

Taking Control: Managing the Highs and Lows



**Nicklaus
Children's
Hospital**



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Taking Control: All About the Highs and Lows

Table of Contents

Meet the Diabetes Team	2
What is Diabetes?	4
a. Types of diabetes	
Blood Glucose Monitoring	6
Insulin	8
a. Different types of insulin	
b. Insulin delivery	
c. Insulin pens	
d. Insulin pumps	
e. Administration sites	
f. How to administer an injection	
g. Proper needle disposal	
Hyperglycemia (High Blood Sugar)	14
a. Causes	
b. Symptoms	
c. Treatment	
Urine Ketone Testing	15
Hypoglycemia (Low Blood Sugar)	16
a. Causes	
b. Symptoms	
c. Treatment	
Diabetic Emergencies	18
a. Severe hypoglycemia	
b. Glucagon	
c. Diabetic ketoacidosis	
Sick Days	21
School Days	22
Exercise	22
Diabetic Technology	23
Nutrition	24
a. Carbohydrates	
b. How to carbohydrate count	
c. "Free" foods	
d. How to read a nutrition label	
Discharge Information	28
Resources and Support Services	30
Scenarios	31



Meet the Diabetes Team

Welcome to the diabetes program. We understand this may be a very overwhelming time for you. Our job over the next couple of days is to try and ease some of the feelings you are experiencing. You and your child will meet with several people during your stay. Each of us will provide you and your family with the information you need to feel comfortable at home.

Doctor/Endocrinologist An endocrinologist is a doctor that specializes in diabetes management. He/she will be stopping by at least once a day to see how you are doing and adjust the child's insulin dosages based on his/her blood glucose (also known as blood sugar level). After discharge, you and your child will need to follow up regularly with the endocrinologist.

Nurse Practitioner A nurse practitioner is a nurse who has completed advanced practice training. He/she works closely with the endocrinologist to monitor progress. A nurse practitioner can also adjust insulin doses, refill prescriptions, and provide diabetes education. You may see the nurse practitioner during follow up visits once you go home.

Diabetes Educator The diabetes educator will teach you how to care for your child's diabetes at home. He/she will teach you how to check blood sugar levels, give insulin injections, and tell you what to do in the event of high/low blood sugars. Once you go home, the education will continue at your follow up endocrinology visits.

Nurse The nurse will provide basic care needs. He/she also helps reinforce the education provided by the diabetes educator. Many times, it is the nurse who provides support during your first blood glucose check and insulin injection.

Dietitian The dietitian will talk to you about your child's eating habits. He/she can advise on what to eat and what not to eat in order to help keep the blood sugar under control.

Social Worker The social worker will help you and your child cope with the new diagnosis, work to ensure medications and supplies are delivered before discharge, provide you with information about community resources, and assist with any needs to support you and your child.

Child Life Specialist The child life specialist will help your child learn about his/her new diagnosis using age-appropriate techniques. This will assist with the challenges that are faced during hospitalization.

Psychology Services Psychological services provides an additional support for you and your child. This service allows you and the child to talk about any feelings or emotions being experienced as well as provide techniques or suggestions on ways to cope.

My Team Members are:

Endocrinologist: _____

Phone: _____

Fax: _____

Nurse Practitioner: _____

Phone: _____

Email: _____

Diabetes Nurse Educator: _____

Phone: _____

Email: _____

Dietitian: _____

Phone: _____

Email: _____

Social Worker: _____

Phone: _____

Email: _____

Child Life Specialist: _____

Phone: _____

Psychologist: _____

Phone: _____

What is Diabetes

Diabetes mellitus is a group of disorders affecting the management of blood glucose (sugar) levels in the blood.

Glucose comes from the food you eat and provides the cells with energy. After the glucose enters the bloodstream, insulin (a hormone produced by the pancreas) helps glucose move into cells.

The cells need glucose in order to produce energy. People with diabetes have problems getting glucose in their cells for various reasons.

When this happens, the body is starved of energy. Over time, high levels of glucose in the blood can hurt the eyes, kidneys, nerves and/or heart. There are different types of diabetes. We will be discussing the most common, type 1 and type 2, in this book.

Type 1 Diabetes

Type 1 diabetes is usually diagnosed early in life; during childhood or as a young adult. It is also known as juvenile diabetes. In type 1, the body does not produce enough insulin.

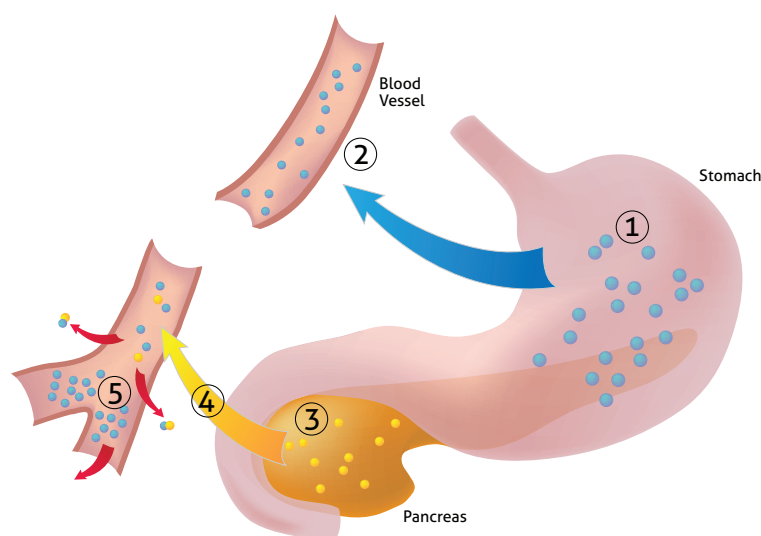
Causes:

Diabetes is believed to be caused by three things:

- Genetics: over 50 percent of diagnosed kids have inherited the gene combination DR3/DR4 from their parents
- Autoimmune response: the body begins to attack its own parts because the body does not think these parts belong inside the body. With type 1 diabetes, the body attacks the islet cells in the pancreas where insulin is made. The damaged islet cells then cause the immune system to develop something called antibodies.
- Virus, chemical, or environment: our genetic make-up determines if a body will allow a virus, chemical, or substance in the environment to get into the islet cells and cause damage.

Treatment:

Proper management includes balancing insulin, food, and exercise to control blood glucose levels.



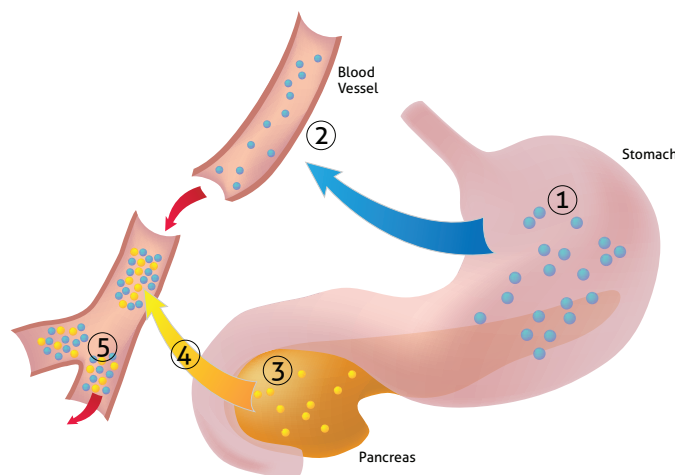
1. The stomach converts food into glucose.
2. Glucose enters the bloodstream.
3. The pancreas makes little or no insulin.
4. Little or no insulin enters the bloodstream.
5. Glucose builds up in the bloodstream.

