# Type 2 Diabetes Basics

## A plan for kids, teens, parents, and families

Intermountain
Primary Children's Hospital
The Child First and Always®

### This book is for beginners

When you first learn you have type 2 diabetes, it's easy to feel confused and scared. But although diabetes is a challenge, it's not a disaster. You're still you — healthy, active, and strong. You will just have to work a bit harder to take care of yourself.

This book can help you get a good start.

# What's Inside…

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# Understanding Diabetes

Diabetes is a metabolic disorder that changes the body's ability to use the sugar (glucose) in food for energy.

## What is Diabetes?

In type 2 diabetes, the body cannot respond well to the insulin it makes. This causes high levels of sugar in the blood. Type 2 diabetes can require multiple blood glucose checks each day and may require oral medication or insulin injections.

### Will type 2 diabetes go away?

In type 2 diabetes, the pancreas can eventually get worn out and not make enough insulin to keep up with the body's needs. There are instances where the body's ability to use its own insulin can improve, such as with a healthy diet and lifestyle changes.

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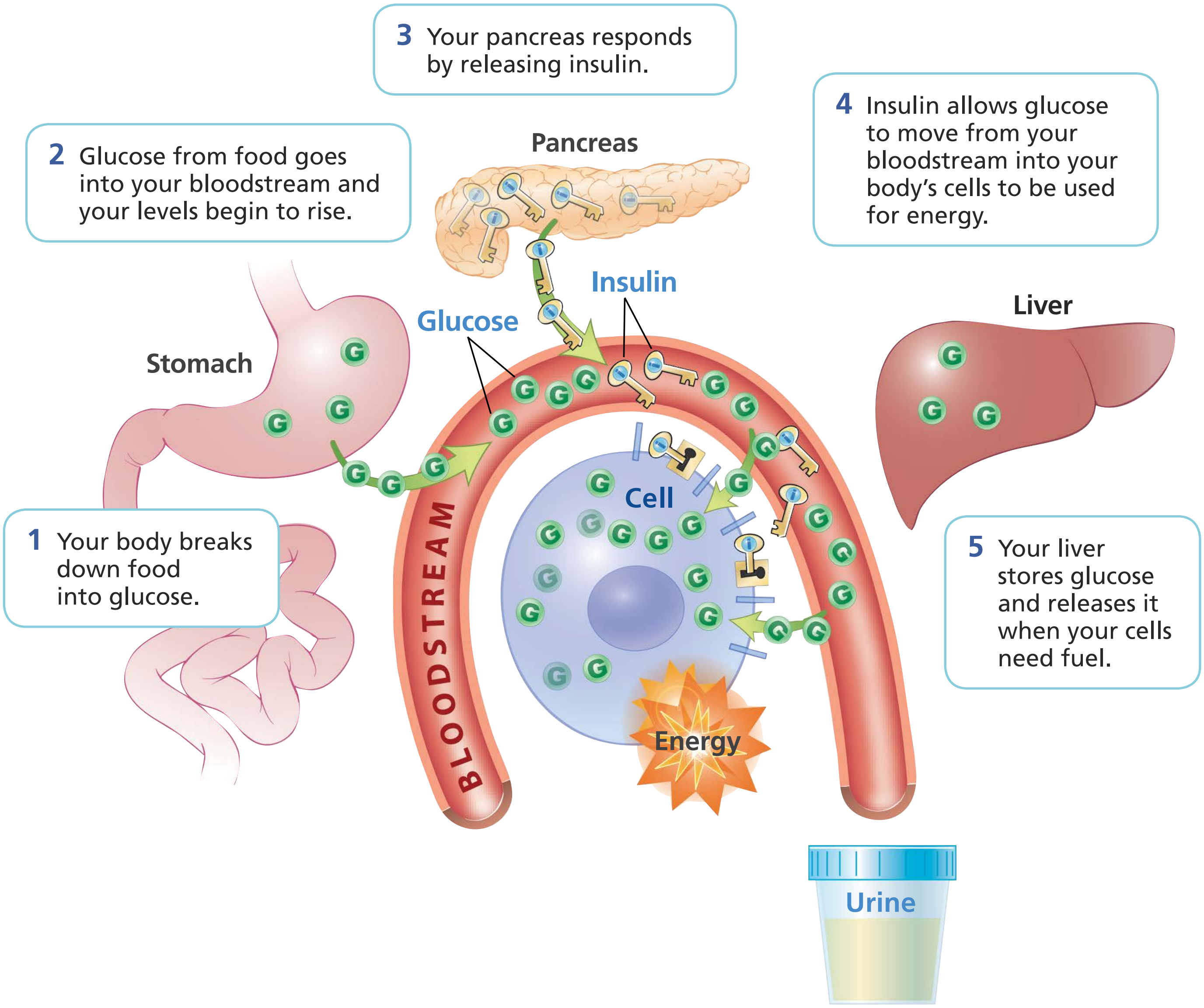
## Getting fuel from food

To understand more about what diabetes is, it helps to know how the body uses food when you do not have diabetes:

1. When you eat, your body breaks food down into glucose. Glucose is a type of sugar that is the body's main source of energy.
2. Glucose from food goes into your bloodstream. Your blood glucose (the amount of sugar in your blood) begins to rise.
3. As your blood glucose rises, your pancreas responds by releasing a hormone called insulin.
4. Insulin allows glucose to move from your bloodstream into your body's cells. Insulin is like a key that "unlocks" the cells. Once in your cells, glucose is used for energy.
5. Your liver stores glucose and releases it when your cells need fuel (for example, when you have not eaten for a while). When you have eaten, however, insulin blocks the release of glucose from your liver.



3 Your pancreas responds by releasing insulin.

2 Glucose from food goes into your bloodstream and your levels begin to rise.

4 Insulin allows glucose to move from your bloodstream into your body's cells to be used for energy.

1 Your body breaks down food into glucose.

5 Your liver stores glucose and releases it when your cells need fuel.

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## Getting fuel from food when living with type 2 diabetes

When you have type 2 diabetes, it is more difficult to get energy from food. Here is why:

1 Your body still breaks down food into glucose, but your cells cannot use it very well for energy.

2 Glucose levels continue to increase in your bloodstream.

3 Your pancreas may not produce enough insulin.

4 The liver releases more glucose into your bloodstream. When it gets too high, glucose begins to "spill" into your urine.

