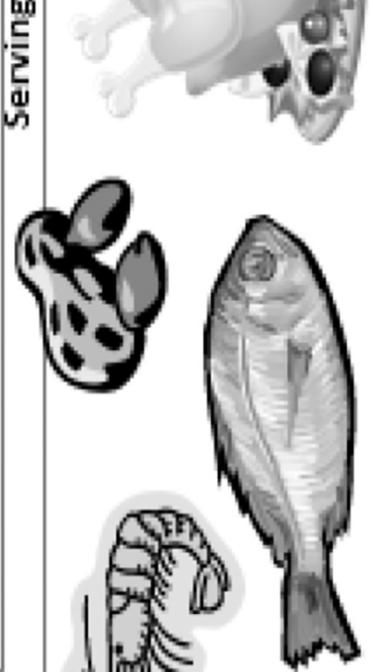


## Fats and oils



## Cheese and eggs

## Meats and proteins



Serving size:

## Food lists

Another way to count carbs is using a food list. These lists help when food labels are not available. Many of the serving sizes listed are for a 15 gram carbohydrate serving.

### Starches

**1 serving = 15 grams (g) carbohydrate**

	Serving size		Serving size
<b><u>Breads</u></b>		<b><u>Cereals</u></b>	
Bagel, large 4 ounce size	¼ (1 ounce)	Bran cereal	½ cup
Biscuit, 2 ½ inches (in.) across	1	Sugar-frosted cereal	½ cup
Bread – whole wheat, white	1 slice	Unsweetened cereal	¾ cup
Bread, reduced-calorie	2 slices	Granola – low fat or regular	¼ cup
Chapatti, small, 6 in. across	1	Grits	½ cup
Corn bread, 2-in. square	1	Oatmeal	½ cup
English muffin	½	Quinoa	1/3 cup
Flour	3 Tablespoons		
Hamburger or hotdog bun	1/2	<b><u>Pasta, rice, noodles (cooked)</u></b>	
Muffin, plain, small 1 ounce size	1	<b>1/3 cup = 15 grams carb</b>	
Naan, 8 in. x 2 in.	¼	<b>½ cup = 22 grams carb</b>	
Pancake, 4 in. across, ¼ in. thick	1	<b>1 cup = 45 grams carb</b>	
Pita, 6 in. across	2	Macaroni and cheese	1 cup = 48g
Roll, small	1	Penne- tube or spiral pasta-	½ cup
Taco shell, hard	1	Wild rice, cooked	½ cup
Tortilla – flour or corn, 6 in.	1		
Waffle, 4-in. square	1		

## 1 serving = 15 grams

	Serving size		Serving size
<b><u>Beans, peas and lentils</u></b>		<b><u>Crackers and snacks</u></b>	
Baked beans	1/3 cup	Animal crackers	8
Beans, cooked (black, garbanzo, lima, kidney, navy, pinto & white)	1/2 cup	Crackers, round	7
Lentils, cooked	1/2 cup	Crackers, saltine	6
Peas, sweet green	1/2 cup	Graham crackers (2 1/2 inch squares)	3
Refried beans	1/2 cup	Oyster crackers	20
<b><u>Starchy vegetables</u></b>		Popcorn	3 cups
Corn	1/2 cup	Potato chips (1 ounce) (snack bag size)	12 to 18
Corn on the cob, large	1/2 cob	Pretzels, stick (3/4 ounce)	30 sticks
French fries	10 to 15	Rice cakes (4 in. across)	2
Mixed vegetables	1 cup	Tortilla chips (1 ounce)	6 to 12
Potato, mashed	1/2 cup		
Pumpkin	1 cup		
Squash (winter: acorn, butternut)	1 cup		
Sweet potato or yam, plain	1/2 cup		
Plantain, ripe	1/3 cup		

## Fruits

1 serving = 15 grams (g) of carbohydrate

Sizes and weights of whole fruits listed include skin, core, seeds and rind.