Type 2 Diabetes

Type 2 is the most common type of diabetes. It is often associated with being overweight. Type 2 occurs when the body doesn't produce enough insulin or the cells do not respond well to the insulin (insulin resistance).

At first, the pancreas will make extra insulin to make up for the cells' resistance; however with time, the pancreas can no longer keep up. People with type 2 diabetes may have normal or high insulin levels.

Type 2 diabetes most commonly occurs after the age of 40, but is now also being seen in overweight children and teenagers.



Causes:

- Genetics: There is a greater chance of developing type 2 diabetes if your parents have it. The genetic mutation that causes it is still unknown.
- Lifestyle Choices: Lack of exercise, unhealthy meal choices, and/or overweight/obesity

1. The stomach converts food into glucose.
2. Glucose enters the bloodstream.
3. The pancreas makes insulin.
4. Insulin enters the bloodstream.
5. Glucose cannot get into the cells of the body. Glucose builds up in the blood.

Treatment:

- Lifestyle changes: diet and exercise
- Medications: Metformin, GLP-1 agonist
- Insulin injections (only when other medications do not work)

Recommendation 60 mins daily

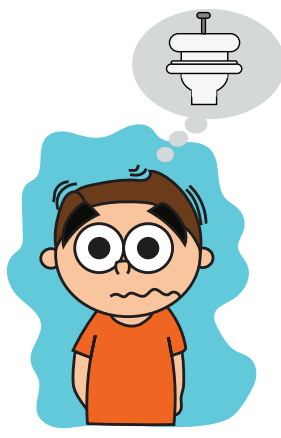
HEALTHY TIP:

60 minutes of exercise daily is recommended for everyone.

Most commonly seen symptoms include:



Very thirsty



Needing to pass urine more often than usual



Very hungry

Blood Glucose Monitoring

The glucose (sugar) in the child’s blood must be checked at certain times. The blood sugar is checked by performing a finger stick using the blood glucose monitor. The child’s blood sugar will need to be checked every day right before each meal and at bedtime.

It is important to check blood glucose before bedtime because this is the longest period in the day the child will go without eating. Checking the blood sugar at bedtime will help determine if a snack is needed before going to sleep in order to avoid a drop in blood sugar during the night.

Blood sugars should also be checked if the child feels or looks sick. It is also important to check blood sugars before the child exercises or participates in sports.

What is too high and what is too low?

A safe blood glucose level depends on many factors; the doctor will help determine a safe range for the child. “Target blood sugar” is a range for the child’s recommended blood sugar level. According to the International Society for Pediatric and Adolescent Diabetes (ISPAD) guidelines, the recommended pre-meal blood glucose range is 70–144 mg/dL.

Toddlers and Preschoolers (0-4) years	70 - 144 mg/dl
School age (5-12 years)	70 - 144 mg/dl
Adolescents and young adults (13-19 years)	70 - 144 mg/dl

These are initial guidelines but may change based on the individual patient response or as necessary by the doctor at follow-up appointments.

Do I have to keep track of blood sugars?

Logging the blood sugar levels regularly in a log book will help the endocrinologist determine if the insulin dose is appropriate. Logging blood sugar levels will help identify patterns.

The goal is for people with diabetes to learn how to manage their condition over time.

TIP: The blood sugar should be checked right before starting to eat. If more than one hour passes since the blood sugar was checked and he/she has not started to eat, the blood sugar level should be checked again before eating. This is important because the blood sugar level could have changed as well as the amount of insulin needed.

What is a Hemoglobin A1c (HbA1c)?

Hemoglobin A1c is a blood test that tells us the average blood sugar levels over the last three months. According to the American Diabetes Association, for children under 18 years old, the American Diabetes Association recommends an A1c goal of less than 7% and some in cases less than 6.5%. Your doctor will order this test periodically to monitor the blood sugars over time.

ADA* HgbA1C Conversion Table and Blood Sugar Levels

Hemoglobin A1C	Average Blood Sugar
6%	125 mg/dl
7%	154 mg/dl
8%	183 mg/dl
9%	212 mg/dl
10%	240 mg/dl
11%	269 mg/dl
12%	298 mg/dl

*Retrieved from ADA - A1c and eAG.
Last reviewed 2026

How do I Check the Blood Sugar?

1



Wash your hands and the child's hands.

2



Gather supplies.

3



Open test strip and insert into glucose monitoring device.

4



If the child is able, allow him or her to choose a finger to stick. Clean the finger with alcohol and allow to air dry completely.

5



Press lancet on side of finger and press button to lunge needle. TIP: The side of finger has less nerve endings which means it is less painful.

6



Squeeze finger for a drop of blood and wipe it away.

7



Squeeze finger and apply second drop to test strip.

8



Record result in log book.

9



Discard test strip and needle.

*** It is important to note that there are many different glucose monitors and lancets, they may work slightly differently. Be sure to read the instruction manual that came with your devices for exact instructions.

Insulin

The child now has to use insulin. Common questions include: What is insulin? Why is the child using insulin? How do you use insulin?

Insulin is a hormone made in the pancreas by the beta cells of the Islet of Langerhans. The pancreas is an organ found behind the stomach. Insulin is necessary for the body. Insulin is in charge of taking the sugar we get from food to the cells. Then the cells use the sugar to nourish the body and produce energy. When there is not enough insulin made by the body, a person with type 1 diabetes needs insulin injections.

Injections are given because stomach acid would destroy the insulin if it were given by mouth.

There are five types of insulin. The doctor will determine which type(s) would work best for the child. The four types of insulin are rapid-acting, short-acting, intermediate-acting and long-acting insulin.

- The rapid-acting insulins are Humalog®, Novolog®, and Apidra®. This type of insulin is clear in color.
- The intermediate insulin is known as NPH, Humulin® N, or Novolin® N. This type of insulin is cloudy in appearance.
- The ultra-rapid-acting insulins are Fiasp® and Lyumjev®. This type of insulin is fast acting insulin designed to work even faster than traditional rapid acting insulins.
- The ultra-long-acting insulin is Tresiba ®. This type of insulin lasts for forty-two hours and should not be mixed with any other insulin in the same syringe.
- The long-acting insulin are Lantus® and Levemir®. This type of insulin lasts for forty-two hours and should not be mixed with any other insulin in the same syringe.

How are the five types of insulin different?

