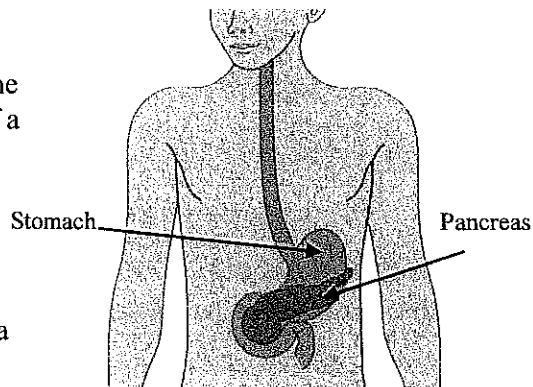


What Is Diabetes?

Diabetes is a condition that causes hyperglycemia (high blood glucose). Insulin is a hormone that is made by the pancreas. The pancreas is an organ located near the stomach and is the size of a fist. Insulin is what keeps your blood glucose within a normal range.

If your pancreas cannot make insulin or the insulin you make does not work right, diabetes develops. Diabetes is a life long condition. With proper care and treatment your child can lead a healthy life and continue with usual activities.



How Does Eating Affect Blood Glucose?

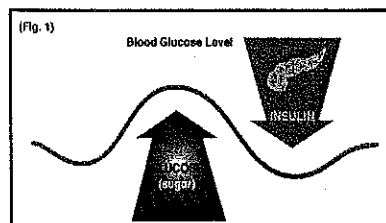
In order to understand diabetes, it helps to have a basic understanding of how the body works before you developed diabetes.

The main source of energy for all the cells in the body is glucose. One way the body gets glucose is from eating foods containing carbohydrates.

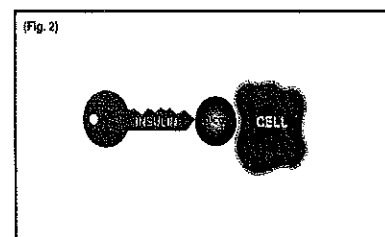
1. The food you eat is made up of fats, proteins and carbohydrates. The food goes into your stomach and is digested.



2. During digestion, the body breaks down the carbohydrates into glucose. This glucose enters the bloodstream. The rise in blood glucose causes the pancreas to release insulin into the bloodstream. (Figure 1)



3. Insulin and glucose travel in the bloodstream to the cells. Insulin acts as a “key” to allow glucose into the cell. Cells use glucose for energy. (Figure 2)



Diabetes changes how the body works:

1. Without insulin or enough insulin, glucose cannot move out of the blood and into the cells.
2. Glucose then builds up in the blood and the body cannot use it for energy. This results in hyperglycemia.

What Are Signs and Symptoms of Diabetes or Hyperglycemia?

- Increased thirst
- Increased urination
- Increased hunger
- Feeling tired
- Weight loss
- Blurred vision

Type 1 and Type 2 Diabetes Overview

There are two main types of diabetes. Children and teens can develop either type 1 or type 2 diabetes.

Type 1 Diabetes:

- The pancreas stops making insulin
- Treatment must include daily insulin
- Makes up about 10% of all cases of diabetes
- Most common type of diabetes in children
- Most of the time there is no family history

Type 2 Diabetes:

- The pancreas may produce insulin, but the pancreas doesn't make enough insulin and/or the cells of the body can't use the insulin properly.
- Treatment always includes diet and exercise. May also need medications (insulin and/or pills).
- Makes up about 90% of all cases of diabetes
- Most common type of diabetes in adults
- Most of the time there is a family history

Your healthcare provider will diagnose your type of diabetes based on blood tests and symptoms. It may take a few weeks to get the test results.

The type of diabetes my child has is _____.

General Facts About Diabetes

- Diabetes is not caused by eating too much sugar.
- There is nothing you can do to prevent type 1 diabetes.
- Weight loss, exercise, and healthy eating may prevent or delay the onset of type 2 diabetes.
- With proper care, someone with diabetes can be as healthy as someone without diabetes.

Checking Your Blood Glucose

Why Is It Important to Check Blood Glucose When You Have Diabetes?

- To know if blood glucose is too low (hypoglycemia)
- To know if blood glucose is too high (hyperglycemia)
- To determine the correct insulin dose
- To let you know how stress, activity, illness, or food affects the blood glucose

Why Is Good Blood Glucose Control Important?

- Keeping your blood glucose in target range will reduce the risk of eye, kidney, and nerve damage
- To keep you healthy and promote normal growth

How Do You Know if Your Diabetes Is in Control?

1. Check your blood glucose 5-6 times a day (or as directed by your diabetes provider) to make sure it is in target range. The chart below will tell you blood glucose ranges to aim for based on your child's age. When first diagnosed, it may take time for your blood glucose to fall within range.