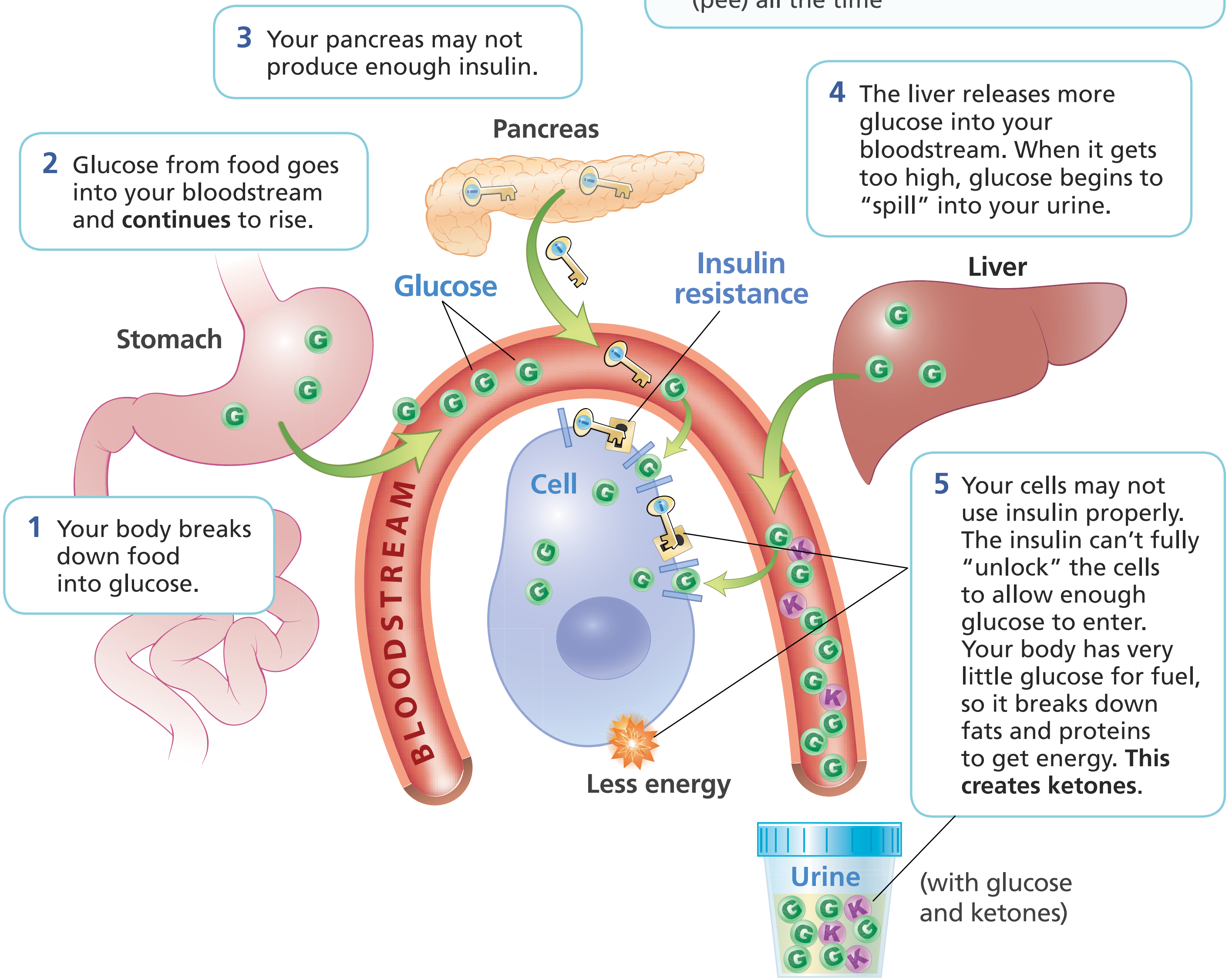
5 Your cells may not use insulin properly. The insulin can't fully "unlock" the cells to allow enough glucose to enter. Your body has very little glucose for fuel, so it breaks down fats and proteins to get energy. This creates ketones.

As a result of not having enough insulin, you will feel:

- Thirsty
- Hungry
- Weak and tired
- The need to urinate (pee) all the time

You might also experience:

- Weight loss
- Blurry vision
- Fast, deep breathing
- Slow or confused thinking



3 Your pancreas may not produce enough insulin.

2 Glucose from food goes into your bloodstream and **continues** to rise.

4 The liver releases more glucose into your bloodstream. When it gets too high, glucose begins to "spill" into your urine.

1 Your body breaks down food into glucose.

5 Your cells may not use insulin properly. The insulin can't fully "unlock" the cells to allow enough glucose to enter. Your body has very little glucose for fuel, so it breaks down fats and proteins to get energy. **This creates ketones.**

(with glucose and ketones)

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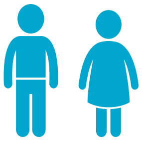
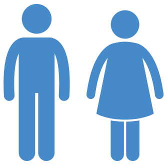
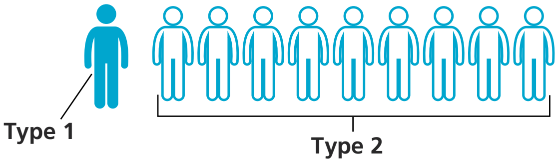
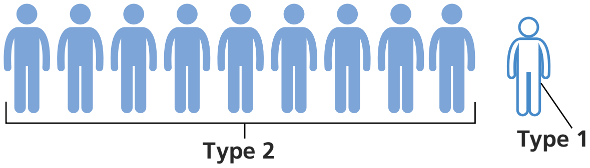
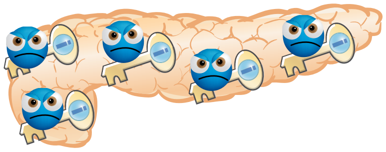
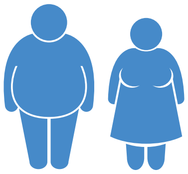
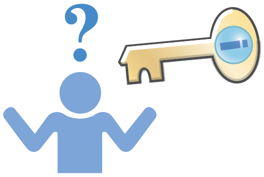
## Understanding the types of diabetes

There are 2 types of diabetes: Type 1 and type 2. Since type 2 diabetes can behave differently and have different treatments, it is important to know what the differences are.

| **Type 1** | **Type 2** |
|---|---|
| Usually happens to kids but can occur at any age  | Usually happens to adults but can also happen to teens and kids  |
| **1** in **10** people of all ages who have diabetes have **type 1**  | **9** in **10** of all people who have diabetes have **type 2**  |
| Is caused by an autoimmune disorder*<br>*This means the immune system (your body's defense system) begins to attack the pancreas for some unknown reason. As a result, the insulin-making beta cells in the pancreas are destroyed.  | The exact cause is not known but it tends to run in families.<br>Some racial and ethnic groups have a greater chance of getting diabetes — American Indians, African Americans, Hispanics/Latinos, Asian Americans, and Pacific Islanders.<br>You do not get diabetes from eating too much sugar.  |
| Not related to being overweight or lack of exercise  | Often happens in people who are overweight or do not exercise much  |
| Body stops making insulin  | Body still makes insulin but cannot use it very well  |
| Treated with injections (shots) of insulin  | Treated with diet, exercise, pills, and sometimes injections of insulin  |

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# Managing and Treating Your Diabetes

Diabetes can lead to health problems. Blood vessels can get damaged and can cause high blood pressure in young people. Damage to the organs in your body can cause blindness, kidney failure, loss of legs or feet, and gum problems or loss of teeth.

The good news is that when you take care of your diabetes, you can avoid these problems. How? **The key is to keep your blood glucose as close to normal as possible.**

See the following pages to learn more about the 5 steps that can help you to keep a normal blood glucose level — and manage and treat your diabetes.

### 5 steps to take care of your diabetes:

- Eat healthy foods
- Be active every day
- Stay at or achieve a healthy weight
- Take your medicine
- Check your blood glucose

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## 1 Eat Healthy Foods

Carbohydrates are a good source of energy for our bodies. If you eat too many carbs at one time, your blood glucose may go too high.