All insulins are grouped according to the following:

- Onset of action (when the insulin starts to work)
- Peak (when the insulin works the best)
- Duration (how long the insulin works for)

See table 1-1 for a comparison of the different insulins

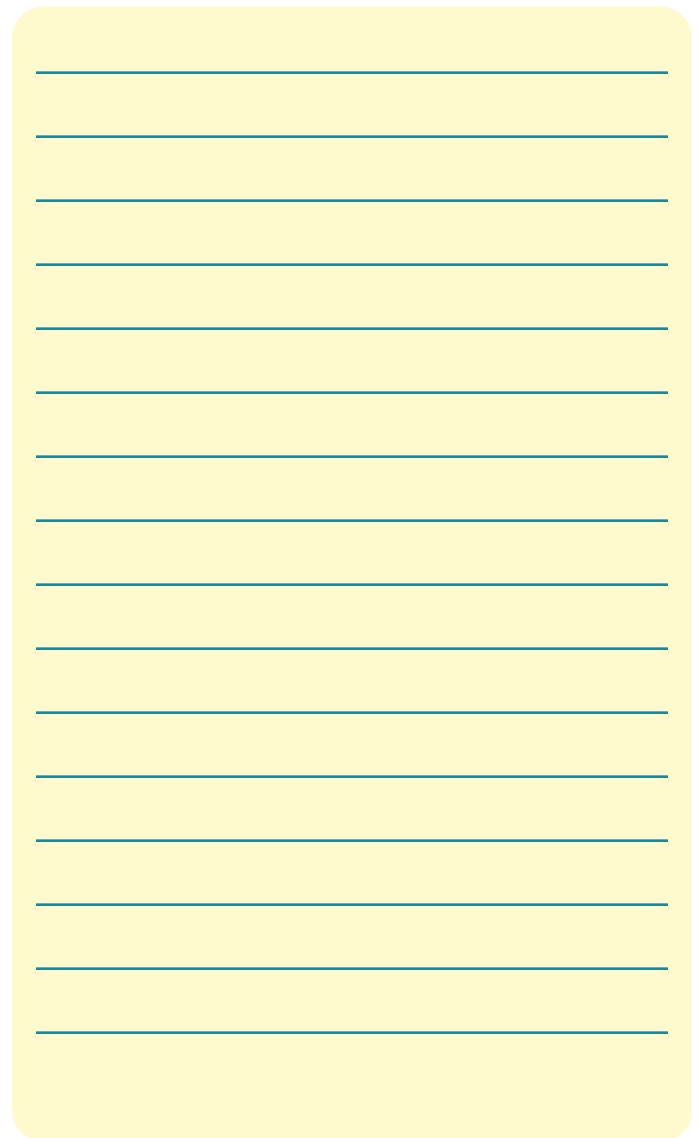


Table 1-1

Types of Insulin	Brand Name	Onset	Peak	Duration
Rapid-Acting	Humalog®, Novolog®, Apidra®	5-10 minutes after injection	1-2 hours after injection	4-6 hours
Ultra Rapid Acting	Fiasp® and Lyumjev®	1-5 minutes after injection	30-50 mins after injection	3-4 hours
Intermediate	NPH	1-2 hours after injection	4-6 hours after injection	12-18 hours
Long-Acting	Lantus® Levemir®	2 hours after injection	No peak	24 hours
Ultra Long Acting	Tresiba®	30-90 minutes after injection	No peak	42 hours

How often do I need to use insulin?

Basal/bolus therapy is the most common insulin therapy used today. This therapy works the way the pancreas used to work before diabetes. It involves using a long-acting insulin (basal) once a day, and a rapid-acting insulin (bolus) several times a day with meals and snacks.

This type of treatment:

- Allows for a more flexible schedule
- Works with carbohydrate counting
- Requires 4-6 injections a day

Insulin Delivery

The idea of giving an injection can feel overwhelming at first, but with time and practice, giving insulin becomes easier. Insulin can be delivered in several ways,

including using a syringe and vial, an insulin pen, or an insulin pump, allowing families to choose the method that works best for them.

TIP: Check for air bubbles in the syringe before injecting. Air bubbles mean you will give less insulin than needed. If you have air bubbles, push insulin back into vial and repeat step 5.

A syringe and vial



1. Wash your hands.



2. Wipe the top of insulin vial with alcohol.



3. Pull the plunger to the amount of insulin needed.



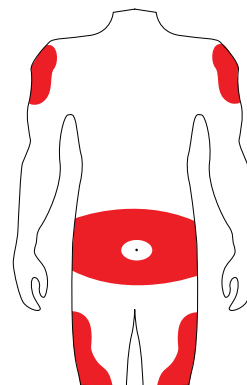
4. Inject the air into the insulin vial.



5. Turn insulin vial upside down and pull plunger to the amount of insulin needed.

Suggested Administration Sites

Insulin works the fastest when the injections are given in the stomach (an inch or more away from the belly button). Some suggested sites for insulin injections are the back of the upper arms, the thighs, and the abdomen. It is important to remember to always rotate the site. If injections are continuously given at the same site, the area will harden and will not absorb the insulin.



Injecting Insulin Using a Syringe



1. Choose site and wipe area with alcohol.



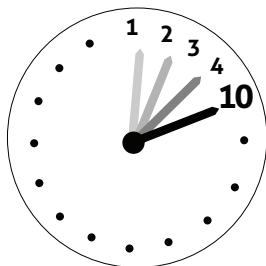
2. Once alcohol completely dries, pinch skin using fingers and hold it.



3. Insert needle completely into skin.



4. Push plunger down to give the insulin.



5. Once all medication has gone in, count to 10 second hold.



6. Release skin and pull needle out of skin.



7. Dispose of needle into appropriate container.

Insulin pens are increasingly becoming more popular, and more insurance companies are covering the cost. Insulin pens are available as both reusable or disposable. Reusable insulin pens contain a cartridge of insulin that is inserted into the pen. Disposable pens come prefilled with insulin. When using pens, the insulin dose is dialed on the pen and the insulin is injected through one small pen needle. Before injecting insulin, pen needles must be primed.



Steps to Prime Insulin Pens:

1. Wash your hands.
2. Remove the pen cap and clean the rubber stopper with alcohol.
3. Place the pen needle on the rubber stopper using pressure and twist until secure.
4. If the pen is brand new, dial to number 5 and hold the pen up vertically with the needle facing up. Push the injection button until you see insulin coming out of the needle and the dial marks 0. If you do not see any insulin come out, repeat this step.
5. If the pen is not new, follow steps 1-4 but set the dial at 2.

REMEMBER:

- **First use:**
Prime with 5 units
- **Every use thereafter:**
Prime with 2 units

Injecting Insulin Using an Insulin Pen



1. Remove pen cap and clean rubber stopper with alcohol.



2. Put on pen needle.



3. Dial to appropriate amount needed to prime needle and push injection button until dial marks 0.



4. Dial amount of insulin needed.



5. Choose injection site and cleanse with alcohol.



6. Insert needle into skin completely and push injection button until dial reaches 0 and count to 10 seconds before removing.