Blood Glucose Ranges With Diabetes

	Under 2 years old	Ages 2 to 5 years	Ages 6 years and older
Before Meals	80 to 200	80 to 180	70 to 150
Before Bedtime snack	100	100	100

**Note: Your provider and diabetes educator will discuss your specific blood glucose target.*

2. At every clinic visit, you will have a HemoglobinA_{1c} (A1C) test. This test is done by finger stick and you will get the result during your clinic visit. The A1C gives estimated average blood glucoses for the last 3 months. You will learn more about this test at your first outpatient education visit.

When Should Blood Glucose Be Checked?

When you **first go home** from the hospital, you will need to check blood glucose often.

Each Day, Check Your Blood Glucose:

- When you first wake up
- Before each meal or snack containing carbohydrates
- Three hours after rapid acting insulin injection
- Before bed
- Midnight and 3:00 a.m.

Will I Always Have to Check Blood Glucose This Often?

No. Once insulin doses are adjusted correctly, you will check blood glucose less often.


Each Day, Check Your Blood Glucose:

- When you first wake up
- Before each meal or snack containing carbohydrates
- Before bed

Your educator will discuss other times you need to check your blood glucose such as:

- Before, during and/or after physical activity
- Feeling symptoms of a high or low blood glucose
- Illness
- Before driving

How to Check Your Blood Glucose

Step 1	Clean your hands with soap and water, when possible or use alcohol pads. Dry hands. Washing your hands is important because any trace of food on your fingers can affect your blood glucose reading.	
Step 2	Gather your supplies: <ul style="list-style-type: none">• Meter and test strip• Lancet device• Lancet Follow the instructions for your specific blood glucose meter.	
Step 3	Select the side or tip (not pad) of finger for your check.	
Step 4	Write your blood glucose in your log book.	

What Are Ketones?

Ketones occur when there is not enough insulin in the body. Without insulin the glucose cannot move from the blood into the cells to be used for energy. If this happens the body uses fat for energy instead of glucose. Ketones buildup in the blood when fat is used for energy instead of glucose. **Ketones** are acids that can build up and lead to diabetic ketoacidosis (DKA).

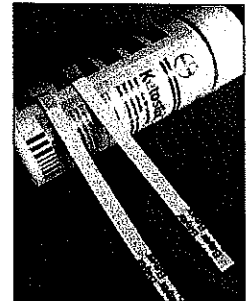
DKA is a medical emergency and is the main reason that children with diabetes are hospitalized.

When to Check for Ketones

Check for ketones when your blood glucose is above 240 mg/dL or when you are sick.

How to Check for Urine Ketones

1. Urinate on a ketone test strip or into a clean container and dip the stick into the urine.
2. Check the instructions in the container to see how long to wait until you can read the results.
3. Compare color result of ketone strip to the color chart that came with the test strips. The strip will turn pink or purple if there are ketones in your urine.
4. Always remember to follow the directions on the bottle or package to know how long to wait before reading the strip. Reading the test strip too soon or too late may give a false result.
5. Write results of ketone testing in a log book.



Store your urine test strips in a cool, clean, dry place and keep in original container. Make sure to keep lid on tight, because test strips are sensitive to light and moisture.

Note: The Precision Xtra blood glucose meter is also used for blood ketones testing. Ask your nurse educator about more information. Most insurance companies do not cover blood ketone test strips.

What Do the Results Mean?

If ketone results are negative, then the results are normal. Positive ketone results range from trace, small, moderate, to large, depending on the brand of ketone strips (Chemstrip or Ketostix).

What to Do for Positive Ketones

Positive ketones are a sign that you need more insulin. Call the Diabetes Center right away to speak with the nurse practitioner or the doctor on call (if calling after regular business hours or weekends) at (513) 636-2444. The provider will give you instructions for how much insulin to give for ketones if appropriate.

- Drink 8 ounces of water or carbohydrate-free, caffeine-free fluids every 30-60 minutes to flush the ketones out of the body.
- Continue to check for ketones until the blood glucose is less than 240 mg/dL, or the illness is over, and ketones checks have been negative two times in a row.

Your diabetes educator will review the guidelines for “Self Management of Ketones and Sick Days” with you at an appointment after you are discharged from the hospital.

Why Are Insulin Injections Needed?

As you learned in Chapter 1, insulin lowers blood glucose. Insulin therapy mimics what the body was doing naturally before the onset of diabetes.

- In type 1 diabetes, the body stops making insulin. You must take insulin by injections each day.
- In type 2 diabetes, the body still makes insulin, but it may not be enough or may not work right. You may need extra insulin by taking insulin injections.
- Insulin cannot be taken as a pill because the digestive stomach acids would destroy the insulin.

Insulin Therapy

Basal Bolus Insulin Injection Therapy is a common type of insulin therapy used at the Diabetes Center. This therapy requires taking two types of insulin.