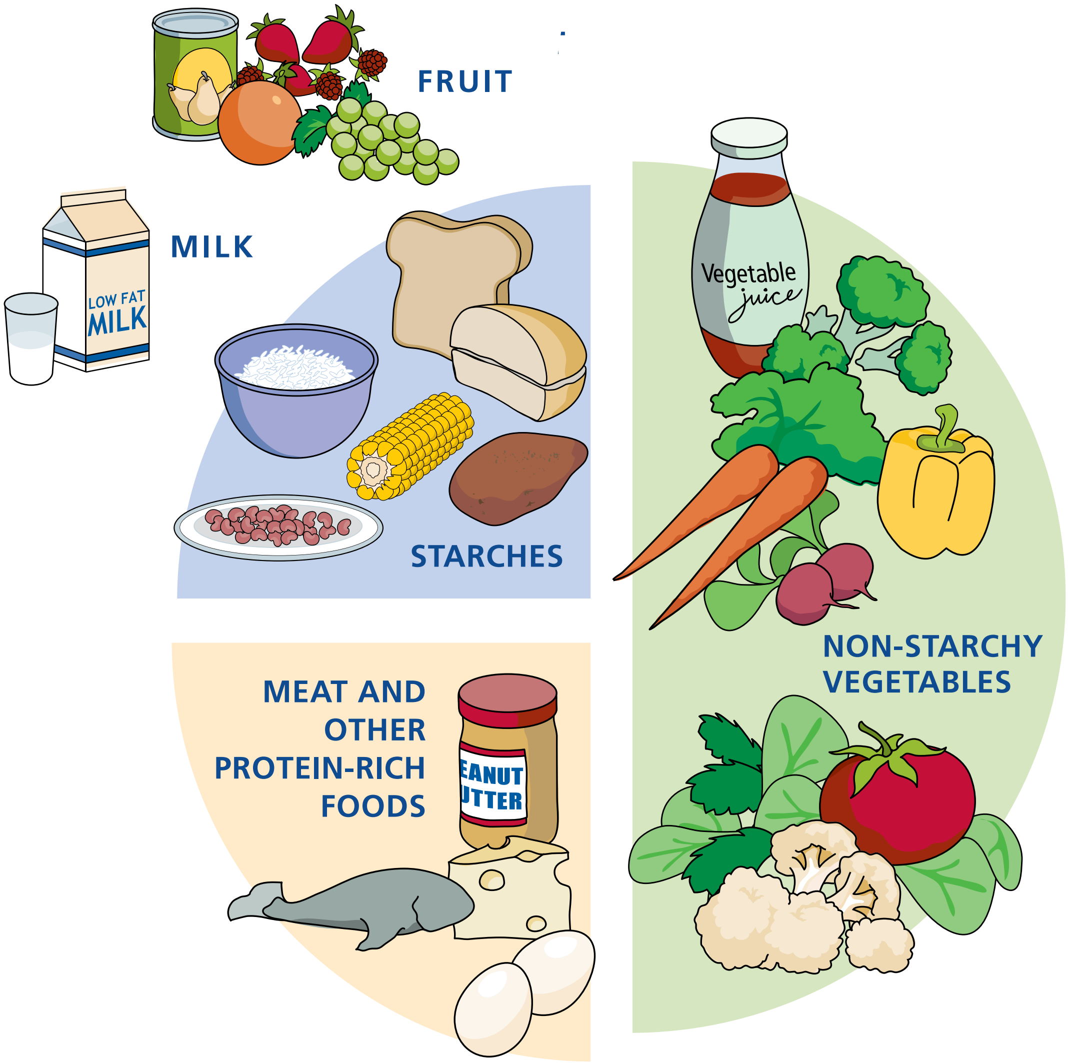
Many foods contain carbs. Whole grains, nonfat or low-fat milk, fresh fruits, and vegetables are good carb choices. Foods like white bread, whole milk, sweetened fruit drinks, soda pop, potato chips, sweets, and desserts have high carbs and not enough fiber or nutrients to keep your body healthy. Learn to eat the right amount at meals and snack times to keep your blood glucose in balance.

Work with your dietitian to figure out a carbohydrate "budget" that works for you. You can write down your carb budget below:

_______ grams per meal

_______ grams for a snack

### Healthy eating includes foods from each of these groups:



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## Low-carb snacks

Low- or controlled-carb snacks can help control your appetite between meals and insulin doses. Snacks that include high-fiber vegetables and protein or hot liquids like soup and tea make you feel full to help control hunger between meals (and insulin doses).

## Better-for-you beverages

Water is the best choice whenever you are thirsty.

Low-fat milk is a healthy choice for meals and snacks. Just remember to count and cover the carbs for every glass of milk.

Regular soda and fruit juice have a lot of sugar and carbs and should not be a routine part of a daily diet.

For a treat, choose diet (sugar-free) sodas or drinks such as Crystal Light. You can also make no-carb and lower-carb beverages at home using sugar substitutes. Try mixing water, lemon juice, and sugar substitute for homemade lemonade. Or, make lower-carb chocolate milk by mixing cocoa powder and sugar substitute with milk.

## Concentrated sweets

Concentrated sweets have a large number of carbs in a small amount of food. They will raise your blood sugar quickly if they are not given with insulin. Use moderation with sweets and eat at a meal with insulin. They should be counted with your meal carbs and fit in your carb budget for the meal. Examples are cake with frosting, candy, cookies, regular soda, and other sweets. Substitute artificially-sweetened foods to help limit carb intake.

### Controlled-carb snacks:

- Small serving of nuts with a sugar-free drink
- String cheese, cheese slices, cubes, and sticks
- Cottage cheese
- CarbMaster yogurt
- Hard-boiled eggs
- Peanut butter (try with celery or carrots)
- Tuna fish
- Deli meats
- Lettuce leaves rolled with meat or cheese
- Pickle rolled in meat or cheese
- Scrambled egg with chopped cooked vegetables
- Small tossed salad with flavored tofu cubes
- Peeled cucumber logs filled with hummus or flavored cream cheese
- Sugar-free Jell-O
- Beef jerky

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## 2 Be Active Every Day

Be active and exercise every day to prevent weight gain and keep your blood glucose in a healthy range.

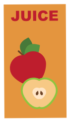
Physical activity is good for everyone. You should aim for at least 60 minutes of play or exercise every day. Just keep in mind that your cells need more energy for physical activity. To prevent low blood glucose (80 mg/dL or less), you may need to cut down your insulin or increase your carbohydrates during or after exercise.

Take some time to plan your exercise program with your care team. Since they know your medical history and current level of fitness, they can help you set reasonable goals. They can also teach you to balance increased physical activity with changes in food choices and medication timing or doses.

Once you've set up your program, get started!

### Follow these tips for healthy exercise:

Check your blood glucose before you exercise to know if you should eat a snack. You may also need to check halfway through or after exercise, especially if it lasts longer than an hour.



Keep some carbohydrate snacks on hand to treat low blood glucose.

Drink plenty of water during exercise or play.