7. Remove pen needle and dispose. The pen needle needs to be changed with every use.

HOW TO SAFELY DISPOSE OF NEEDLES



Pen needles and syringes should be disposed of in a hard plastic container such as a "sharps container," which you can get at a local pharmacy or a colored laundry detergent bottle. For detergent bottle use, follow the steps listed below:

- Write in large letters "medical waste" on the container and keep it in a safe place out of children's reach with the top on at all times
- When the container is half to three-fourths full, put duct tape around the top to further secure it
- Contact the local city waste management and ask if there are any special guidelines to follow. If there are no guidelines, you may place the sealed and labeled container inside the regular trash

BEDTIME BLOOD SUGAR CHECKS



Bedtime blood sugar levels need different care than the blood sugar levels of the child during the day. This is because the child will be going to sleep and this is the longest time period the child will go without eating. It is very important to prevent the blood sugar from dropping during the night.

It is also important to understand that the “bedtime blood sugar” should be taken a minimum of 3 hours after the last rapid acting insulin dose was given with dinner and is not related to whether the child is going to sleep or not. If the bedtime blood sugar is taken before a minimum of 3 hours have passed since the rapid acting insulin dose was given with dinner, it will lead to an inaccurate reading. An inaccurate reading can result in giving too much insulin at bedtime or too little if it is needed. Below

you will find a table showing target blood sugars for bedtime. The table shows what blood sugars are too low and need a snack, and which blood sugars are too high and need insulin according to the child’s age. Any snack given according to the table below, does not require insulin unless more carbohydrates than what was recommended was consumed.

Age	Target Bedtime Blood Sugar	Too Low	Too High
Toddlers and Preschoolers (0-4 years)	100– 150 mg/dl	If less than 100mg/dl give 6-8 g of a complex carbohydrate snack (carbohydrate and protein) with no insulin coverage	Only if more than 200mg/dl give insulin looking at your sliding scale and subtracting 1 unit
School age (5-12 years)	100 – 150 mg/dl	If less than 100 mg/dl give 10 g of a complex carbohydrate snack (carbohydrate and protein) with no insulin coverage	Only if more than 200mg/dl give insulin looking at your sliding scale and subtracting 1 unit
Adolescents and young adults (13-19 years)	100 – 150 mg/dl	If less than 100 mg/dl give 10g of a complex carbohydrate snack (carbohydrate and protein) with no insulin coverage	Only if more than 180mg/dl give insulin looking at your sliding scale and subtracting 1 unit

These are initial guidelines but may change based on the individual patient response or as necessary by the doctor at follow-up appointments.

It is recommended that a blood sugar after bedtime is taken between 3 and 4 a.m. for the first 3-4 days post discharge from the hospital and anytime that there is a change in the child’s long acting insulin or if there has been increased physical activity in the late afternoon/evening hours.

Hyperglycemia (High Blood Sugar)

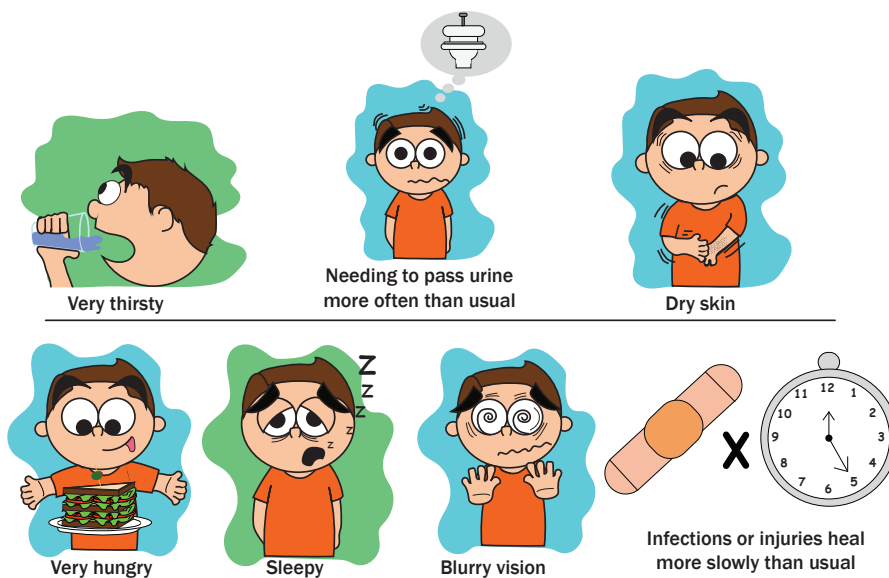
What is hyperglycemia?

Hyperglycemia, also known as high blood sugar, occurs when there is a build up of glucose in the blood. The glucose in the blood cannot enter the body's cells because there is not enough insulin, therefore it stays in the blood stream. Hyperglycemia is defined as a blood sugar greater than what the child's target goal range should be.

What can cause hyperglycemia?

- Not enough insulin
- Too much food
- Being less active than normal
- Sickness
- Stress

Signs and Symptoms of High Blood Sugar:



How is hyperglycemia treated?

- Check the blood sugar if any of the above symptoms are present.
- Check the urine for ketones. See "urine ketone testing" (page 13) for instructions.
- Additional rapid-acting insulin may be needed. This can occur either immediately or with the next meal depending on how high the blood sugar is and if there are ketones present in the urine

Call the doctor if the child has:

- High blood sugar levels for three or more days (it may mean that the doctor needs to adjust the dose of insulin)
- Moderate or large ketones

Urine Ketone Testing

What are ketones?

Ketones are harmful toxins in the blood. Without insulin, cells cannot get enough glucose for energy and therefore start breaking down the fat in the body for energy. The process of breaking down fat results in the formation of “ketones.” The kidneys try to get rid of the ketones through the urine.

When is it necessary to check the urine for ketones?

- When sick (cold, flu, or fever)
- When blood glucose is above 300 mg/dl
- When an insulin shot is missed
- After vomiting even once
- When using an insulin pump and there is blockage in the catheter or pump failure

What needs to be done when there are ketones in the urine?

- Drink lots of water or non-sugary drinks to flush the ketones out
- Use the sliding scale to lower the blood sugar
- Re-check the blood sugar two hours after the correction to ensure the blood sugar is decreasing
- In case of moderate or large ketones, notify the endocrinologist because more insulin may be needed to lower the blood sugar
- Continue checking for ketones with every urine until a negative reading is achieved

Testing Urine for Ketones



1. Gather supplies



2. Collect urine



3. Dip the test strip in the urine



4. Wait the appropriate amount of time



5. Compare the test strip color to the label on the bottle

HELPFUL HINT:

Make sure that all the squares on the strip come into contact with the urine. Let the strip sit out after dipping it in the urine for 60 seconds (or the time that it says on the directions of the bottle or box) then read the strip using the label on the bottle.

Hypoglycemia (Low Blood Sugar)

What is hypoglycemia?

Hypoglycemia is low blood sugar that occurs when there is little glucose in the blood. Blood sugars below 70 mg/dL are considered low. When this happens the body does not have the source of energy it needs to function properly.

What can cause hypoglycemia?

- Late or missed meals or snacks
- More exercise than usual
- Too much insulin or the wrong dose
- Sickness, especially with vomiting and/or diarrhea

Signs and Symptoms of Low Blood Sugar:



It is very important to know the signs and symptoms of hypoglycemia because a low blood sugar can happen quickly and must be treated immediately. If it is not treated, loss of consciousness (inability to wake your child) or a seizure can occur.

