Diabetes Patient Education

A Guide for Newly Diagnosed Patients

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HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

Dear Patient and Family,

Welcome to the Boston Children's Hospital Diabetes Program.

Discovering that you have diabetes, or that your child has diabetes, can be upsetting and stressful. Feeling confused and overwhelmed right now is normal. Please know that we are here to support you and your family as you start to learn about this condition and how to adjust to it.

Gaining the knowledge and skills you need in order to manage diabetes is very important. We will help you learn about the basics of diabetes, including how to use diabetes devices and diabetes medications and approach healthy eating for diabetes. A team of diabetes educators will work with you to help you understand everything you need to know. This education will start here in the hospital over the next couple of days. Once you are home, you will have an outpatient diabetes team that will teach, coach and guide you on a regular basis.

This packet has information sheets that will give you an overview. Do not worry if it seems like too much to take in all at once. We will go over this information with you step by step as you learn.

We understand that diabetes is a disease that affects the whole family. We are here to support you, answer questions and address your concerns. It may not feel like it now, but families tell us that they do slowly get comfortable managing diabetes. Over time, life with diabetes truly does starts to feel normal.

You've got this!

The Boston Children's Diabetes Team

Diabetes Patient Education

A Guide for Newly Diagnosed Patients

Table of Contents

Introduction

Family Education Sheet

Introduction to Diabetes Team Teaching

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While your child is in the hospital, we will teach you how to manage your child's diabetes at home.

- This Family Education Sheet will help you understand what to expect during your stay with us.
- Your outpatient Diabetes Team will keep teaching you after you leave the hospital, but we want to help you get the most out of your learning opportunities while you are here.

Who will teach me about diabetes?

- **Child Life specialists** will help your child with coping during their hospital stay and treatment.
- **Diabetes nurse educators (DNEs)** will help you understand diabetes.
- **Dietitians** will help you understand how food and diet affect your child's blood glucose.
- **Doctors** will make rounds daily and are available to answer your questions.
- **Social workers** will assist you with any emotional, financial or behavioral concerns, and provide you with information about additional community resources.
- **Staff nurses** will teach you about diabetes and help you learn how to give your child insulin injections.

What can I do to learn the most I can?

- Read the educational and teaching materials given to you.
- Please stay with your child while they are in the hospital so you can practice giving insulin injections and checking blood glucose levels.
- If you have a young child who cannot be left alone, it may help to ask a friend or family member to stay with your child while you are learning. We find that it is often very hard for parents and caregivers to concentrate on learning new information and skills while they are watching their child.

 Publication Date 10/8/2018 page 1 of 1 #161051

Diabetes and Insulin

Family Education Sheet

What is diabetes?

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What is type 1 diabetes?

- Type 1 diabetes is an autoimmune disease that affects the way the body regulates blood sugar, also called glucose.
- The body's immune system does not recognize the cells (beta cells) in the pancreas that make insulin as belonging to the body. The immune system attacks and destroys these beta cells.
- Without enough beta cells, the body cannot make enough insulin. Insulin is a hormone that the body needs to get glucose into the cells of the body.

What causes type 1 diabetes?

- We do not know the exact cause of type 1 diabetes. Infections or environmental factors may trigger the immune system to destroy beta cells. Family history may be a risk factor.
- There is nothing that you did to cause type 1 diabetes, and there is nothing you can do to prevent type 1 diabetes.

How is type 1 diabetes treated?

- People with type 1 diabetes need insulin treatment for their entire lives.
- There is no cure for type 1 diabetes. People with type 1 diabetes manage it by balancing insulin, food and exercise. Your diabetes team will teach you how to do this.

What is type 2 diabetes?

- Insulin resistance causes type 2 diabetes. This means that the cells in the pancreas that make insulin (beta cells) work but the body does not respond normally to insulin.
- When people have insulin resistance, the pancreas makes more insulin to try to keep the blood sugar normal at first. However, after some time, the pancreas cannot keep up and the person gets abnormal blood sugar levels, which is type 2 diabetes.