Keep track of how exercise affects your blood glucose, and discuss it with your doctor or diabetes educator at your next visit. Talk with your doctor or diabetes educator before starting a new sport or activity because your body may react differently.

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## 3 Stay at or Achieve a Healthy Weight

Follow your recommended meal plan to prevent weight gain and to keep your blood glucose in a healthy range.

### The basics of eating well with diabetes

- **Eat a variety of foods.** This is the best way to make sure you're getting the energy, vitamins, and minerals you need to grow, play, work, and stay healthy. About half of your plate should be fruits and non-starchy vegetables. The other half should include starchy vegetables, grains, and protein.
- **Try to stick to a schedule.** Eat regular meals; don't skip meals. Structure meals and snacks so that you are not eating more often than every 2 to 4 hours during the day (to minimize grazing or nibbling between meals). Be sure to include a source of protein in each snack.

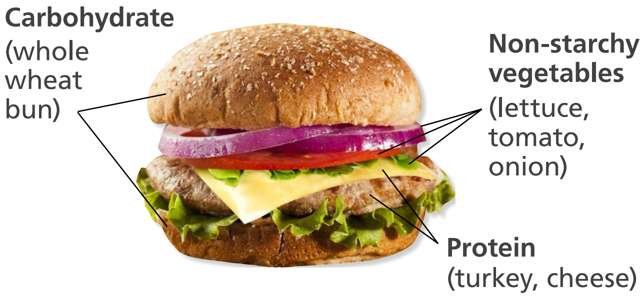
### How to read a food label

It is important to know how to read a food label because it can help you know how many carbohydrates you are eating. This is what you should watch for:

1. **Check the serving size.** For the chocolate milk label on the right, a serving is 1 cup. Be careful to notice that there are 2 servings in this bottle.
2. **Check how many grams of carbohydrates are in a serving** by looking at the "Total Carbohydrate" number on the label.

**If you drink this whole bottle of chocolate milk you get 2 servings—or 62 grams of carbs!**

- **Pay attention to carbohydrates in your meals and snacks, and limit sweets.** Food is made up of 3 main nutrients: Fat, protein, and carbohydrates ("carbs"). Of these, carbs have the biggest effect on your blood glucose. Carbohydrates are found in breads, cereals, starchy vegetables (like corn, peas, and potatoes), pasta, fruits, milk, and sweets.



**Nutrition Facts**

Serving Size 1 cup (240 mL)
Servings per container: 2

| Amount per Serving | |
|---|---|
| **Calories** 190 | Calories from Fat 25 |
| | **% Daily Value*** |
| **Total Fat** 2.5 g | **4%** |
| Saturated Fat 1.5 g | **9%** |
| Trans Fat 0 g | |
| **Cholesterol** 15 mg | **5%** |
| **Sodium** 230 mg | **10%** |
| **Potassium** 450 g | **10%** |
| **Total Carbohydrate** 31 g | **10%** |
| Dietary Fiber 1 g | **3%** |
| Sugars 29 g | |
| **Protein** 10 g | |
| Vitamin A 10 % | Vitamin C 0 % |
| Calcium 35 % | Iron 4 % |
| Vitamin D 25 % | |

There are 31 grams of carbohydrate in 1 cup of chocolate milk. So, ½ cup has 15 ½ grams of carbohydrate. 2 cups have 62 grams of carbohydrate.

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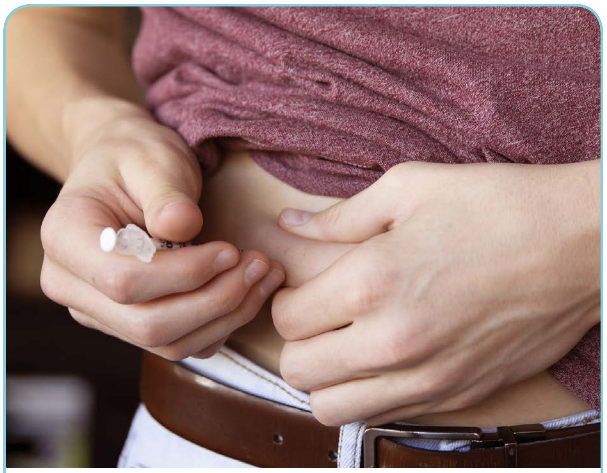
## 4 Take Your Medicine

Kids with type 2 diabetes may need to take pills or insulin injections to help control blood glucose.



### About giving injections

Giving an injection—to yourself or to someone else—might be scary at first. You may worry about doing it wrong or worry that it will hurt. With practice, patience, and the help of your doctor, you will soon feel more comfortable.

### When do I take pills?

Kids with type 2 diabetes often take medicine by mouth. These pills are called oral medications.

Oral medications won't cure your diabetes. Their purpose is to help lower your blood glucose, and they work in different ways to do this.

There are many ways to treat diabetes with medication. You may be given only one type of oral medication. Or, you may be given two or more different types of pills or pills that combine the actions of two different medications. Some kids will need to take diabetes pills as well as insulin injections.

### When do I take insulin?

Your insulin regimen (plan) will tell you what kind of insulin to take, how much you should take, and the right time to take it. The plan is determined by your age, weight, and other things. Keep in mind that it may take some time for you and your doctor to find the regimen that works best for you.

Your doctor will prescribe insulin in a way that resembles normal insulin production in the body.

### How to manage your medicine

- **Follow ALL parts of your plan.** Diabetes medicine works best when combined with regular blood glucose checks, meal planning, and exercise.
- **Take your medicine just as your doctor tells you to.** Don't stop taking it because you feel fine — and don't mix diabetes medicine and other medicines unless your doctor says it's okay.
- **Pay attention to how your medicine affects you**. Your blood glucose levels and symptoms or side effects can help you and your doctor know how the medicine is working for you.
- **Stick to a routine.** Set an alarm to remind you to take your medicine. Or, take it at the same time you do other regular activities like brushing your teeth or eating a meal.
- **Get organized.** A pillbox can help you keep track of your pills. Find a place to store your insulin and insulin dose information. A tool to track your insulin dose and blood glucose can be helpful.
- **Don't wait until the last minute to order refills.** Mark your calendar to remind you when to order. Allow several days for the prescription to be filled. Pharmacies sometimes have a delay in filling orders — and it's important that you don't run out of your prescription.

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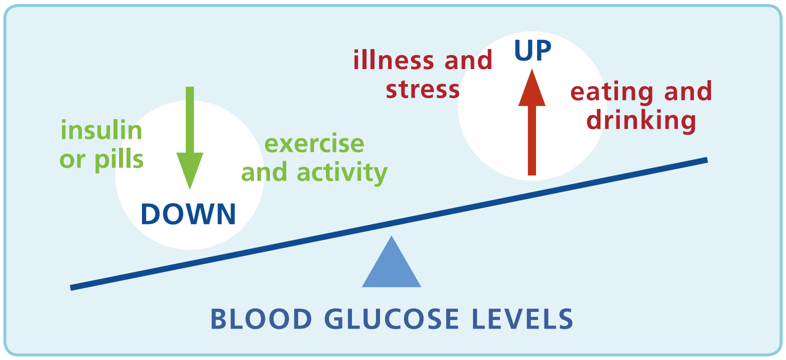
## 5 Check Your Blood Glucose

Your doctor will tell you what blood glucose level is good for you and teach you how to use a meter to check it. **Your goal is to keep your blood glucose as close to this level as you can.**

Insulin or pills and exercise and activity can make your blood glucose go down.