1. **Basal insulin (long-acting)** is the insulin your body needs 24 hours a day regardless of food intake.
 - Usually taken once a day
 - Dose typically does not change from day to day
 - Background insulin that is not related to food intake
 - Lasts about 24 hours
2. **Bolus insulin (rapid-acting)** is the insulin you take when you eat and to lower a high blood glucose level.
 - Taken each time you eat carbohydrates
 - Dose amount changes based on blood glucose and carbohydrate intake
 - Extra insulin may be needed when ketones are present
 - Lasts about 3 hours

Guidelines for Using Insulin Glargine (Lantus®)

Description: Basal insulin. Available in 10 ml insulin vial, 3 ml prefilled insulin pen.

Appearance: Clear, looks like water

Action: (long-acting insulin)

- Starts to work in one hour after subcutaneous injection.
- Full effect is reached within 4 to 5 hours.
- Continues to work at a constant level for 18 to 26 hours.

Administration:

- Give injection into subcutaneous (fat) tissue once a day at the same time each day. Do not vary injection time by more than one hour.

Late Dose Instructions (1 to 4 hours late): Take usual dose amount, then move dose time back 1 hour each day until dose is back on schedule.

Missed Dose Instructions (more than 4 hours late): Test blood glucose and ketones and call the Diabetes Center for instructions!

- **DO NOT MIX** with any other insulin or solution.



Possible Side Effects:

- Hypoglycemia is the most common side effect.
- The insulin may cause mild to moderate discomfort at the injection site. Inject insulin slowly to minimize any discomfort.
- Redness or swelling at the injection site (tell your provider if this persists).

Storage (See package insert for specific storage guidelines):

- Unopened vials, 3 ml prefilled insulin pen, or insulin pen cartridge
 - Keep in refrigerator.
 - Insulin may be used until expiration date.
- Opened vials, 3 ml prefilled insulin pen, or insulin pen cartridge
 - Can be used for up to 28 days.
 - Store at room temperature below 86° F
 - Do not store insulin pen in refrigerator once in use.

Tips:

- Always put the date on your insulin vial/cartridges when you open them.
- If insulin freezes or gets above 86°F, throw it away and start with a new vial.
- Do not use if it looks cloudy.
- Do not use any insulin product after the expiration date stamped on the label.
- Never change insulin brands without first talking with your diabetes healthcare provider.
- See package insert for complete information on possible side effects and storage.

Guidelines for Using Rapid Acting Insulins: Insulin Lispro (Humalog®), Insulin Aspart (NovoLog®), or Insulin Glulisine (Apidra®)

Description:

- Bolus insulin for carbohydrates and / or correction of high blood glucose levels or ketones
- NovoLog®, Humalog®, or Apidra® insulins available in vials and insulin pens

Appearance: Clear, looks like water

Action: (Rapid-acting insulin)

- Starts to work rapidly—generally about 10 – 20 minutes after injection
- Peak action of insulin is 30 – 90 minutes after injection
- Duration of action 3 – 5 hours

Administration:

- Inject into subcutaneous (fat) tissue.
- Administer rapid-acting insulin and begin eating within 15 minutes. Waiting longer may result in low blood glucose.

Possible Side Effects:

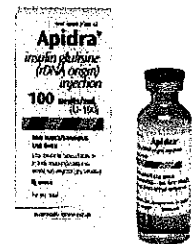
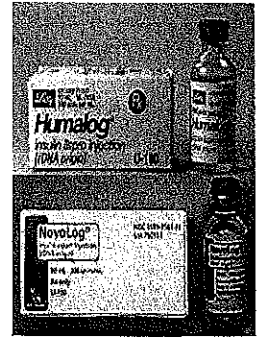
- Hypoglycemia is the most common side effect
- Redness, swelling or redness at the injection site (tell your provider if this persists)

Storage (See package insert for specific storage guidelines):

- Unopened vials, 3 ml pre-filled insulin pen, or insulin pen cartridge
 - Keep in refrigerator
 - Insulin may be used until expiration date.
- Opened vials, 3 ml pre-filled insulin pen, or insulin pen cartridge
 - Can be used for up to 28 days.
 - Store at room temperature below 86° F. Do not store insulin pen in refrigerator once in use.

Additional Information:

- Always date your insulin vial/cartridges when you open them.
- If insulin freezes or gets above 86°F, throw it away and start with a new vial.
- Do not use if cloudy.
- Do not use any insulin product after the expiration date stamped on the label.
- Never change insulin brands without first consulting with your diabetes healthcare provider.
- See package insert for complete information on possible side effects and storage.