Hypoglycemia Treatment

How is hypoglycemia treated?

If the child has signs or symptoms of hypoglycemia, check his/her blood sugar immediately with the glucose meter and treat as described below.

- Have the child eat or drink a fast-acting carbohydrate. A fast-acting carbohydrate is a food or drink that contains only carbohydrates with no fat or protein. Fat slows the rate of emptying of the stomach so it will take longer for the carbohydrate to be absorbed and enter the bloodstream.
(See chart for examples)

Fast-Acting Carbohydrate	Amount (15-20 grams of carbohydrate)
Glucose tablets	3-4 tablets
Orange or apple juice	4 ounces
Lifesavers	6 candies
Cake icing	1 tablespoon
Regular soda	5 ounces



**Chocolate candy should not be used to treat hypoglycemia because it contains fat which slows digestion and does not allow glucose (sugar) to enter the blood stream fast enough **



- Fast-acting carbohydrates should raise the blood glucose level within 15 minutes and the child should begin to feel better. It is important to check the blood sugar level again after the 15 minutes. If it is still below 70 mg/dL, give another fast-acting carbohydrate and re-check the blood glucose level in 15 minutes
- After treating the hypoglycemia successfully, give a light snack (1 carbohydrate AND 1 protein) if the next meal or snack is more than one hour away. This will keep the blood sugar level within goal range

Diabetic Emergencies

There are two diabetic emergencies:

1. Severe hypoglycemia
2. Diabetic ketoacidosis

What is severe hypoglycemia?

- The blood sugar is so low that the brain does not have enough glucose to function adequately
- When the child has a blood sugar level below 70 mg/dL AND cannot eat or drink
- The child becomes unconscious (you are unable to awaken your child)
- He/she has a seizure

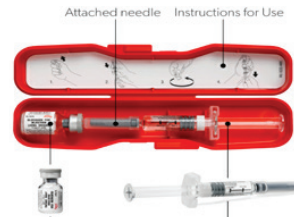
Every diabetic child reacts differently to blood sugar levels. One child may be awake and able to drink with a blood sugar level of 50mg/dL, while a different child may be difficult to arouse or completely unconscious. This is why a case of severe hypoglycemia is not defined by a specific low blood sugar level but rather by how your child is behaving.

How is a low blood glucose emergency treated?

If the child is having symptoms of low blood sugar, it is important to check his/her blood sugar right away. If the blood sugar is low (below 70mg/dL) but you can still wake child, follow the steps outlined in the hypoglycemia management section, page 17. If the child is not awake enough to follow simple commands such as drinking from a cup or straw, place the child on his/her side and get the emergency medication prescribed. If the child is having a seizure, protect his/her head by using something cushioned to prevent injury.

Glucagon:

Is a medication that raises the blood sugar level usually within 10-20 minutes and will make the child wake up (become conscious) again. It is a hormone that is normally made in the pancreas. It is of utmost importance NOT to put any food or drink in the mouth of a person who is unconscious or is having a seizure, because he/she may choke



Gvoke HypoPen:

It's an autoinjector pen that it is premixed used to treat hypoglycemia. Safe to use in adults and kids with diabetes 2 years and above.



Baqsimi:

Baqsimi is glucagon in nasal powder form. Used to treat severe hypoglycemia (very low blood sugar). Indicated for children with diabetes ages 4 years and above.



Call 911 or your local emergency number if:

- There is an inability to give emergency medication in a low blood-glucose emergency
- It is not possible to awaken the child within 15 minutes of giving emergency medication
- The child is unable to eat within one hour after receiving emergency medication
- The child's seizure does not stop after five minutes

TIP:

Remember to always replace your Emergency Medication in case of another emergency.

TIP:

- Make sure to check the expiration date and replace the emergency medication kit before it expires.
- Always keep your glucagon emergency kit in the same place.

What is diabetic ketoacidosis (DKA)?

Diabetic ketoacidosis occurs due to high blood sugars. It happens when ketones build up in the blood faster than the kidneys can get rid of them. It is a serious condition that requires immediate attention.

Causes of DKA:

- Not injecting enough insulin (error in carbohydrate counting at meals, applying the sliding scale, or error in measuring insulin with the syringe or dialing it on the insulin pen)
- Taking medications that increase blood sugar
- Illness
- Vomiting

Signs and Symptoms of DKA:

- Nausea
- Vomiting
- “Fruity” smelling breath
- Fast breathing
- Fast heartbeat

Identification and Treatment of DKA:

- Check blood sugar levels and check urine for ketones
- Give extra insulin for high blood sugars as directed by a doctor or nurse practitioner
- Maintain hydration with fluids by mouth or through an intravenous (IV) catheter

If moderate or large ketones are present, have the child start drinking water and call the doctor. If the child is feeling sick with vomiting and is unable to tolerate anything by mouth, take the child to the nearest emergency room immediately because he/she needs an IV (intravenous catheter) and special IV fluids for hydration that will flush the ketones out of the body. The child’s blood sugar will also rise unusually high in this condition and the child will need additional insulin in a hospital setting for it to be controlled safely.

TIP:

If the blood sugar is greater than 300 mg/dL, check the urine for ketones using the urine dip sticks in order to catch DKA signs early.

Sick Days

People with diabetes get sick just like anyone else. Infections, surgeries, and injuries can cause the body to feel extra stress. This added stress can cause the blood sugar to rise to high levels without warning. Extra care is needed to control the blood sugars during this time in order to prevent diabetic ketoacidosis which is a medical emergency.

Sick Day Management:

- Check the blood sugar every two to four hours
- Check the urine for ketones each time the child urinates
- Never forget to give an insulin dose
- Administer additional insulin if needed to control high blood sugars
- Have the child drink plenty of fluids to stay hydrated
- Monitor for signs and symptoms that would require immediate attention

Signs and Symptoms that would Require Immediate Attention:

- If the child has vomited more than three times and can't keep anything in his/her stomach
- If the child has moderate or large ketones in the urine along with signs and symptoms of DKA
- If the child has difficulty breathing
- If the child's blood sugar cannot be maintained above 70 mg/dL
- If the child is not eating or drinking enough

Foods to Eat when Sick:

- Broth type soups; bouillon or chicken noodle or canned soup
- Sugar-free or sweetened gelatin depending on blood sugar level
- Regular or diet soda depending on blood sugar level
- Popsicles: regular or diet depending on the blood sugar level
- Sports drink
- Juices
- Graham crackers

- Saltine crackers
- Banana or other fruits
- Instant mashed potatoes
- Instant pudding mixes
- Bread or toast
- Applesauce

Use sugar-free fluids if glucose is 150 mg/dL or higher

Drink plenty of liquids:

To prevent loss of body fluids (dehydration), have the child drink at least 4 - 6 ounces ($\frac{1}{2}$ to $\frac{3}{4}$ cup) of water or sugar-free liquids every hour. Examples are sugar-free soda, ice chips, water, sugar-free ginger ale or club soda. The child should take small sips of fluids if he/she is nauseous.