Illness and stress, along with eating and drinking, can make your blood glucose go up.

**Checking your blood glucose is the only way to know how much insulin or food your body needs.**

### How do I check my blood glucose?

To check your blood glucose, first, wash your hands to make sure there is no sugar on them. Then, prick your finger to get a tiny sample of blood. Use a small machine called a **glucose meter** to read the sample and display your blood glucose level.

There are many different meters to choose from. Your provider or diabetes educator will help you get a meter and show you how to use it. It may take some practice. Follow the directions that come with your meter.

### Understanding your glucose meter

Use a strip to test the accuracy of your meter.

Check the date and time on your glucose meter regularly to make sure they are accurate.

Most glucose meters store at least 100 readings.

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# Treating and Preventing LOW Blood Glucose (Hypoglycemia)

Low blood glucose (hypoglycemia) is when your blood glucose level drops below your target range. This section tells you how to treat and prevent low blood glucose.

It is especially important to watch for low blood glucose. Check your blood glucose as often as your doctor suggests or any time you have symptoms. Talk to your doctor as the type of medication you are on will determine your risk for low blood glucose.

## What can I do to treat low blood glucose?

If you think your blood glucose is low, **test it right away if you can.** This helps make sure that the symptoms are coming from low blood glucose. Then, **treat with the 15 / 15 rule** if your blood glucose is below target, or you have symptoms of low blood glucose.

- **Treat with 15 grams of rapid-acting carbohydrate.** See the list at the right for some suggestions. (**Note:** If the person cannot eat, drink, or respond — or if the person has passed out or is having seizures — it probably means that blood glucose is severely low. They need an injection of glucagon. See **page 17** for instructions.)
- **Wait about 15 minutes for the treatment to work, then re-check your blood glucose.** If it's still below 80 mg / dL, have another snack with 15 grams of carbohydrate. Check your blood glucose in 15 minutes. Repeat until your blood glucose is above 80.

  If your blood glucose is between 80 to 100 mg / dL, and it will be more than 30 minutes before your next meal or snack, have a small snack with 15 grams of carbs and some protein to help stabilize your blood glucose. Check again in 1 hour.

### Low before mealtime?

If your blood sugar is low right before mealtime, you can do either of these things:

- Have 15 grams of quick sugar as usual

**OR**

- Subtract 15 grams of carbohydrate from the total carb count for your meal

### Rapid-acting carbohydrates

The following rapid-acting carbohydrates each contain about 15 grams of carbohydrate:

- ½ cup of fruit juice or punch (NOT sugar-free)
- 3 to 4 glucose tablets, or 1 tube of glucose gel
- 1 tablespoon of brown sugar, honey, or corn syrup
- 1 fruit roll-up
- 4 teaspoons of white sugar
- ½ cup of regular soft drink (NOT diet)
- 8 Life Savers candies (NOT sugar-free)
- 2 tablespoons of raisins
- 3 to 5 pieces of hard candy
- 11 jellybeans or Skittles candies
- 1 cup of skim milk

**Note:** If these foods are not available, any carbohydrate source will work. However, candy bars, cookies, and other higher-fat options are poor sources of quick energy — the fat slows down the digestion of carbohydrates. High-fiber foods (such as many fresh fruits) also slow digestion.

### What if my child cannot eat or drink — or has passed out or is having seizures?

Give a glucagon injection and consider calling 911. Severely low blood glucose is dangerous, so give glucagon immediately, without waiting to test blood glucose. See **page 18** for instructions.

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# Living Life to Its Fullest

Managing diabetes takes work, but it does not have to keep you from reaching your goals and fulfilling your dreams. When you take good care of yourself and your diabetes, anything is possible!

**There are some other things you will need to be aware of and do as a person living with type 2 diabetes:**

- **Be prepared** for when to call your doctor if you have an emergency, travel, or have other unexpected life events.
- **Inform** your teachers, coaches, school administrators, and activity coordinators about diabetes and helping you stay safe at school.
- **Educate yourself** with the latest information from websites, apps, and other resources.

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## Being Prepared

See the instructions below to know when to call your doctor and get emergency care, to be prepared for an emergency, vacations, travel, and other unexpected life events.

### Call your doctor if:

- **You're sick** with fever, vomiting, diarrhea, a large amount of ketones in your body, confusion, and dehydration, or you're not sure what to do to take care of yourself.
- **You have high blood glucose.** You can't control it, despite taking action to correct it. You have 2 or 3 readings in a row with results of 240 mg/dL or higher. You have repeated readings during a specific time of day. You have moderate to large amounts of ketones in your urine.
- **You have low blood glucose.** You can't control it, despite taking action to correct it. You have 2 or 3 readings in a row with results of 80 mg/dL or less. You have more than 2 unexplained episodes of low blood glucose in a week. You have repeated low glucose readings during a specific time of day.

### Get emergency care if:

- **You cannot keep blood glucose above 80 mg / dL**.
- **Vomiting has continued for more than:**
  - **4 hours** (for a child younger than 2 years)
  - **6 hours** (for a child 2 to 7 years old)
  - **8 hours** (for a child 8 years or older)
- **You have large ketones and vomiting.**
- **You notice signs of dehydration**, including little or no urination, no tears, a dry mouth, or dry skin.
- **You feel sleepy, don't have any energy, or are breathing heavily.**

## What you need to know about glucagon

Glucagon is a hormone that helps the liver release glucose into the body quickly. It is used as an emergency treatment for very low blood glucose when someone cannot or will not eat or drink.

Glucagon should be given whenever someone who takes insulin is:

- Unable or refusing to drink, swallow, or eat sugar (or sugar-sweetened products) when blood sugar is low
- Angry or aggressive
- Having seizures or convulsions
- Unconscious or unresponsive

While it is best to test the person's blood glucose level before giving glucagon, it is safe to give even if blood glucose is not dangerously low.

Glucagon comes as a kit with a syringe and a small bottle of powdered medication, as a dry nasal spray, and as a pre-mixed single-dose syringe or pen. (See **page 17** for more information.)

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## **What you need to know about glucagon** (continued)

Glucagon is packaged in kits. Two common brand-name kits are the **Glucagon Emergency Kit** and the **GlucaGen HypoKit**.

You must mix the liquid in the syringe with the powder in the bottle right before giving an injection of glucagon with these kits.

**Gvoke** is another type of glucagon that is pre-mixed (reconstituted) and comes in a single-dose syringe or pen that is ready to use. Follow injection instructions included with the Gvoke syringe or provided by your diabetes care team.

A **Baqsimi** (nasal glucagon) kit contains a nasal applicator with glucagon that can be given in one nostril. The kit seal **should not be opened** until it is going to be used.