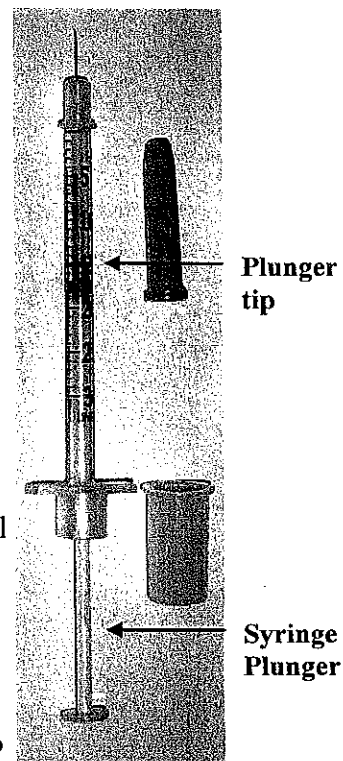


Drawing Up Insulin With an Insulin Syringe

You will need:

- Insulin Syringe
- Insulin
- Alcohol Pad

- Step 1:** Wash your hands with soap and water.
- Step 2:** Clean the rubber stopper on the insulin vial with an alcohol pad.
- Step 3:** Remove the orange cap from insulin syringe.
- Step 4:** Pull back syringe plunger until the top edge of the plunger tip lines up with the correct number of insulin units you will give. The lines on a syringe measure the insulin in units.
- Step 5:** Push needle through rubber stopper of insulin vial. Then push plunger down forcing air into the vial. Leave needle in vial.
- Step 6:** Turn vial and syringe upside down and hold together in one hand at eye level. Using the other hand pull plunger down to the unit line slightly beyond the dose of insulin you will give. This pulls insulin into syringe.
- Step 7:** Check syringe for air bubbles. Small air bubbles are not dangerous, but take up space preventing you from getting your full insulin dose. If any are present, push plunger all the way up pushing all the insulin back into the vial. Pull plunger back down pulling insulin to the correct amount of insulin in the syringe. This process may have to be repeated 2 or 3 times to remove all air bubbles.
- Your nurse or diabetes nurse educator can show you other ways to get air bubbles out of the syringe.
- Step 8:** Take needle out of vial. Now you are ready to give the insulin.



SAFETY TIPS:

- It is **important** that you give the right amount of insulin. If you take the wrong amount of insulin, your blood glucose could go **too high** or **too low**.
- Make sure you understand the markings on your syringes so you use the correct syringe for your dose.
- Insulin syringes come in three different sizes and each can hold a different amount of insulin.

3/10 ml insulin syringe:

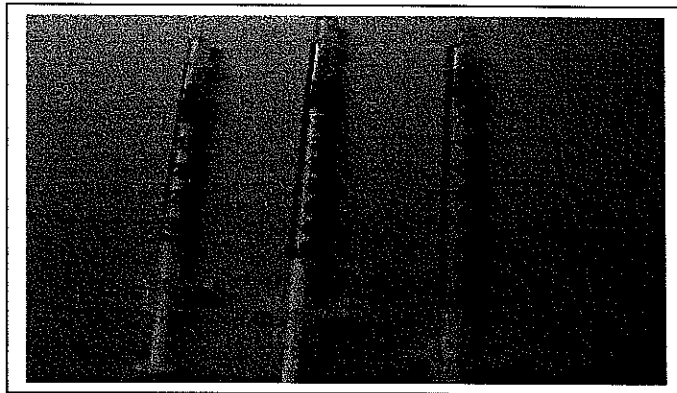
- Holds up to 30 units of insulin
- Available with whole unit lines or with both whole and half unit lines on the syringe

1/2 ml insulin syringe:

- Holds up to 50 units of insulin
- Each line equals 1 unit of insulin

1 ml insulin syringe:

- Holds up to 100 units of insulin
- Each line equals 2 units of insulin



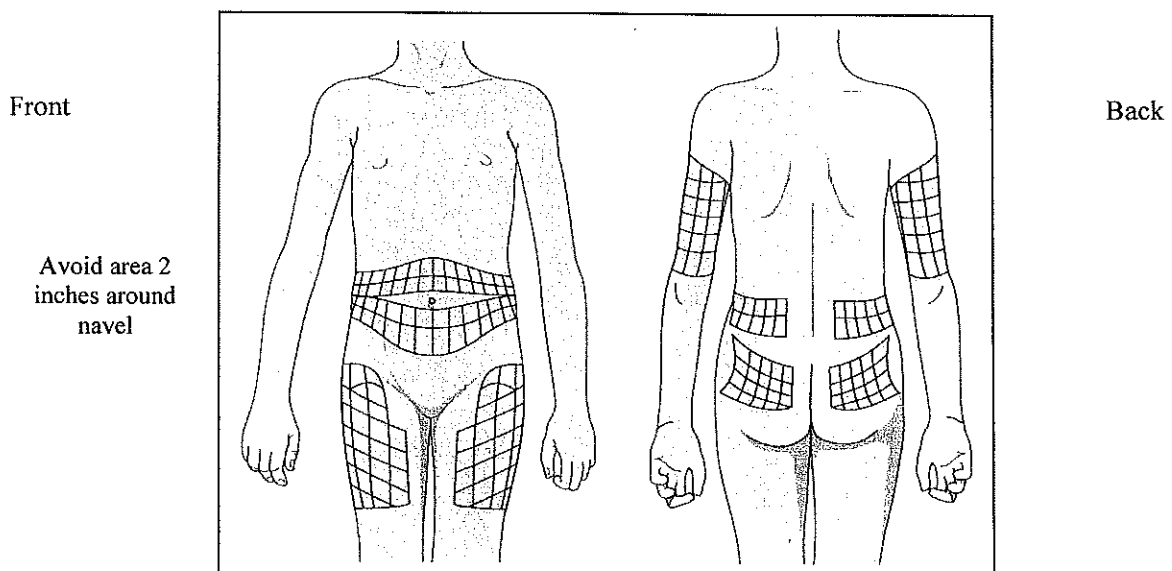
3/10 ml 1/2 ml 1 ml
insulin syringes

Giving the Injection With an Insulin Syringe

- Step 1:** Clean injection area. Pinch up skin using thumb and finger. This pulls the fatty tissue away from the muscle allowing you to inject insulin into the fat.
Insulin injected into a muscle works faster and may cause a low blood glucose.
- Step 2:** Holding syringe like a dart, quickly PUSH needle all the way into pinched-up area. The usual injection angle is about 45 degrees.
- Step 3:** Push plunger all the way in to inject insulin beneath pinched-up skin. Count to 3, let go of the pinched skin and remove needle.
- Step 4:** If slight bleeding or stinging occurs, you may apply gentle pressure over the area for a few seconds. **DO NOT RUB** injection area (this may cause insulin to be absorbed too quickly).

Sites for Insulin Injections

- The pictures below show the different areas you can use for your injections.
- You can inject insulin in the fatty areas of your arms, thighs, stomach (abdomen), and buttocks area (see picture below). Insulin works fastest when injected in the abdomen.
- It is important to include all of the above areas and rotate within each area. If you are rotating within one area, give injections at least 1/2 – 1 inch apart. Avoid 2 inches from navel.
- Injecting in the same area may cause build up of fatty tissue under the skin. Insulin injected into such an area will not be absorbed properly and will cause problems with blood glucose control.
- Your nurse educator can help you plan a pattern for injection rotation.



Giving the Injection With an Insulin Pen

An insulin pen is a device that allows you to give insulin. There are two types of insulin pens:

- Pre-filled disposable pen comes with insulin in the device
- Reusable insulin pen devices need an insulin cartridge

Your diabetes medical provider and nurse educator will let you know if your child is able to use an insulin pen.

You will need:

- Insulin pen
- Insulin cartridge if using reusable pen device
- Insulin pen needles
- Alcohol Pad

Each insulin pen device works slightly differently, so follow the pen manufacturer's instructions for use.



Steps for Giving Insulin With an Insulin Pen

Step 1: Clean the rubber stopper on the end of the insulin pen with an alcohol pad.

Step 2: Remove protective tab from pen needle.

Step 3: Press needle onto the end of the pen and twist to the right until it is tight.

Step 4: Prime the pen needle by dialing the pen to 2 units, holding the pen with the needle upright and flicking the cartridge firmly with finger, and pushing the button all the way.

- You **should see insulin come out the top of the needle**. If not, repeat previous step until a drop appears.
- Priming will ensure you get your full dose of insulin and that the pen is working.

Step 5: Dial your correct dose of insulin.

Step 6: Clean injection area with an alcohol pad and pinch up skin using finger and thumb.

Step 7: Inject the needle straight into the skin and push the button with your thumb.

- Make sure that all of the insulin was injected. Count for 10 seconds before removing needle from skin.
- If slight bleeding or stinging occurs, you may apply slight pressure. **DO NOT RUB** injection area as this may cause insulin to be absorbed too quickly.

What Is Hypoglycemia?

Hypoglycemia is another word for low blood glucose. Hypoglycemia occurs when the blood glucose drops below:

- For ages 5 and under during the day: less than 80 mg/dL
- For ages 6 and older during the day: less than 70 mg/dL
- For all ages at bedtime or overnight: less than 100* mg/dL

*Your provider may change this at future clinic visits.