What causes type 2 diabetes?

- There are often factors in someone's family history or personal medical history that put them at risk, particularly having a family history of type 2 diabetes.

How is type 2 diabetes treated?

- Type 2 diabetes can sometimes be managed with medication taken by mouth, diet and exercise. Some people may need to start out with insulin injections.
- For people who use insulin, it is important to balance insulin, food and exercise. Your diabetes team will teach you how to do this.

Family Education Sheet

Blood Glucose Scale

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High blood glucose (blood sugar level that is greater than 300 mg/dL)

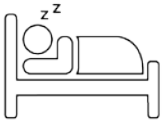
300 mg/dL

Symptoms of Diabetic Ketoacidosis (DKA)


Usually starts with nausea and/or belly ache


Vomiting


Deep and rapid breathing


Drowsiness

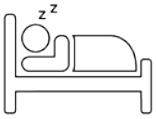
Check ketones

- Always check when blood glucose is greater than 300 mg/dL and when you are sick.
- Call the Endocrine Team if you have ketones.
- To clear ketones within 12 hours, you need more insulin fluid and rest.

Symptoms of high blood glucose


Thirsty


Increased urination


Feeling weak or tired


Weight loss


Blurred vision

Your child's blood glucose goal range

_____mg/dL

_____mg/dL

What causes blood glucose to go up?

- Food
- Illness
- Stress
- Hormones

What causes blood glucose to go down?

- Insulin
- Exercise

Low blood glucose (blood sugar level that is lower than 70 mg/dL)

70 mg/dL

Symptoms of low blood glucose

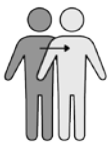

Confusion, feeling dazed or unfocused


Dizzy


Sweaty


Shaky


Irritable


Paler skin than usual


Clingy or more quiet than usual

If child is unresponsive or has a seizure

- Use the Glucagon Emergency Kit

Family Education Sheet

Glucagon

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_____ 's emergency dose is _____ Date _____

What is glucagon?

Glucagon is a hormone that the pancreas makes to raise the body's blood glucose (sugar) level. The pancreas is a gland near the stomach that helps process food.

The synthetic (human-made) version of glucagon comes in a powdered form that you mix with a solution before injecting it into one of your child's muscles. It tells the liver to release stored glucose into the blood.

How do I store glucagon?

- **Unopened glucagon kit (powder form):** Glucagon should be stored at room temperature when it is still in its powdered form.
- **Opened glucagon kit (mixed form):** Once you mix the glucagon powder with the solution, you can keep it in the refrigerator for 24 hours. Throw it out after 24 hours.

When do I use glucagon?

Glucagon should be used in an emergency when your child has a serious low blood glucose reaction (called hypoglycemia) and is unresponsive or having a seizure.

How much glucagon do I give?

Your child's emergency dose is listed above. The dose is based on your child's weight and may change as your child grows. Your diabetes team will prescribe the dose that's right for your child.

How to give a glucagon injection

As emergency medication

If your child is unresponsive or having a seizure, call 911 or your local emergency services number.

Then, use the glucagon kit to raise blood glucose.

Figure 1 to the right shows you how to give the injection:

1. Mix glucagon as instructed and draw up your child's prescribed dose using the syringe in the kit.
2. Give the injection into your child's arm, buttock or thigh muscle. Do not pinch the skin.
3. After giving the injection, turn your child on their side. Glucagon may cause vomiting (throwing up).
4. Your child should wake up within 10-15 minutes. You can give your child another glucagon injection if your child does not wake up after 15 minutes.