If the child cannot eat his/her usual diet or soft foods and the glucose is below 150 mg/dL, sip on liquids that contain sugar. Examples are regular Sprite®, regular ginger ale, tea with honey, or a sports drink.

Sipping liquids that have sugar prevents the glucose from dropping too low. These fluids will also provide extra calories or energy that the body needs to fight and recover from illness.



If the child has any of these symptoms, **call the doctor or go to the nearest Emergency Room!**

TIP:

If you need an over-the-counter drug to control symptoms such as cough and nasal congestion, ask your doctor or pharmacist for a list of sugar-free products that are available.

Exercise

Exercise is important for everyone whether diabetes is present or not. Exercise helps keep blood sugar levels in a good range. It is recommended to exercise 60 minutes daily. Exercise makes the body more sensitive to insulin which means insulin has a greater effect on lowering blood sugar levels. When the body exercises, it uses glucose at an increased rate from the blood in order to provide the muscles with energy. A snack may be necessary before exercising in order to avoid low blood sugars.

Here are some tips to help avoid a low blood sugar when exercising:

- Check the blood sugar before exercise
- Try to plan activities after a meal or snack
- Try to plan activities around the same time each day
- Add an additional snack if the blood sugar is within goal range before exercising 15 grams of carbohydrates
- Use sports drinks during hard exercise
- Check the blood sugar more frequently during and up to 24 hours after exercise because the blood sugar may decrease as the body is replacing lost glucose used during exercise
- Drink more water than usual to prevent dehydration
- Avoid giving insulin in the body part being used such as the legs before/after a soccer game



SAFETY TIP:

The child should not exercise if he/she has ketones in the urine.

School Days

The child spends a good portion of his/her day at school. It is important to let the school know the child has diabetes. The teacher, principal, and school nurse should all be aware. If the child rides a school bus, the bus driver should know as well. Letting close friends know is also a good idea and can serve as a support system for your child.

Many schools require a Diabetes Medical Management Plan (DMMP) to be filled out. The plan lets the school know what needs to happen while the child is at school in order to manage his/her diabetes. The plan consists of:

- Insulin regimen
- Blood sugar goals
- When and how often to test the blood sugar
- Low blood sugar treatment and follow up
- High blood sugar treatment and follow up
- Contact information for the endocrinology office
- Family's emergency contact information

In addition to the DMMP, many schools require that extra supplies be left at the school. We recommend putting together a diabetes kit for the school. The diabetes kit consists of:

- Insulin
- Syringes or pen needles
- Extra glucometer to be left at school
- Glucometer testing strips
- Lancet device/lancets
- Extra glucagon kit
- Glucose tablets or juice box (to treat low blood sugar)
- Urine ketone strips

Children should always have juice or glucose tablets readily available to treat low blood sugar. For younger children, we recommend having juice or glucose tablets in the classroom. For older children, we recommend carrying juice or glucose tablets in their backpack or pockets.

504 Law Section 504 is a civil rights law that protects children with diabetes against discrimination. It ensures that children with diabetes have equal access to education and school-sponsored activities. It also gives you as parents the right to request a 504 meeting with the school to develop a 504 plan. The 504 plan is a legal agreement between you and the school that outlines what services and modifications will be available for the child. The plan is based on the DMMP mentioned above. Not every child with diabetes needs a formal 504 plan. Some schools are comfortable making any kind of accommodations needed for your child. While in other cases, the 504 plan is needed to make sure the school knows its role in the child's care.

Diabetes Technology

Insulin Pumps

Insulin pumps: are computerized devices that are worn continuously and deliver insulin into the fat layer below the skin through a flexible plastic tube. The insulin is given at a steady rate mimicking the body's natural insulin release. In addition, an on demand or bolus dose, based on the blood sugar and the amount of carbohydrates eaten, may be given. Insulin pumps are for those who already have experience using insulin. It can be an effective option. We can discuss more about insulin pumps at the office clinic visits.

Tandem



ilet Pump



Twist Pump



Medtronic Pump



OmniPod Pump



Continuous Glucose Monitoring (CGM)

CGM: is a technology used to track blood glucose level. The device includes a small sensor inserted under the skin, which measures glucose levels in the interstitial fluid. CGMs provide alerts when glucose levels are trending too high or too low, helping patients respond quickly to prevent emergencies. While CGMs offer valuable insights, occasional fingerstick blood glucose checks are still recommended to confirm accuracy and calibrate the device when needed.

Dexcom G7



Freestyle Libre 3



Nutrition

Carbohydrate Counting

If the child has been diagnosed with type 1 diabetes, he/she will need to be on a special diet called “carbohydrate counting” diet. The diet is simply what the name indicates; the need to count carbohydrates while following a healthy diet.

Why is carbohydrate counting important?

- It provides good blood sugar control.
- It helps keep track of the amount of carbohydrates that the child may eat at meals/snacks.
- It allows you to determine the amount of insulin to give at meals/snacks.

What are carbohydrates?

- One of the three main food groups (also known as a “macronutrients”), protein and fat are the other two groups. Carbohydrates:
- Provide necessary nutrients to help the body and brain work properly
- Also provide energy

What foods have carbohydrates?

*Starches

- Breads
 - Examples: bagels, muffins, waffles
- Cereals and grains
 - Examples: oatmeal, rice, pasta

*Vegetables

- Starchy
 - Examples: corn, peas, potatoes
- Non-starchy
 - Examples: tomatoes*, onions*, broccoli*
- Legumes and beans
 - Examples: garbanzos, lentils, black beans

*Fruits

- All fruits and fruit juices

*Dairy

- Examples: milk, yogurt, ice cream

*Sweets

- Examples: cookies, brownies, custards, candy

Pediatric Nutrition Care Manual from Academy of Nutrition and Dietetics.

Age	Carbs (grams) for Meals	Carbs (grams) for Snack
<5 Year Old	30-45g at each meal	15-20g
5-12 Year Old	45-60g at each meal	15-20g
13 Years Old	45-75g at each meal	15-20g

Which foods do not have carbohydrates?

There are some foods/beverages that you will not have to count because they are **free** of carbohydrates or only have **small** amounts.

*Protein foods

- Examples: chicken, fish, beef, turkey, ham, bacon, eggs, cheese*, nuts*

*Fats

- Examples: butter, oils, mayonnaise

*Non-starchy vegetables

- Examples: tomatoes*, lettuce*, cucumbers*, carrots*

*Artificial sweeteners

- Examples: Splenda®, Sucralose®, Stevia®

*Diet drinks

- Examples: diet soda, Crystal Light®

*Water



NOTE: Foods marked with an asterisk () are foods low in carbohydrates. They may become foods that need to be counted depending on the portion consumed. It is also important to note that although the food items mentioned above will not be counted, you will have to keep a healthy balance.*

How do I count carbohydrates?

The registered dietitian (RD) will educate you on how to carbohydrate count ("carb count"). Education is based on the American Diabetes Association and Academy of Nutrition and Dietetics Exchange List for Diabetes. It is based on exchanges, meaning *portions, servings, or choices*. The *Exchange List for Diabetes* will have an extensive list of foods and the amounts of carbohydrates.