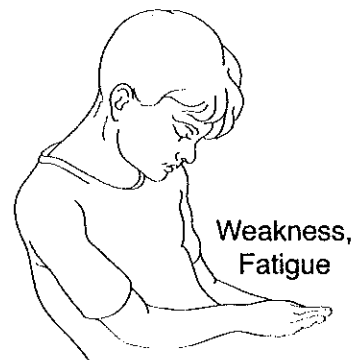
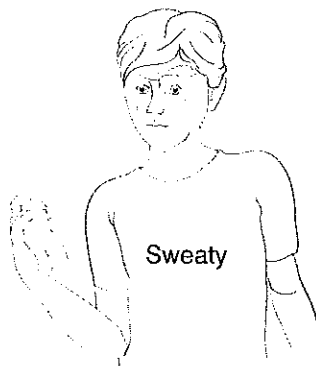
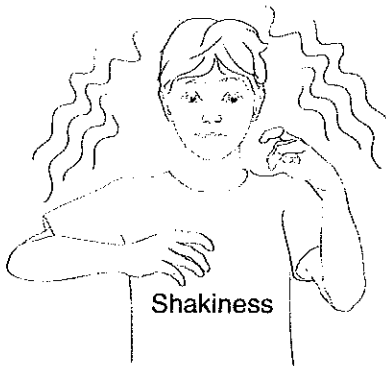
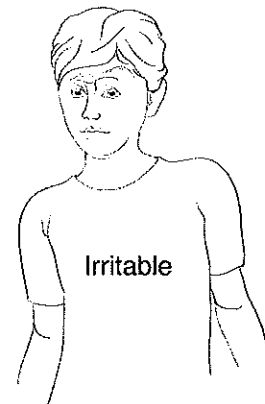
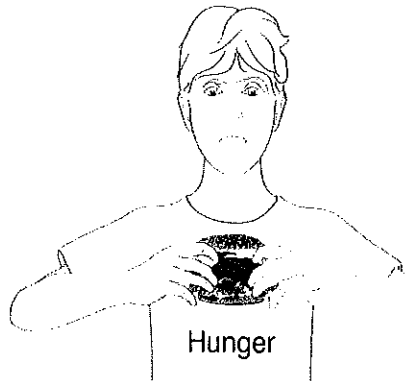
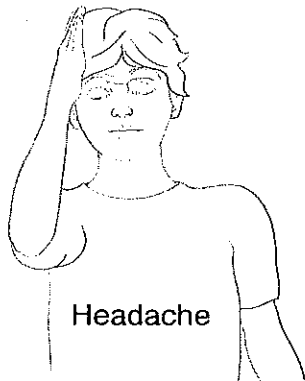
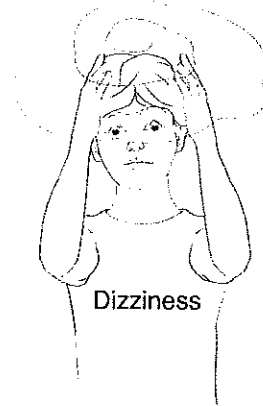
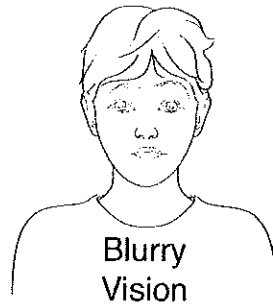
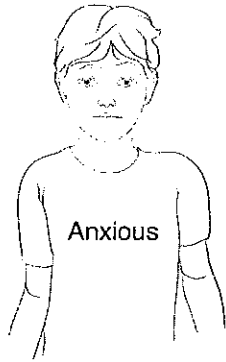
What Can Cause Hypoglycemia?

- Not enough food
- Too much insulin
- Increased physical activity without taking extra carbohydrate
- Waiting more than 10-15 minutes to eat after taking bolus insulin dose

What Are Signs and Symptoms of Hypoglycemia?

- Shakiness
- Hunger
- Pale skin color
- Dizziness
- Sweating
- Sleepiness
- Headache
- Trouble focusing
- Confusion
- Slurred speech
- Irritability
- Seizures

Signs and Symptoms for Hypoglycemia



Treatments for Mild to Moderate Hypoglycemia

You need to treat hypoglycemia right away! If hypoglycemia goes untreated it may cause you to have a seizure or lose consciousness (pass out).

- If you are alert and able to swallow:
 - Eat or drink 15 grams of fast acting carbohydrates
 - Retest blood glucose in 15 minutes
- Examples of 15 grams of fast-acting carbohydrates:
 - ½ cup of juice or regular soda
 - 1 fun- pack of Skittles® or Air Heads®
 - 3-4 glucose tablets
- If blood glucose is still low, repeat treatment with 15 grams of fast- acting carbohydrate and retest in 15 minutes. If blood glucose is still low after 2 treatments, repeat treatment, and call the Diabetes Center at (513) 636-2444, option 3, and then 9.

My treatment care plan for treating a low is _____.

Treatment for Severe Hypoglycemia

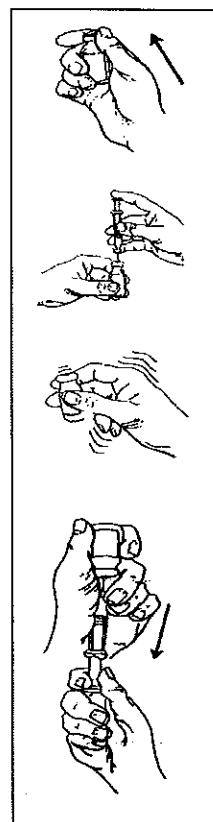
Severe hypoglycemia is a medical emergency and requires immediate attention. It is important that caregivers be trained on how to give glucagon (medication by injection) that raises blood glucose.

- If unconscious, having a seizure, or unable to safely swallow, do not try to give fast acting carbohydrate. The person may choke and/or food and liquid may go into the lungs.
- Treatment for severe hypoglycemia is glucagon by injection. If you are unable to treat with glucagon, call 911 immediately.
- Glucagon will raise blood glucose by causing the release of stored glucose from the liver and muscles.
- Glucagon comes in an emergency kit with a syringe filled with clear liquid and a vial of powdered glucagon.