**Glucagon is necessary. If your pharmacy or insurance refuses to cover it, contact your doctor's office for advice.**

## Follow these steps to give a glucagon injection:

1. Open the kit and pop the seal off of the bottle.
2. Take the cap off the syringe.
3. Stick the syringe needle into the bottle and push the plunger down so the liquid goes into the bottle.
4. Pull the syringe out of the bottle.
5. Swirl the bottle until the powder is completely mixed with the liquid.
6. Stick the syringe back in the bottle and draw up the liquid into the syringe. Remove the filled syringe from the bottle.
7. Hold the syringe like a pencil and insert the needle into the thigh, buttock, or upper arm of the person who needs glucagon.
8. Inject the glucagon. For a child younger than 6 years, only inject half of the medication. For a child 6 years or older, inject all of it.
9. Remove the syringe and turn the person on their side so they will not choke if they vomit (throw up).
10. Call 911 and stay with the person until help arrives.

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# Inform Teachers, Coaches, and Administrators at School

Informing your teachers, coaches, school administrators, and activity coordinators about diabetes can help you stay safe at school. Here are some tips:

## What you need to know:

### The school's responsibilities

School districts and staff must provide an individualized plan to accommodate a student's special healthcare needs. Two federal laws apply:

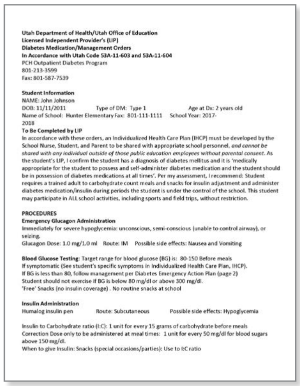
- **The Education for All Handicapped Act of 1975** entitles all physically, developmentally, emotionally, and other health-impaired children to free, appropriate public education. Any school that receives federal funding or is a facility that is considered open to the public must reasonably accommodate the special needs of children with diabetes.
- **Section 504** is a civil rights law that makes it illegal for any agency or organization that receives federal funds to discriminate in any way against qualified people with disabilities.

Staff at most schools are aware of their obligation to support your daily diabetes care — including helping with blood glucose monitoring and medication. Still, they will rely on you and your family to work with them on your needs — to teach them how to help you and give them the tools they need to do so.

## What you need to do:

### Prepare the school staff

- **Contact your school or district nurse.** The nurse can give you any additional forms and make sure that you have the support you need for your daily diabetes care.
- **Talk with the nurse about when and where you will check your blood glucose and inject insulin.** Younger children might need help from the nurse or another member of the school staff. Older kids may want to do these things on their own.
- **Make an appointment with your teacher, coach, and school counselor** to discuss diabetes care at school and after school. Give each person a packet that includes:
  - A copy of your **Diabetes Medical Management Order** signed by your doctor.
  - The ***Diabetes: Information for teachers***, ***Low Blood Glucose***, and ***Diabetes Medicines: Glucagon*** handouts (see below). These documents are included in the **Resources** section of this handbook.
  - Glucose gel, glucose tablets, or juice.
  - A Glucagon or GlucaGen kit, a dry nasal spray, or pre-mixed single-dose syringe or pen.



**Utah Department of Health/Utah Office of Education**
**Licensed Independent Provider's (LIP)**
**Diabetes Medication/Management Orders**
**In Accordance with Utah Code 53A-11-603 and 53A-11-604**
PCH Outpatient Diabetes Program
801-213-3599
Fax: 801-587-7539

**Student Information**
NAME: John Johnson
DOB: 11/11/2011 Type of DM: Type 1 Age at Dx: 2 years old
Name of School: Hunter Elementary Fax: 801-111-1111 School Year: 2017-2018
**To Be Completed by LIP**

In accordance with these orders, an Individualized Health Care Plan (IHCP) must be developed by the School Nurse, Student, and Parent to be shared with appropriate school personnel, *and cannot be shared with any individual outside of those public education employees without parental consent*. As the student's LIP, I confirm the student has a diagnosis of diabetes mellitus and it is 'medically appropriate for the student to possess and self-administer diabetes medication and the student should be in possession of diabetes medications at all times'. Per my assessment, I recommend: Student requires a trained adult to carbohydrate count meals and snacks for insulin adjustment and administer diabetes medication/insulin during periods the student is under the control of the school. This student may participate in ALL school activities, including sports and field trips, without restriction.

**PROCEDURES**
**Emergency Glucagon Administration**
Immediately for severe hypoglycemia: unconscious, semi-conscious (unable to control airway), or seizing.
Glucagon Dose: 1.0 mg/1.0 ml Route: IM Possible side effects: Nausea and Vomiting

**Blood Glucose Testing**: Target range for blood glucose (BG) is: 80-150 Before meals
If symptomatic (See student's specific symptoms in Individualized Health Care Plan, IHCP).
If BG is less than 80, follow management per Diabetes Emergency Action Plan (page 2)
Student should not exercise if BG is below 80 mg/dl or above 300 mg/dl.
'Free' Snacks (no insulin coverage) . No routine snacks at school

**Insulin Administration**
Humalog insulin pen Route: Subcutaneous Possible side effects: Hypoglycemia

Insulin to Carbohydrate ratio (I:C): 1 unit for every 15 grams of carbohydrate before meals
Correction Dose only to be administered at meal times: 1 unit for every 50 mg/dl for blood sugars above 150 mg/dl.
When to give Insulin: Snacks (special occasions/parties): Use to I:C ratio

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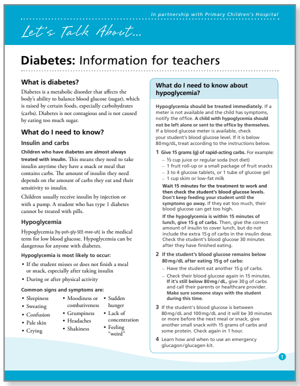

*In partnership with Primary Children's Hospital*

*Let's Talk About...*

**Diabetes:** Information for teachers

**What is diabetes?**

Diabetes is a metabolic disorder that affects the body's ability to balance blood glucose (sugar), which is raised by certain foods, especially carbohydrates (carbs). Diabetes is not contagious and is not caused by eating too much sugar.

**What do I need to know?**

**Insulin and carbs**

**Children who have diabetes are almost always treated with insulin.** This means they need to take insulin anytime they have a snack or meal that contains carbs. The amount of insulin they need depends on the amount of carbs they eat and their sensitivity to insulin.

Children usually receive insulin by injection or with a pump. A student who has type 1 diabetes cannot be treated with pills.

**Hypoglycemia**

Hypoglycemia [hy-poh-gly-SEE-mee-uh] is the medical term for low blood glucose. Hypoglycemia can be dangerous for anyone with diabetes.

**Hypoglycemia is most likely to occur:**

- If the student misses or does not finish a meal or snack, especially after taking insulin
- During or after physical activity

**Common signs and symptoms are:**

- Sleepiness
- Sweating
- Confusion
- Pale skin
- Crying
- Moodiness or combativeness
- Grumpiness
- Headaches
- Shakiness
- Sudden hunger
- Lack of concentration
- Feeling "weird"

**What do I need to know about hypoglycemia?**

**Hypoglycemia should be treated immediately.** If a meter is not available and the child has symptoms, notify the office. **A child with hypoglycemia should not be left alone or sent to the office by themselves.** If a blood glucose meter is available, check your student's blood glucose level. If it is below 80 mg/dL, treat according to the instructions below.