	Serving size		Serving size
<b><u>Fresh fruit</u></b>		<b><u>Dried fruit</u></b>	
<b>1 serving = 15 grams carb</b>		<b>1 serving = 15 grams carb</b>	
Apple, small (2 in. across)	1 (4 ounces)	Raisins, cranberries	2 Tablespoons
Apricots, fresh	4 whole		
Banana, medium	½ (4 ounces)	<b><u>Canned fruit (no added sugar)</u></b>	
		<b>1 serving = 15 grams</b>	
Blackberries, blueberries	¾ cup	Applesauce, fruit cocktail,	½ cup
		Mandarin oranges, grapefruit, peaches, pears, pineapple	
Cantaloupe, honeydew, cubed	1 cup	The grams noted in canned fruit include the juice.	
Cherries	12		
Dates	3		
Grapefruit, large	½		
Grapes, small	15 to 17 (½ cup)		
Kiwi	1		
Mango, cubed	½ cup		
Nectarine, small	1		
Orange, small	1	<b><u>Fruit juice (unsweetened)</u></b>	
Pear, large	½ (4 ounces)	Apple, grapefruit, orange, pineapple	½ cup (4 ounces)
Papaya, cubed	1 cup		
Pineapple, cubed	¾ cup	Grape, fruit juice blends, prune	1/3 cup
Plums, small	2		
Raspberries	1 cup		
Strawberries	1 ¼ cup		
Tangerines, clementines	2		
Watermelon, cubed	1 ¼ cup		

## Milk and Yogurt

### Health tips:

- Milk and yogurt are good sources of calcium and protein.
- Give children over the age of 2 fat-free and low-fat milk and yogurt products.
- The higher the fat content, the more saturated fat and cholesterol it has.

<u>Milk</u>	<b>Carbohydrate (grams) 1 serving = 1 Cup</b>	<u>Yogurt</u>	<b>Carbohydrate (grams) 1 serving = 6 ounces</b>
Skim milk, non-fat	12 grams	Yogurt, regular	28 grams
1% fat milk, low fat	12 grams	Yogurt, light	15 grams
2% fat milk	12 grams	Yogurt, low carb ( < 6 grams of carbs)	5 grams
Whole milk	12 grams		
<b><u>Other Milks</u></b>			
Almond milk, vanilla	16 grams		
Chocolate milk	24 grams		
Rice milk, vanilla	26 grams		
Soy milk, unsweetened	4 grams		
Soy milk, vanilla	10-25 grams		

## Combination foods

	<b>Carbohydrate (grams) per Serving size</b>	<b>Carbohydrate (grams) per Serving size</b>
Breaded chicken, fish, meat with 3 Tablespoons Flour	3Tbsp Flour = 15 grams	<b><u>Salads</u></b>
Chicken nuggets	5 pieces = 15 grams	Coleslaw ½ cup = 15 grams
Chili with beans	1 cup = 15 grams	Macaroni ½ cup = 26 grams
Casserole type, Lasagna	1 cup = 30 grams	Potato ½ cup = 18 grams
Pizza, cheese or pepperoni, medium regular crust, cut into 8 pieces	1 slice = 30 grams	
Soup	1 cup = 15 grams	

## Sweets and desserts

### Health tips:

- Eat sweets and desserts only sometimes and as part of your meal. This allows your blood sugar to rise slower.
- Many of the foods listed in this section contain more than 15 grams of carbohydrate in a serving. Please read carefully.