Using Your Glucagon for Severe Hypoglycemia

Mixing and Drawing Up Glucagon

1. Remove the flip-off seal from the bottle of glucagon.
2. Remove the needle protector from the syringe, and inject the entire contents of the syringe into the bottle of glucagon.
3. Remove the syringe and shake bottle gently until liquid is clear. This cannot be mixed ahead of time.
4. Using the same syringe, draw the glucagon into the syringe to the dose prescribed by your diabetes provider.



Giving the Glucagon Shot

1. Insert the needle into your child's thigh and inject the entire contents of the syringe. Withdraw the needle from the skin. **Turn your child onto his or her side, in case of nausea and vomiting.**
2. **Call 911.**
3. When the child wakes up and can swallow, urge the child to take small sips of a carbohydrate-containing fluid (fruit juice or regular pop). If tolerated, follow with 15 grams of a carbohydrate and a fat-containing food (such as cheese and crackers).
4. Let your diabetes health care provider know that your child had a severe low blood glucose before the next insulin dose at (513) 636-2444, option 3, and then 9.

What Are Carbohydrates?

Carbohydrates are one of three main nutrients found in food that provide energy to the body. The other two nutrients are fat and protein. The body can use each of these for energy but prefers to use carbohydrates. The two most common types of carbohydrate are starch and sugar. About half of our daily calorie intake comes from carbohydrate foods.

How Do Carbohydrates Affect Blood Glucose Level?

During digestion the body breaks down carbohydrates into glucose. This glucose enters the bloodstream causing a rise in blood glucose. Insulin and glucose travel in the bloodstream to the cells. Insulin acts as a key to open the cell door. This allows the blood glucose to go into the cell and be used for energy.

Some people think that if you have diabetes you should avoid carbohydrate foods. This is not true. Carbohydrate foods are important sources of energy, fiber, vitamins, and minerals and are needed for a well-balanced diet.

A person with diabetes who is taking insulin uses carbohydrate counting and a carbohydrate ratio to determine how much insulin to take when eating carbohydrate foods.

What Types of Foods Contain Carbohydrate?

- Grains such as breads, rice, pasta, cereals, crackers, pancakes and tortillas
- Starchy veggies such as corn, potatoes, peas, dried beans and legumes
- Fruits and fruit juices
- Milk and yogurt
- Foods with added sugar such as cakes, cookies, pies, candy, ice cream, and sugar sweetened beverages



Carbohydrate Counting

In order to count carbohydrates, you must find the grams of carbohydrate in each food. This is done each time you eat. Many resources are available to help you find the carbohydrate grams in foods such as food labels, books, and websites. You will learn how to calculate the insulin dose for the carbohydrate foods you eat in chapter 8.

Mini Pretzels

Nutrition Facts	
Serving Size 1oz (28g/About 18 pretzels)	
Servings Per Container 16	
Amount Per Serving	
Calories 110	Calories from Fat 5
% Daily Value*	
Total Fat 1g	1%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 390 mg	16%
Total Carbohydrate 22g	8%
Dietary Fiber 1g	6%
Sugars 1g	
Protein 3g	
Vitamin A 0%	Vitamin C 0%
Calcium 0%	Iron 6%
Thiamin 15%	Niacin 10%
Folic Acid 10%	Riboflavin 8%
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.	

Serving Size: The serving size is found at the top of the food label. The calorie and nutrient amounts listed are based on the serving size. If you choose to eat a larger serving, the calorie and nutrient amounts will increase.

Note: 28g is the weight in grams for 18 pretzels if you weigh them on a food on a scale. It is NOT the grams of carbohydrate.

Servings Per Container: This number is found below the serving size and states how many servings are in the entire package. If you poured out the bag and divided it into servings you would have 16 piles of pretzels with 18 pretzels in each pile.

Total Carbohydrates: This gives the total number of carbohydrates in the serving size. Always look at "total carbohydrate" when counting carbohydrates. If your child eats 2 servings, multiply the Total Carbohydrates by 2.

Terms such as "sugar free", "no sugar added", or "net carbs" on the front of food packages may be misleading. **Always refer to the total carbohydrates from the Nutrition Facts label!**

Foods With Low or No Carbohydrate

Foods with low carbohydrate amounts may or may not require insulin depending on your carbohydrate ratio. Always do the calculation to be sure.

Low Carbohydrate Foods

(These foods may have up to 5 grams of carbohydrate per serving. Always check serving size and total carbohydrate grams.)

Vegetables

Broccoli
Cauliflower
Cucumber
Green, yellow and red pepper slices
Tossed Salad
Celery Sticks
Pea Pods
Tomato slices
Olives
Dill Pickles

Nuts & Seeds

Peanuts
Pistachio nuts
Soybean nuts
Sunflower seeds
Pumpkin seeds

Other

Ranch dressing
Sour cream
Cottage Cheese

No Carbohydrate Foods

(These foods typically have 0 to 1 gram of carbohydrate per serving.)