1. **Give 15 grams (g) of rapid-acting carbs.** For example:
   - ½ cup juice or regular soda (not diet)
   - 1 fruit roll-up or a small package of fruit snacks
   - 3 to 4 glucose tablets, or 1 tube of glucose gel
   - 1 cup skim or low-fat milk

   **Wait 15 minutes for the treatment to work and then check the student's blood glucose levels. Don't keep feeding your student until the symptoms go away.** If they eat too much, their blood glucose can get too high.

   **If the hypoglycemia is within 15 minutes of lunch, give 15 g of carbs.** Then, give the correct amount of insulin to cover lunch, but do not include the extra 15 g of carbs in the insulin dose. Check the student's blood glucose 30 minutes after they have finished eating.
2. **If the student's blood glucose remains below 80 mg/dL after eating 15 g of carbs:**
   - Have the student eat another 15 g of carbs.
   - Check their blood glucose again in 15 minutes. **If it's still below 80 mg/dL,** give 30 g of carbs and call their parents or healthcare provider. **Make sure someone stays with the student during this time.**
3. If the student's blood glucose is between 80 mg/dL and 100 mg/dL and it will be 30 minutes or more before the next meal or snack, give another small snack with 15 grams of carbs and some protein. Check again in 1 hour.
4. Learn how and when to use an emergency glucagon/glucagen kit.

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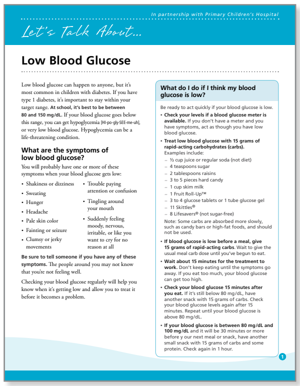

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*Let's Talk About...*

**Low Blood Glucose**

Low blood glucose can happen to anyone, but it's most common in children with diabetes. If you have type 1 diabetes, it's important to stay within your target range. **At school, it's best to be between 80 and 150 mg/dL.** If your blood glucose goes below this range, you can get hypoglycemia [HI-po-gly-SEE-me-uh], or very low blood glucose. Hypoglycemia can be a life-threatening condition.

**What are the symptoms of low blood glucose?**

You will probably have one or more of these symptoms when your blood glucose gets low:

- Shakiness or dizziness
- Sweating
- Hunger
- Headache
- Pale skin color
- Fainting or seizure
- Clumsy or jerky movements
- Trouble paying attention or confusion
- Tingling around your mouth
- Suddenly feeling moody, nervous, irritable, or like you want to cry for no reason at all

**Be sure to tell someone if you have any of these symptoms.** The people around you may not know that you're not feeling well.

Checking your blood glucose regularly will help you know when it's getting low and allow you to treat it before it becomes a problem.

**What do I do if I think my blood glucose is low?**

Be ready to act quickly if your blood glucose is low.

- **Check your levels if a blood glucose meter is available.** If you don't have a meter and you have symptoms, act as though you have low blood glucose.
- **Treat low blood glucose with 15 grams of rapid-acting carbohydrates (carbs).** Examples include:
  - ½ cup juice or regular soda (not diet)
  - 4 teaspoons sugar
  - 2 tablespoons raisins
  - 3 to 5 pieces hard candy
  - 1 cup skim milk
  - 1 Fruit Roll-Up™
  - 3 to 4 glucose tablets or 1 tube glucose gel
  - 11 Skittles®
  - 8 Lifesavers® (not sugar-free)

  Note: Some carbs are absorbed more slowly, such as candy bars or high-fat foods, and should not be used.
- **If blood glucose is low before a meal, give 15 grams of rapid-acting carbs**. Wait to give the usual meal carb dose until you've begun to eat.
- **Wait about 15 minutes for the treatment to work.** Don't keep eating until the symptoms go away. If you eat too much, your blood glucose can get too high.
- **Check your blood glucose 15 minutes after you eat.** If it's still below 80 mg/dL, have another snack with 15 grams of carbs. Check your blood glucose levels again after 15 minutes. Repeat until your blood glucose is above 80 mg/dL.
- **If your blood glucose is between 80 mg/dL and 100 mg/dL** and it will be 30 minutes or more before y our next meal or snack, have another small snack with 15 grams of carbs and some protein. Check again in 1 hour.

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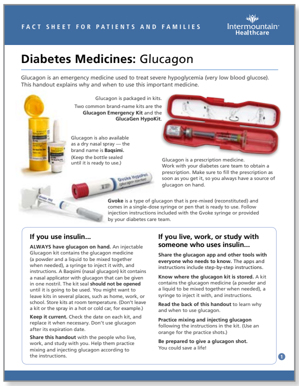

FACT SHEET FOR PATIENTS AND FAMILIES

Intermountain Healthcare

**Diabetes Medicines:** Glucagon

Glucagon is an emergency medicine used to treat severe hypoglycemia (very low blood glucose). This handout explains why and when to use this important medicine.

Glucagon is packaged in kits. Two common brand-name kits are the **Glucagon Emergency Kit** and the **GlucaGen HypoKit**.

Glucagon is also available as a dry nasal spray — the brand name is **Baqsimi.** (Keep the bottle sealed until it is ready to use.)

Glucagon is a prescription medicine. Work with your diabetes care team to obtain a prescription. Make sure to fill the prescription as soon as you get it, so you always have a source of glucagon on hand.

**Gvoke** is a type of glucagon that is pre-mixed (reconstituted) and comes in a single-dose syringe or pen that is ready to use. Follow injection instructions included with the Gvoke syringe or provided by your diabetes care team.

**If you use insulin...**

**ALWAYS have glucagon on hand.** An injectable Glucagon kit contains the glucagon medicine (a powder and a liquid to be mixed together when needed), a syringe to inject it with, and instructions. A Baqsimi (nasal glucagon) kit contains a nasal applicator with glucagon that can be given in one nostril. The kit seal **should not be opened** until it is going to be used. You might want to leave kits in several places, such as home, work, or school. Store kits at room temperature. (Don't leave a kit or the spray in a hot or cold car, for example.)

**Keep it current.** Check the date on each kit, and replace it when necessary. Don't use glucagon after its expiration date.

**Share this handout** with the people who live, work, and study with you. Help them practice mixing and injecting glucagon according to the instructions.

**If you live, work, or study with someone who uses insulin...**

**Share the glucagon app and other tools with everyone who needs to know.** The apps and instructions include step-by-step instructions.

**Know where the glucagon kit is stored.** A kit contains the glucagon medicine (a powder and a liquid to be mixed together when needed), a syringe to inject it with, and instructions.

**Read the back of this handout** to learn why and when to use glucagon.

**Practice mixing and injecting glucagon** following the instructions in the kit. (Use an orange for the practice shots.)