STARCHES/FRUITS/SWEETS/COMBINATION FOODS

1 carbohydrate exchange (serving/portion) = 15 grams of carbohydrate

—Therefore—

2 carbohydrate exchanges = 30g

3 carbohydrate exchanges = 45g

—and so on—



Examples of 1 carbohydrate exchange

Starches	Fruits	Other Foods
1/4 bagel	1 apple	6 chicken nuggets
1 small pancake (4 inches across)	1/2 banana	2 small chocolate chip cookies
1 slice of bread	1 1/4 cup strawberries	1/2 cup mac and cheese
1/3 cup of rice	1/2 cup apple juice	2 tablespoon pancake syrup
1/2 cup corn	1/2 cup orange juice	1/2 cup regular ice cream
1/2 cup beans	17 grapes	1 cup lentil soup

Milk And Other Dairy Products

1 milk exchange = 12 grams of carbohydrate

Examples of 1 milk exchange

8 ounces of milk (1 cup)
8 ounces soy milk (1 cup)
6 ounces plain yogurt ($\frac{3}{4}$ cup)

NON-STARCHY VEGETABLES

1 non-starchy vegetable exchange = 5 grams of carbohydrate

1 cup raw vegetables OR $\frac{1}{2}$ cup cooked vegetables

Let's practice:

Sample breakfast:

$\frac{1}{2}$ cup oatmeal = 15 grams

8 ounces milk = 12 grams

1 $\frac{1}{4}$ cup strawberries = 15 grams

1 egg = 0 grams

TOTAL = 42 grams of carbs

Now that you are able to carbohydrate count you will be able to determine how much insulin to give the child after his/her meals. The amount of insulin will depend on the insulin-to- carbohydrate ratio prescribed by the doctor.

Example: 1 unit of Humalog per every 15 grams of carbohydrate

If your child ate the above meal (42 grams) you will simply divide by 15, which is the insulin to carb ratio.
 $42 \div 15 = 2.8$ units - **You would provide 3 units**

Rounding:

- Round up if the number next to the decimal point is 5 or greater.
- Example: 3 .8 units - 4 units
- Stay at the same number if the number next to the decimal point is 4 or less.
- Example: 2 .1 units - 2 units

How many grams of carbohydrates does the body need?

The amount of carbohydrates the body needs will be determined by the registered dietitian. Since every person is unique, the amount of carbohydrates is based on gender, age, and physical activity. The dietitian will provide the amount of carbohydrates for meals and snacks. Carbohydrate-free snacks that do not require insulin will also be an option.

Remember, carbohydrates are necessary for the body to work well and stay healthy. Keep in mind, it is not only the amount of carbohydrates that matter, but what type of carbohydrate is eaten. Try to provide natural sources of carbohydrates (fruits, vegetables, milk, etc..) rather than processed/added sugars (such as candies, table sugar, sweets). When you provide grains, attempt to provide whole/high fiber versus refined/low fiber. One example is providing whole wheat rather than white bread or pasta.

Free Food" Snack Ideas:

- Sugar-free Jell-O
- Turkey/ham rolls
- Mozzarella cheese string
- Tuna salad (with carrot/celery sticks)
- Handful of nuts
- Hardboiled egg
- Diet sodas, diet iced teas (i.e. Crystal Light®)
- 1 cup raw non-starchy vegetables (carrots, lettuce, peppers or broccoli)

General Recommendations Regarding Free Food Snacks:

- Should be less than 20 calories
- Usually less than 5 grams* of carbohydrate in each serving
- Limit free foods to no more than three servings per day
- Spread free foods throughout the day

NOTE: The child's specific free food allowance is based on his/her insulin-to-carbohydrate ratio prescription. Please discuss it with the dietitian.

TIP

A "free food snack" is when the carb count results in 0.4 or less which means the child does not need insulin. If the carb count results in more than 0.4, the food is not a "free food snack" and the child needs insulin unless the snack is before physical activity or at bedtime with a blood sugar level within or below the recommended bedtime range.

Reading a Nutrition Label:

Using the exchange list is a helpful tool, but sometimes we can get even more specific by using the nutrition facts label. Packaged foods are required to have a nutrition facts label that can provide you with nutrition information, including carbohydrate counts, specific to that product.

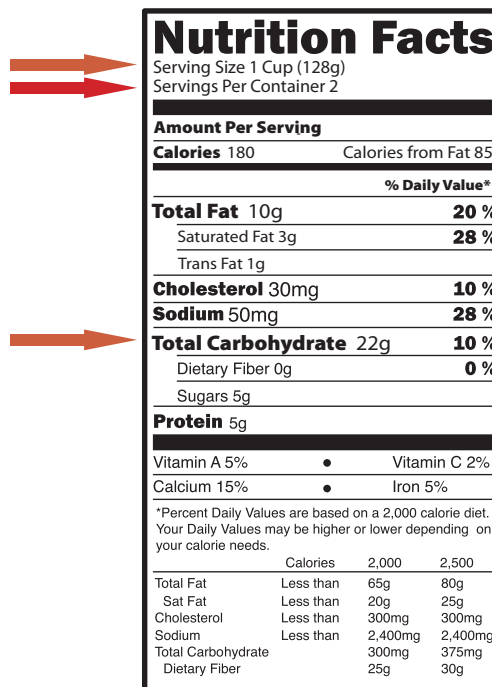
3 main sections to look at:

1. Serving size
2. Servings per container
3. Total carbohydrate

Example using above label:

1. Serving size = 1 cup
- 2 Servings per container = 2 cups (whole can)
3. Total carbohydrate = 22 grams
 - a. Always based on serving size (in this case 1 cup)

Note: If the child wants to eat an entire can of soup it has 44 grams of carbohydrates because we are doubling the serving size.



Nutrition Facts	
Serving Size 1 Cup (128g)	
Servings Per Container 2	
Amount Per Serving	
Calories 180	Calories from Fat 85
% Daily Value*	
Total Fat 10g	20 %
Saturated Fat 3g	28 %
Trans Fat 1g	
Cholesterol 30mg	10 %
Sodium 50mg	28 %
Total Carbohydrate 22g	10 %
Dietary Fiber 0g	0 %
Sugars 5g	
Protein 5g	
Vitamin A 5%	Vitamin C 2%
Calcium 15%	Iron 5%
*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	300mg 375mg
Dietary Fiber	25g 30g

You are now ready to **carbohydrate count!!**

Please keep in mind this information is only a guide. Your dietitian will teach you how to carb count and provide all the information needed for you to feel comfortable to carb count on your own.

Resources:

- Phone Applications (Apps)
- Carb Counting with Lenny®
 - Calorie King®
 - My Fitness Pal®

Discharge Information

We want to make sure you have everything you need to go home. Before you leave we will ask to see all the supplies and medications filled. The following is a list of what you should have:

- Humalog or Novolog _____
- Lantus or Levemir _____
- NPH _____
- Insulin syringes or pen needles _____
- Urine ketone sticks _____
- Blood glucose meter _____
- Lancet device _____
- Lancets _____
- Log book _____
- Glucagon emergency kit _____

Storing insulin:

Insulin is good for 28 days or four weeks once it is opened. It can be left at room temperature during this time. Unopened insulin vials or pens should be kept in the refrigerator until the expiration date on vial, pen or box.