Cheese

String cheese
Cheese cubes**
Sliced Cheese

Eggs

Hard boiled egg
Deviled egg
Omelet with salsa
Scrambled eggs
Egg salad

Sweet Treats

Sugar-free jello*
Sugar-free popsicles*

Meats

Roasted Chicken Wings
Turkey luncheon meat
Chicken Salad
Tuna Salad
Beef Jerky
Hot dogs**
Pepperoni**
Salami Slices**
Bologna**

Drinks

Diet soda
Sugar-free Kool-Aid
Crystal Light
Coke Zero
Sprite Zero
Water

* Sugar-free does not always mean carbohydrate-free

**Indicates a high fat/high calorie food. Avoid eating these foods on a daily basis.

Importance of Physical Activity

Physical activity should be a normal part of life for everyone and is an important aspect of being healthy.

There are many benefits of physical activity, including:

- Better blood glucose control
- Better insulin sensitivity
- Better blood pressure
- Better cholesterol levels
- Weight control
- Overall improved fitness and sense of well-being

For children, exercise may include activities such as play, recess, dancing, bike riding or sports. The Center for Disease Control's (CDC) Division of Nutrition, Physical Activity and Obesity recommend children and adolescents do 60 minutes or more of physical activity daily.



Children with diabetes are able to participate in any type of activity by following the guidelines in this chapter.

Does Activity Affect Blood Glucose?

During physical activity the body is more sensitive to insulin. This means the body doesn't need as much insulin during activity. Insulin cannot be decreased once it is given. As a result, hypoglycemia can occur during or after physical activity.



You may need to eat carbohydrates before and/or during activity to prevent hypoglycemia.

- Fast-acting carbohydrates are best to use because they digest and get into the blood quickly.
- You may need to eat fast-acting carbohydrates every 30 minutes without insulin.
- Fast-acting carbohydrates are foods that contain mostly sugar with little or no protein, fat, or fiber. **Examples include:** fruit, fruit juice, sports drinks or certain types of candy.

Both the blood glucose level before activity and the intensity level of the activity will help you decide how many grams of fast-acting carbohydrates to eat. Follow the activity table on next page to help you decide the correct amount of carbohydrates to eat.

Blood glucose testing should be done:

- Before
- Every hour during
- 1-2 hours after vigorous or prolonged exercise.

Physical Activity Table

To use the physical activity table below first decide on the type of activity and/or level of intensity. Next, test the blood glucose before beginning the activity. Find the amount of fast acting carbohydrates to take for that activity. Remember the carbohydrate grams are for every 30 minutes of activity and they do not require insulin.

Type of Activity	Test Blood Glucose	Amount of Fast-Acting Carbohydrates for Every 30 Minutes of Activity
Low / Light Slower walk (During activity can easily talk or sing)	80-100 mg/dL	5-10 grams
	100-300 mg/dL	None
Moderate Faster walk (During activity can talk in short phrases)	80-100 mg/dL	10-15 grams
	100-180 mg/dL	5-10 grams
	180-300 mg/dL	None
Vigorous/Strenuous Running (During activity can have difficulty talking easily)	80-100 mg/dL	15-25 grams
	100-180 mg/dL	15-25 grams
	180-300 mg/dL	5-10 grams

Exercise can continue to lower the blood glucose after the activity is over. Therefore a correction bolus for high blood glucose should not be given within 1 hour of vigorous or prolonged activity.

Because the drop in blood glucose may be delayed as much as 12-24 hours, test again during the night at 2:00 or 3:00 a.m.

Everyone is different and each type of activity can affect blood glucose differently. Recording all blood glucose levels in the log book will give much information on how the body reacts to different types of exercise. This information will help you make decisions about how many carbohydrates are needed for different types of activity.

Hyperglycemia and Physical Activity

NEVER exercise if ketones are positive. Remember to check for ketones when blood glucose is over 240 mg/dL.

- Follow the *Self-Management of Ketones and Sick Days* guidelines or call the Diabetes Center for assistance.

If blood glucose is over 300 mg/dL and ketones are negative, use caution. Recheck blood glucose and ketones in 30 minutes.

- If blood glucose has increased and/or ketones have developed, your body does not have enough insulin.
- STOP EXERCISING and follow the *Self-Management of Ketones and Sick Days* guidelines or call the Diabetes Center for assistance.

Other Safety Precautions

- Always have a diabetes medical ID (necklace, bracelet or shoe tag) clearly visible during physical activity.
- During physical activity it is important that someone be present who knows you have diabetes and how to help if needed.
- Drink extra water during and after exercise. Remember that sports drinks can provide both fluids and carbohydrates.
- To treat a low blood glucose, keep fast-acting carbohydrates handy such as juice, sports drinks, lifesavers or candy.
- Do not exercise if your blood glucose is low before or during exercise. Always treat low blood glucose with fast-acting carbohydrates and retest in 15 minutes. Once your blood glucose is above 80 mg/dL, then follow the activity table for fast acting carbohydrates before resuming activity.