#### Brownies, cake, cookies and donuts

Banana nut bread, 1 inch slice	30 grams
Brownie, small, 1 ¼ inch square	15 grams
Cake, unfrosted, 2 inch square	15 grams
Cake, frosted, 2 inch square	30 grams
Chocolate chip cookies, 2 small	15 grams
Donut, glazed	30 grams
Sweet roll (small)	30 grams
Vanilla wafers, 5	15 grams

#### Ice cream and other frozen desserts

Frozen ice pop, 1	10 grams
Fruit juice bar, 100% juice	15 grams
Frozen yogurt, low fat	½ cup = 15 grams
Ice cream, regular	½ cup = 15 grams
Ice cream, no sugar added	½ cup = 15 grams
Sherbet, sorbet	½ cup = 30 grams

#### Pie and pudding

Fruit pie, 2 crusts, 1/6 of 8 inch pie	45 grams
Pumpkin pie, 1/6 of 8 inch pie	30 grams
Jell-O, regular	½ cup = 15 grams
Jell-O, sugar free	Free
Pudding, regular	½ cup = 25 grams
Pudding, sugar free	½ cup = 15 grams

#### Candy

Candy bar, 1 fun size	10 to 12 grams
Chocolate kisses, 5 pieces	15 grams
Marshmallows, 4 pieces	22 grams
Candy, hard, sugar-free, 1 piece	Free

## Sauces, condiments, drinks and free foods

### Spreads and syrups

Chocolate syrup, 2 Tablespoons	24 grams
Fruit spreads, 100% fruit, 1 Tablespoon	10 grams
Honey, Agave Nectar 1 Tablespoon	15 grams
Jam or Jelly, regular, 1 Tablespoon	15 grams
Jam or jelly, sugar-free, 1 Tablespoon	Free
Pancake syrup, regular, 1 Tablespoon	15 grams
Pancake (Maple) syrup, light, 2 Tablespoons	15 grams
Pancake syrup, sugar free, 2 Tablespoons	Free
Sugar, white, brown, 1 Tablespoon	15 grams
Whipped Topping (Cool Whip), 2 Tablespoons	Free

### Drinks

Hot chocolate, regular	1 cup = 24 grams
Lemonade or fruit drink	1 cup = 30 grams
Sports drink	1 cup = 15 grams
Coffee/Tea, unsweetened	Free
Sugar-free drinks	Free

### Sauces

Barbecue sauce, 2 Tablespoons	10 to 15 grams
Honey mustard, Two Tablespoons	13 grams
Spaghetti Sauce, ½ cup	10 to 15 grams
Sweet 'N Sour, 2 Tablespoons	13 grams

### Condiments , salad dressing, and seasonings

Ketchup, 1 Tablespoon, 2 packets	5 grams
Hot pepper	Free
Tabasco sauce	
Garlic, herbs, spices	Free
Lemon or lime juice	Free
Mustard	Free
Soy sauce	Free
Vinegar	Free
Salad Dressings	Free
Ranch, Italian	
Mayonnaise	Free

## Non-starchy vegetables

If your ratio is 1:5 – ½ cup cooked or 1 cup raw = 5 grams carb

If your ratio is NOT 1:5 – these foods count as a “free” vegetable.

- Asparagus
- Beans: green, Italian, wax
- Beets
- Broccoli
- Brussels sprouts
- Cabbage
- Carrots
- Cauliflower
- Celery
- Cucumber
- Dill pickle
- Greens: collard, kale, mustard, turnip
- Mushrooms
- Okra
- Onions
- Snow peas
- Peppers
- Salad greens
- Salsa (1/4 cup)
- Spinach
- Tomato
- Turnips
- Yellow squash
- Zucchini

## Snacks

1 Serving = 15 grams

### Crackers

7 animal crackers  
23 Cheese Nips (1/2 cup)  
45 Goldfish (1/2 cup)  
3 graham cracker squares  
3 gingersnaps  
12 Ritz Bitz  
6 Ritz crackers  
6 saltine crackers  
16 Teddy Grahams  
5 Triscuits  
12 Wheat Thins  
2 Oreos, small chocolate chip  
5 vanilla wafers  
3 cups light popcorn  
15 potato chips (snack bag)  
30 thin stick pretzels  
1/2 sandwich  
1 cup soup

### Fruits

1/2 medium banana  
15 to 17 small grapes  
1 small apple or orange  
1 cup fresh fruit, berries  
1/2 cup unsweetened applesauce  
1/2 cup canned fruit (light syrup)  
2 Tbsp raisins