Storing blood glucose strips:

Do not store test strips outside the vial. Replace the cap immediately after removing strip. Discard strips as per manufacturer instructions.

Insulin dose and injection schedule:

Insulin: carbohydrate ratio= _____: _____ with meals

Type of insulin: _____

Bedtime insulin dose= _____ units of _____
(type of insulin)

Insulin sensitivity factor= _____ unit for every _____
above _____

OR

Morning insulin dose- Give before breakfast or immediately after

_____ units of _____ (type of insulin)

_____ units of _____ (type of insulin)

Lunch insulin dose- Give before lunch or immediately after

_____ units of _____ (type of insulin)

_____ units of _____ (type of insulin)

Dinner Insulin dose- Give before dinner or immediately after

_____ units of _____ (type of insulin)

_____ units of _____ (type of insulin)

Bedtime insulin dose

_____ units of _____ (type of insulin)

_____ units of _____ (type of insulin)

TIP:

When you open a new vial or pen, write the date or expiration on the label so you know when to throw it out. Expired insulin does not work well to control blood sugars.

TIP:

Remember to rotate sites with each injection.

Blood glucose monitoring schedule:

Check the child's blood glucose at least _____ times a day

_____ Before breakfast

_____ Before lunch

_____ Before dinner

_____ At bedtime

_____ When there are symptoms of high or low blood sugar

Remember to record in the log book:

- Blood sugar result
- Insulin doses
- Urine ketone results
- Any schedule changes or food changes that can explain a high or low blood sugar reading

Goal or target range:

The target goal range is _____ to _____ mg/dl

What to do when symptoms of hypoglycemia (low blood sugar) are present:

- Check the child's blood sugar level
- If below 70 mg/dl, treat with 15 grams of a fast-acting carbohydrate
- Wait 15 minutes and recheck blood sugar
- If blood sugar is still below 70 mg/dl, give another 15 grams of fast-acting carbohydrates
- After 20-30 minutes of correction, give a light snack or provide meal to maintain blood sugar level

What to do when symptoms of hyperglycemia (high blood sugar) are present:

- If blood sugar is greater than 300 mg/dl, check urine for ketones
- Additional insulin may be needed to bring the blood sugar down

When to check the urine for ketones:

- When sick
- If the blood sugar is greater than 300 mg/dl

Follow up appointment:

The child's first outpatient appointment is scheduled for:

Date: _____

Time: _____

What to bring to each appointment:

- Log book
- Discharge instructions
- A list of questions you or the child may have

TIP:

Encourage water or a sugar-free drink if ketones are present. Notify endocrinologist if the child has moderate or large ketones.

Resources and Support Services

- **AACE Diabetes Resource Center**
<http://resources.aace.com/>
- **American Diabetes Association**
<http://www.diabetes.org/>
- **Breakthrough T1D**
<http://www.breakthrought1d.org>
- **Children with Diabetes**
www.childrenwithdiabetes.com
- **Diabetes , Youth and Families**
www.dyf.org
- **National Diabetes Information Clearinghouse**
www.niddk.nih.gov/health/diabetes

Medical Alert ID

- **Medic Alert Foundation**
1-800-432-5378
www.medicalert.org
- **Lauren's Hope**
1-800-360-8680
www.laurenshope.com
- **American Medical ID**
1-800-363-5985
www.americanmedical-id.com

Contact your diabetes team for a list of local current support groups



**Nicklaus
Children's Hospital
Diabetes in Children**
YouTube® videos



**Download a PDF
version of this book.**

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References

- American Diabetes Association. (2019). Food lists for diabetes. Academy Of Nutrition And Dietetics.
- American Diabetes Association. (2023). Hyperglycemia (High Blood Glucose) | ADA. Diabetes.org. <https://diabetes.org/living-with-diabetes/treatment-care/hyperglycemia>
- American Diabetes Association. (2024). Signs, Symptoms, and Treatment for Hypoglycemia (Low Blood Glucose) | American Diabetes Association. Diabetes.org. <https://diabetes.org/living-with-diabetes/hypoglycemia-low-blood-glucose/symptoms-treatment>
- American Diabetes Association Professional Practice Committee. (2024). 2. Diagnosis and Classification of Diabetes: Standards of Care in Diabetes—2025. Diabetes Care, 48(Supplement_1), S27–S49. <https://doi.org/10.2337/dc25-S002>
- eAG/A1C Conversion Calculator | American Diabetes Association. (n.d.). Professional.diabetes.org. https://professional.diabetes.org/glucose_calc
- Understanding Type 1 Diabetes | ADA. (2024). Diabetes.org. https://diabetes.org/about-diabetes/type-1?_gl=1

Scenarios

Sliding Scale – Humalog/Novolog (based on blood sugar levels):

151-200 mg/dl	0.5 unit
201-250 mg/dl	1 unit
251-300 mg/dl	1.5 units and check urine for ketones

Carbohydrate Count:

0.5 unit per 10 grams of carbohydrates

Example:

- Blood sugar level before breakfast: 170 mg/dl.
- Number of carbohydrates eaten for breakfast: 45 grams

According to the sliding scale: 170 mg/dl requires 0.5 unit.

For the carbohydrates: Divide the 45 grams of carbohydrates by 10 and then multiply that result by 0.5 to calculate how many carbohydrates are needed.

- $45 \div 10 = 4.5$ and
- $4.5 \times 0.5 = 2.25$

Therefore for the sliding scale and carbohydrate count:

$0.5 + 2.25 = 2.75$ which you round to 2.5 units of insulin for breakfast.

To round half units, look at the first number after the decimal point and determine whether it is closer to 0 or 5.

- Example: Looking at 2.75 the first number after the decimal is 7 which is closer to 5 than it is to 0.
- Therefore, the most precise measurement for 2.75 when rounding using half units is 2.5.

**Looking at a number line will help you understand this concept better. The result will always be a half, whole number or a whole number and a half. Example: 0.5 (half), 7 (whole number), 3.5 (whole number and a half).

Sliding Scale – Humalog/Novolog (based on blood sugar levels):

151-200 mg/dl	1 unit
201-250 mg/dl	2 units
251-300 mg/dl	3 units and check urine for ketones

Carbohydrate Count:

1 unit per 8 grams of carbohydrates

Example:

- Blood sugar level before breakfast: 185 mg/dl.
- Number of carbohydrates eaten for breakfast: 61 grams

According to the sliding scale: 185 mg/dl requires 1 unit.

For the carbohydrates: Divide the 61 grams of carbohydrates by 8.

- $61 \div 8 = 7.625$

Therefore for the sliding scale and carbohydrate count: $1 + 7.625 = 8.625$ which you round to 9 units of insulin for breakfast.

To round, look at the first number after the decimal point and if it is 5 or greater, go to the next number. If the first number after the decimal point is less than 5 stay at the same number.

Example: Looking at 8.625 the first number after the decimal point is 6 which is greater than 5. Therefore the most precise measurement when using whole units for 8.625 is 9.





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