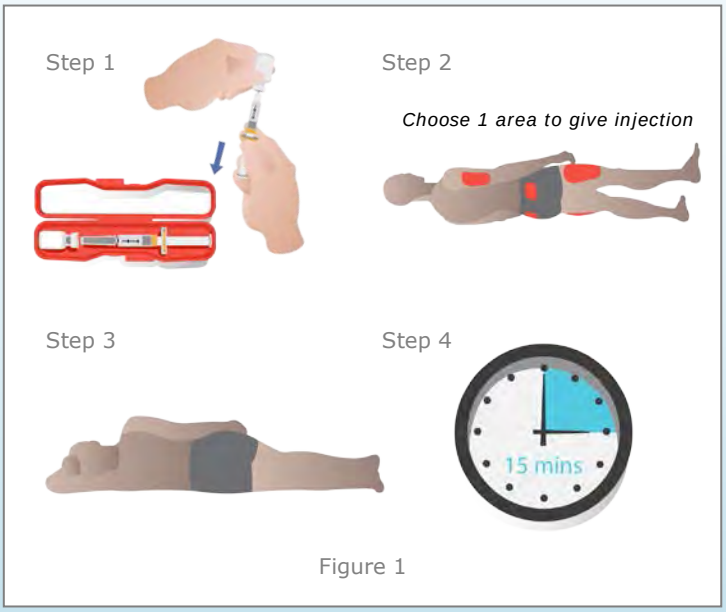

Figure 1

As non-emergency medication

If your child cannot eat or drink anything and has low blood glucose, call your diabetes team to learn how to use glucagon for non-emergency treatment.

- The non-emergency dose is smaller than the emergency dose and is based on your child's age (not weight).

Family Education Sheet

Ketones and Diabetic Ketoacidosis (DKA)

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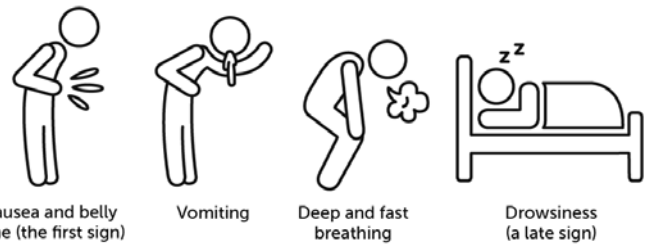
What are ketones?

- Without enough insulin, the body cannot use glucose in the blood for energy. Instead, the body breaks down its own fat to use for energy.
- Ketones (or ketoacids) form during the process of breaking down fat. Ketones show up in the blood before they show up in the urine (pee).
- It is important to discover ketones right away and get rid of them quickly.

What is diabetic ketoacidosis (DKA)?

- High level of ketones in the blood makes the blood more acidic. This is called **diabetic ketoacidosis (DKA),** and it requires immediate treatment. DKA is life-threatening.

What are life-threatening signs and symptoms of diabetic ketoacidosis (DKA)?



When do ketones develop?

- If you do not get enough insulin
- If you do not take your insulin
- If you are sick, which causes high blood glucose levels and the need for more insulin

When do I check for ketones?

- If you are sick with any illness
- When blood glucose is greater than 300 mg/dL

What do I do if there are ketones in my blood or urine?

Call your diabetes team. They may make the following recommendations:

- **Take more rapid-acting insulin.** The amount depends on the blood glucose reading and amount of ketones. Your diabetes team will tell you how much insulin to take.
- **Drink extra fluids** to help flush out ketones from the body.
- **Get more rest.**
- **Continue to check for blood and/or urine ketones.**
    - Check for urine ketones every time you pee until the urine ketone test reads negative, trace, or small.
    - Check for blood ketones as instructed by your diabetes team until the blood ketones are in a normal range (less than 1.0 mmol/L).

Family Education Sheet

How to Store Insulin

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How do I store vials of standard U-100 insulin?

These instructions cover all U-100 vials (Humalog, Novolog, Regular, NPH, Lantus [Glargine], Levemir [Detemir] and 70/30 and 75/25 combination insulin.

Unopened vials of insulin

- Store them in the refrigerator.
- They are good **unopened** the until expiration date on the bottle.