### Breads and cereals

1 slice toast  
1/2 English muffin  
1/2 small bagel (1 ounce)  
1 pancake, 4 inches  
1 frozen waffle  
3/4 cup unsweetened cereal  
1/2 cup sweetened cereal

### Yogurt and dairy

1 gogurt  
6 oz light fruit yogurt  
1/2 cup sugar free pudding  
1/2 cup plain ice cream

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### Free snacks – 5 grams carb or less

Raw veggies and Ranch dressing  
Dill pickles  
Small salad  
Cheese, string or cubed  
Chicken or tuna salad  
Grilled chicken strips  
Coffee/Tea, Unsweetened Tea, Diet Beverages

Lunch meats  
Omelet, scrambled egg, hard-boiled egg  
Nuts, peanuts, almonds, 1 ounce (1/4 cup)  
Sunflower seeds, 2 Tablespoons  
Sugar free gelatin  
Sugar free popsicle

## Hyperglycemia and Hypoglycemia Resource Sheet

### High blood sugar (Hyperglycemia)

#### Symptoms:

Increased thirst, drowsy,  
blurred vision, dry skin,  
increased urination or  
increased hunger

#### Causes:

- Skipping insulin/diabetes pills or not taking the right amount
- Not enough activity
- Eating too much
- Illness, infection or stress

#### Take action:

- Check blood sugar often.
- Check for ketones.
- Drink extra water.
- If no ketones, exercise.
- Call doctor for blood sugar: over 240 two times in a row or any time over 300.

### Low blood sugar (Hypoglycemia)

#### Symptoms:

Nervous, headache, shaky,  
fast heartbeat, blurred vision,  
sweaty, tired or dizzy

#### Causes:

- Too much insulin/diabetes pills
- More activity than usual
- Not enough food or skipping a meal

#### Take action:

- Check blood sugar.
- Eat 15 grams of carbs (1/2 cup juice or 3 to 4 glucose tabs).
- Wait 15 minutes.
- Recheck blood sugar (should be over 70).
- Repeat if blood sugar has not increased.
- Call doctor or 911 if blood sugar is not over 70 after 2 treatments with carbs.

**Note:** If blood sugar returns to normal and the next meal is not within 30 minutes, eat a snack that contains protein and carbs.





Student's Name: \_\_\_\_\_ Date of Birth: \_\_\_\_\_

**NOTIFY PARENT of the following conditions: (If unable to reach parent, call diabetes provider office.)**

- a. Loss of consciousness or seizure (convulsion) immediately after calling 911 and administering glucagon.
- b. Blood sugars in excess of 300 mg/dl, when ketones present.
- c. Abdominal pain, nausea/vomiting, fever, diarrhea, altered breathing, altered level of consciousness.

**SPECIAL MANAGEMENT OF INSULIN PUMP:**

- Contact Parent in event of:
  - Pump alarms or malfunctions
  - Detachment of dressing / infusion set out of place
  - Leakage of insulin
    - Student must give insulin injection
    - Student has to change site
    - Soreness or redness at site
  - Corrective measures do not return blood glucose to target range within \_\_\_\_\_ hrs.
- Parents will provide extra supplies including infusion sets, reservoirs, batteries, pump insulin, and syringes.

**This student requires assistance by the School Nurse or Trained Diabetes Personnel with the following aspects of diabetes management:**

- Monitor and record blood glucose levels
- Respond to elevated or low blood glucose levels
- Administer glucagon when required
- Calculate and give insulin Injections
- Administer oral medication
- Monitor blood or urine ketones
- Follow instructions regarding meals and snacks
- Follow instructions as related to physical activity
- Respond to CGM alarms by checking blood glucose with glucose meter. Treat using Management plan on page 1.
- Insulin pump management: administer insulin, inspect infusion site, contact parent for problems
- Provide other specified assistance: \_\_\_\_\_