**Be prepared to give a glucagon shot.** You could save a life!

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## Educating Yourself

Taking care of your diabetes can seem complicated, especially at first. There's a lot you need to know and do. Resources such as community groups, websites, and mobile apps can help you with your diabetes care. See below for some helpful resources and links.

| Resource | Website |
|---|---|
| Intermountain Healthcare | **intermountainhealthcare.org/diabetes** |
| Primary Children's Hospital Diabetes Clinic at the Utah Diabetes Center | **healthcare.utah.edu/utahdiabetescenter** |
| American Diabetes Association | **diabetes.org** |
| Children with Diabetes | **childrenwithdiabetes.com** |
| Juvenile Diabetes Research Foundation (JDRF) | **jdrf.org** |
| Foundation for Children and Youth with Diabetes (camp) | **fcydcamputada.org** |
| College Diabetes Network | **collegediabetesnetwork.org** |
| Barbara Davis Center for Childhood Diabetes | **barbaradaviscenter.org** |
| National Institutes of Health (NIH):<br>• National Diabetes Education Program<br>• National Institute of Diabetes and Digestive and Kidney Diseases | Primarily for physicians: **niddk.nih.gov**<br>Primarily for patients: **diabetes.niddk.nih.gov** |

Smartphone apps can be a helpful way to count carbs and to track your activity and blood glucose levels.

| Resource | Website / App |
|---|---|
| **MyFitnessPal:** Information for more than 4 million foods, including items from most fast-food and chain restaurant menus. | **MyFitnessPal.com**<br>(app) |
| **CalorieKing:** Provides nutrition facts for your favorite food brands and fast food restaurants. Includes thousands of foods in their database. | **CalorieKing.com**<br>(app) |
| **Carb Manager:** The world's most comprehensive and accurate database of foods featuring carb counts, macros, and micronutrients. | **CarbManager.com**<br>(app) |
| **MyNetDiary:** Helps you learn and self-manage your diet, exercise, blood glucose, and medicines. | **MyNetDiary.com**<br>(app) |
| **OnTrack Diabetes:** Helps you manage your insulin, blood glucose, food, activity, weight, and HbA1c. You can set reminders to help keep you on track. | **OnTrackDiabetes.com**<br>(app) |

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# Glossary

**albumin screen:** a test for microalbuminuria, a condition that may indicate kidney disease.

**albuminuria:** a condition where albumin (a type of protein) is present in the urine. This may be an indication of kidney disease.

**autoimmune process:** a process in which the body's immune system—which is responsible for protecting your body from invading germs—mistakenly attacks healthy tissue. Type 1 diabetes results from an autoimmune process that attacks the pancreas, damaging it so it can't produce enough insulin.

**basal:** a baseline amount. In insulin treatment, your basal insulin refers to the insulin you take to keep a minimum level of insulin in your body at all times.

**beta cells:** the cells in the pancreas that normally produce insulin.

**blood glucose:** the amount of glucose in your blood.

**bolus:** a single, large dose of medication—a surge. In insulin treatment, your bolus insulin refers to the insulin you take with food to help your body process the glucose from food.

**carbohydrates (carbs):** a nutrient in many foods. Eating and drinking carbohydrates have a big effect on your blood glucose. For this reason, people who take insulin need to match their insulin dose to their carbohydrate intake (they need to "cover their carbs").

**correction dose:** a dose of insulin given to correct high blood glucose.

**cholesterol:** a type of lipid (fat) found in the blood. Too much cholesterol in the blood can lead to a heart attack or stroke.

**diabetes educators** (also called certified diabetes care and education specialists, or CDCES)**:** specially trained nurses, dietitians, or other healthcare providers who can help explain your diabetes and create individual treatment plans for you. They can also teach you skills such as how to take medication correctly, and offer support and encouragement to keep you on track. Educators can work with you individually, or in a diabetes education class.

**DKA (diabetic ketoacidosis):** a serious condition that involves high blood glucose, ketones, and dehydration. DKA must be treated right away.

**fat:** one of the 3 major nutrients in food (along with protein and carbohydrate). All fats contain different percentages of monounsaturated, polyunsaturated, and saturated fat. Your body uses fats to repair cells and help cells send signals.

**glucagon:** emergency medication used to treat very low blood glucose (hypoglycemia). It comes in a kit and is given by injection when a person's blood glucose has dropped so low that they cannot eat or drink, or are unconscious or having seizures.

**glucose:** a type of sugar that is your body's main source of energy. (Blood glucose refers to the glucose in your bloodstream.)

**glucometer:** a glucose meter.

**glucose meter:** a machine that measures the glucose in your bloodstream (your blood glucose).

**HbA1c** (also called A1C, or glycosylated hemoglobin)**:** a blood test that measures the amount of glycosylated hemoglobin in your bloodstream. The result reflects your overall average blood glucose control over the previous 2-month to 3-month period.

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## Glossary (continued)

**hyperglycemia:** high blood glucose.

**hypoglycemia:** low blood glucose.

**insulin:** a hormone produced by the pancreas that allows glucose to move out of your bloodstream and into your body's cells. Insulin is the "key" that "unlocks" your cells and allows glucose to enter. Once inside, the glucose can serve as fuel for the cells.

**insulin deficiency:** when the pancreas has stopped — or nearly stopped — making insulin.

**insulin resistance:** when the cells in the body do not respond properly to insulin. Insulin resistance is the most common cause of type 2 diabetes.

**islet cells:** see islets of Langerhans (below).

**islets of Langerhans:** clumps of cells within the pancreas. These clumps contain the cells that make insulin (the beta cells). Transplanting islet cells from a donor pancreas to the body of a person with diabetes is a promising treatment for people with type 1 diabetes.

**lipid profile:** a blood test that measures the lipids (fats) found in your blood. A full lipid profile will measure your total cholesterol, LDL cholesterol, HDL cholesterol, and triglyceride levels.

**ketones:** a by-product of the breakdown of fat and protein inside your body. High levels of ketones can be harmful.

**metabolic disorder:** any condition — such as diabetes — that affects how your body uses food for energy and growth.

**mg / dL:** abbreviation for "milligrams per deciliter." Blood glucose is often measured in units of mg / dL.

**mmol / L**: abbreviation for "millimoles per liter." Blood ketones are often measured in units of mmol / L.

**pancreas:** the organ that normally produces insulin, located behind your stomach.

**protein:** one of the 3 major nutrients in food (along with fat and carbohydrate). Your body uses protein to build and repair muscles, bones, organs, and other tissues.

**receptors:** structures on cell surfaces (or inside cells) that receive and bind a specific substance. For example, insulin binds to insulin receptors on the cell surface to allow glucose to enter the cell.

**retinopathy:** an eye disease caused by damage to the small blood vessels of the retina.

**target range:** the range of levels between which your blood glucose should stay. (For example, many school-age children have a blood glucose target range of 80 to 150 mg / dL.) Your medical team will tell you what your target range is.

**type 1 diabetes:** the type of diabetes that occurs when the pancreas has stopped — or nearly stopped — making insulin.

**type 2 diabetes:** the type of diabetes that occurs when the body no longer uses insulin properly (insulin resistance), fails to make enough insulin, or has a combination of these problems.

**triglycerides:** a type of lipid (fat) found in the blood. High triglycerides are often found in people who have high levels of LDL (bad) cholesterol and low levels of HDL (good) cholesterol. High triglycerides signal increased heart risk.

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## Questions for my doctor:

## Notes

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## Notes

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