Opened vials of insulin

- You can store **opened** vials in the refrigerator or at room temperature.
- Keep them away from heat (above 85˚F/29.4°C) and light.
- **Never freeze insulin** or use frozen insulin.
- **Open vials are good for 4 weeks (28 days)** from the date opened. **Exception:** Levemir is good for 42 days after opening.
- Write the date you open the insulin on the bottle as a reminder.

How do I store diluted U-10 insulin?

- All diluted insulin is **opened** insulin.
- Store diluted insulin vials in the refrigerator or at room temperature.
- Diluted insulin is good for **4 weeks (28 days)** from the date you mix it **if refrigerated**.
- It is only good for **2 weeks (14 days)** if stored at **room temperature** after mixing.

If you are going home with 2 vials of diluted insulin, you have a 28-day supply if stored in the refrigerator.

How do I store insulin pens and cartridges?

Unopened pens and cartridges

- Store them in the refrigerator.
- They are good until the expiration date.

Opened pens and cartridges

- Store these **only** at room temperature.
- They are good for:
  - Humalog pen – 28 days
  - Novolog pen – 28 days
  - Lantus pen – 28 days
  - Levemir pen – 42 days
  - Basaglar pen – 28 days
  - Tresiba pen – up to 8 weeks
  - NPH pen – 14 days
  - 70/30 pen – 10 days
  - 75/25 pen – 10 days

Family Education Sheet

Basal-Bolus Insulin by Injection

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What should I know about long-acting insulin (basal insulin)?

- Lantus/Levemir is a long-acting insulin that can last up to 24 hours. It starts to act in 1–2 hours.
- The insulin is clear and colorless.
- **Do NOT mix Lantus/Levemir with any other insulin.**
- Long-acting insulin is usually taken at dinner or in the morning. Your child can take it any time in a 24-hour period, but your child should take it at the same time every day.
- Store Lantus/Levemir in the refrigerator if unopened.
  - You can use it until the expiration date on the vial if it is unopened and refrigerated.
  - Only use it for 28 days if it is open and stored at room temperature or refrigerated.
  - If you're using an insulin pen, refer to your insulin pen family education sheet for storage.

What should I know about rapid-acting insulin (bolus insulin)?

- Humalog/Novolog insulin is a rapid-acting insulin that starts to act in 10–15 minutes. It peaks in 30 - 90 minutes. It lasts 2–4 hours.
- The insulin is clear and colorless.
- You can mix Humalog/Novolog insulin with other insulin, such as Regular or NPH.
- **Do NOT mix Humalog/Novolog with long-acting insulin (Lantus/Levemir).**
- Give your child rapid-acting insulin 10–15 minutes before eating. Sometimes it may be OK to give rapid-acting insulin right after eating.
- The dose you give your child is based on the blood glucose reading taken just before eating and the number of carbohydrates to be eaten.
- Store Humalog/Novolog in the refrigerator if unopened.
  - You can use it until the expiration date on the vial if it is unopened and refrigerated.
  - Only use it for 28 days if it is open and stored at room temperature or refrigerated.
  - If you're using an insulin pen, refer to your insulin pen family education sheet for storage.

Never freeze insulin or put it in an area hotter than 85°F. Do not put it in direct sunlight.

Family Education Sheet

Basal-Bolus Calculation Worksheet

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My target blood glucose (BG) is: _____

My correction factor is: _____ *(1 unit of rapid-acting insulin will lower blood glucose _____ mg/dL)*

My insulin to carbohydrate ratio is: _____ *(1 unit of rapid-acting insulin will cover _____ g carbohydrate)*

Calculate the insulin needed to correct blood glucose levels

Step	Equation	Example	Your Numbers
Step 1: Find out how much blood glucose (BG) is above your target.	current BG – target BG **# above target**	*225* *— 150* *75*	—
Step 2: Find the dose of insulin you need to correct your BG.	# above target ÷ correction factor **insulin to correct BG**	*75* *÷ 45* *1.6 units*	÷