**This student may independently perform the following aspects of diabetes management:**

Monitor blood glucose:

- in the classroom
- in the designated clinic office
- in any area of school and at any school related event

- Monitor urine or blood ketones
- Calculate and give own injections
- Calculate and give own injections with supervision
- Treat hypoglycemia (low blood sugar)
- Treat hyperglycemia (elevated blood sugar)
- Carry supplies for blood glucose monitoring
- Carry supplies for insulin administration
- Determine own snack/meal content
- Manage insulin pump
- Replace insulin pump infusion set
- Manage CGM

**LOCATION OF SUPPLIES/EQUIPMENT:** (Parent will provide and restock all supplies, snacks and low blood sugar treatment supplies.)

This section will be completed by school personnel and parent:

	Clinic room	With student		Clinic room	With student
Blood glucose equipment	<input type="checkbox"/>	<input type="checkbox"/>	Glucagon kit	<input type="checkbox"/>	<input type="checkbox"/>
Insulin administration supplies	<input type="checkbox"/>	<input type="checkbox"/>	Glucose gel	<input type="checkbox"/>	<input type="checkbox"/>
Ketone supplies	<input type="checkbox"/>	<input type="checkbox"/>	Juice /low blood glucose snacks	<input type="checkbox"/>	<input type="checkbox"/>

*My signature provides authorization for the above Diabetes Mellitus Medical Management Plan. I understand that all procedures must be implemented within state laws and regulations. This authorization is valid for one year.*

**SIGNATURE of AUTHORIZED PRESCRIBER:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

Authorized Prescriber: MD, NP, PA

**Name of Authorized Prescriber:** \_\_\_\_\_

**Address:** \_\_\_\_\_

**Phone:** \_\_\_\_\_

**SIGNATURES**

I, (Parent/Guardian) \_\_\_\_\_ understand that all treatments and procedures may be performed by the student and/or Trained Diabetes Personnel within the school, or by EMS in the event of loss of consciousness or seizure. I also understand that the school is not responsible for damage, loss of equipment, or expenses utilized in these treatments and procedures. I give permission for school personnel to contact my child's diabetes provider for guidance and recommendations. I have reviewed this information form and agree with the indicated information. This document serves as the Diabetes Medical Management Plan as specified by Georgia state law.

PARENT/GUARDIAN SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

SCHOOL NURSE SIGNATURE: \_\_\_\_\_ DATE: \_\_\_\_\_

# Diabetes sick day management

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## What to do when your child is sick

### Be sure your child is receiving enough insulin.



#### Maintain insulin schedule

- Always take long-acting insulin as scheduled.



#### Check blood sugar

- Monitor levels at least every two to four hours.
- Extra correction insulin is needed if blood sugars are high.



#### Check urine or blood ketones every four hours

- Ketones can form when your child is sick, even if blood sugars are normal.
- Extra insulin is needed if ketones are elevated.
- Early detection of ketones can help prevent hospitalizations.
- Ketones and blood sugars usually increase together—but not always. Be sure to treat both.



#### Stick to a regular meal plan

- Ill children need fuel from carbohydrates. They also need the insulin that helps process the carbohydrates.
- Give rapid-acting insulin (Humalog, Novolog or Apidra) to correct high blood sugars, even if your child is not eating.



#### Give plenty of fluids

- Dehydration can readily occur when your child is ill.
- Avoid caffeine as it can increase fluid loss.
- If your child is adequately hydrated, he should use the restroom at least every four hours. If this is not happening, be sure to provide more fluids.
- Keep these on hand for sick days: sugar-containing beverages, Pedialyte, Jell-O (regular or sugar-free), broth, popsicles, applesauce, toast, saltines, rice and other bland foods.

## When to call your doctor

Your endocrinologist (diabetes doctor) will manage your diabetes concerns. Call the doctor before giving any medication for nausea or vomiting.



### Call your diabetes doctor if your child has:

- Signs and symptoms of too little insulin. These may include:
  - High blood sugar (three blood sugars over 240 in one day)
  - Moderate to large ketones in the urine
  - Repeated vomiting
- Low blood sugars that do not come up with ingestion of carbs
- A severe low requiring glucose gel or glucagon
- A severe low resulting in a seizure
- An illness with uncontrollable blood sugars
- Missed a dose of long-acting insulin
- Been prescribed steroids—this medication may increase insulin needs

**Call 911** if your child is less alert or having trouble breathing.



### Before calling your diabetes doctor, know:

- Temperature and symptoms (vomiting or diarrhea)
- Current blood sugar and ketone results
- The last time your child urinated

Remember to call your child's primary care doctor for all other concerns.

## Good sick day management and communication with the diabetes doctor can prevent diabetic ketoacidosis (DKA).

### What is DKA?

DKA occurs when there is not enough insulin in the body, which causes it to break down fat too quickly. Fat gets turned into chemicals called ketones. Usually, a body processes ketones easily, but when sick, too many ketones can form. Ketones can make the body acidic and make your child feel ill. This is why good sick day management and timely communication with your child's diabetes doctor is so important. Your child may need more insulin when ill.



Visit [choa.org/diabetes](http://choa.org/diabetes) to learn more.

# »MYchart



## Make life easier

### Securely access your child's medical information

MYchart is our new online tool designed to help you streamline your child's care. You can access it for free through your computer and mobile device. With MYchart, you can securely connect with your child's healthcare team and access much of his medical information 24 hours a day.

#### What can I do on MYchart?

Through our secure online portal, you can:

- Communicate with your child's healthcare team.
- Receive reminders for upcoming appointments and tests.
- Receive results of many of your child's tests.
- View and print immunization records.

#### How does MYchart help me save time?

MYchart simplifies the healthcare process. You can:

- Request appointments online.
- Ask about common health issues or test results.
- Submit a request for a prescription renewal.

#### Can my child's doctor contact me through MYchart?

Yes, if his practice participates in the Children's electronic medical record. Find a list of participating practices on [choa.org/MYchart](http://choa.org/MYchart). When you receive new test results, the doctor might send you a note to help explain them. The doctor might also:

- Recommend that you make a follow-up appointment.
- Provide more instructions.
- Ask you to call the office to discuss results.

#### How do I sign up for MYchart?

You need an access code to create an account. You can request an access code at your next doctor visit, or by going online.

- **To request an access code at your doctor's office:**
  - Request an access code when you check in for your next appointment at Children's or one of our MYchart participating practices. You will receive a letter or email containing your access code.
- **To request an access code online:**
  - Visit [choa.org/mychart](http://choa.org/mychart).
  - Click on "Request an access code."

– Follow the prompts to complete your request.

#### How do I activate the account?

You must use a computer to activate your account. Using your access code:

- Visit [choa.org/mychart](http://choa.org/mychart).
- Click on "Activate now."
- Follow the prompts to complete the activation process.

After your account is activated, you can access MYchart via the mobile app. Download the app for free from the iTunes Store or Google Play.

#### Are all my doctors participating in MYchart?

Every patient of Children's Healthcare of Atlanta and our MYchart participating practices is eligible to sign up for a MYchart account. However, some features, such as secure messaging, might not be available at all locations.

#### What is proxy access?

Proxy accounts are available to the parents/guardians of patients. Proxy access includes access to all information available on MYchart up to age 18. Once the patient turns 18, proxy access is automatically removed and may only be reinstated upon request and permission from the adult patient.

Teen accounts are available to patients 13 and older and will allow teen patients access to their own MYchart information with their parent/guardian's consent.



If you have questions about MYchart or how to sign up, ask your healthcare provider or the front desk staff at your doctor's office. Visit [choa.org/MYchart](http://choa.org/MYchart) to learn more.

*For the patients of Children's Healthcare of Atlanta  
and our MYchart participating practices.*