Calculate the insulin needed to cover the carbohydrate content of the food you are eating

Step	Equation	Example	Your Numbers
Step 1: Find out the total carbohydrate content of the foods you are eating.	Sum of carbohydrate content for each food item **Total carbohydrate**	*20* *+ 20* *40*	+
Step 2: Find the dose of insulin you need to cover the total carbohydrate content.	Total carbohydrate ÷ insulin to carbohydrate ratio **insulin to cover carbohydrates**	*40* *÷ 15* *2.6 units*	÷

Calculating the total mealtime rapid-acting insulin dose

Step	Equation	Example	Your Numbers
Step 1: Calculate the mealtime dose of rapid-acting insulin by adding together both circled numbers from the above.	Units to correct BG + units to cover carbohydrate **total calculated insulin dose**	*1.6* *+ 2.6* *4.2 units*	+
Step 2: Round the dose to the nearest ½ unit.	x.1–x.3 = round down x.4–x.7= round to ½ line x.8–x.9 = round up	*Round down to 4 units*	

Family Education Sheet

Daily Schedule (Basal-Bolus Insulin Plan)

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_____'s Daily Schedule

Give Lantus/Levemir ____ units at _____ every day.

_____ Get up.

_____ Check blood glucose and log results.

_____ Calculate insulin dose based on correction factor and carbohydrate intake:

Take _____ insulin.

_____ Eat breakfast.

_____ Eat snack—**optional.**

(cover for carbohydrates with _____ insulin).

_____ Check blood glucose before lunch and log results.

_____ Calculate insulin dose based on correction factor and carbohydrate intake:

Take _____ insulin.

_____ Eat lunch.

_____ Eat snack— **optional**.

(cover for carbohydrates with _____ insulin).

_____ Check blood glucose before dinner and log results**.**

_____ Calculate insulin dose based on correction factor and carbohydrate intake:

Take _____ insulin.

_____ Eat dinner.

_____ Check blood glucose before bedtime and log results.

_____ Calculate insulin dose based on bedtime correction factor and carbohydrate intake (snack is optional).

Take _____ insulin.

_____ Go to bed.

_____ Check blood glucose overnight and log results.

_____ Calculate insulin dose based on overnight correction factor.

Take _____ insulin.

When do I check blood glucose overnight?

- For the first 2 nights after you go home from the hospital
- For 2 nights any time the long-acting insulin dose is changed
- If you/your child had been ill or did not get enough food/drink during the day
- If you give correction dose before bedtime
- As a random check once a week

What should I do in the middle of the night if blood glucose is low?

If blood glucose is low (less than 80 for ages 5 and younger and less than 70 for ages 6 and older), give fast-acting carbohydrate:

- 5–10 grams for ages 5 and younger
- 15 grams for ages 6 and older

Wait 15 minutes. Re-check the blood glucose.

If the blood glucose is still low, repeat these steps.

Once the blood glucose is within the goal range, eat a snack with 15 grams of carbohydrate and 7 grams of protein. Do not cover carbohydrates with insulin for treatment of overnight low blood glucose.

Your Insulin Plan

- **Blood glucose target**
  - 8 a.m.– 8 p.m.: _____
  - 8 p.m.– 8 a.m.: _____
- **Correction factor**
  - **8 a.m.–8 p.m.:** 1 unit of rapid-acting insulin lowers blood glucose by _____ mg/dL.
  - **8 p.m.–8 a.m.:** 1 unit of rapid-acting insulin lowers blood glucose by _____ mg/dL.
- **Carbohydrate ratio:** 1 unit of rapid-acting insulin for every _____ grams of carbohydrate.

My Basal/Bolus Food Plan

A basal/bolus insulin plan can make the timing and size of meals more flexible.

Here are some key points to keep in mind:

- "**Basal**" insulin (i.e. Lantus, Levemir):
  - Long acting insulin
  - Given 1 time a day
  - Lasts for 24 hours
- "**Bolus**" insulin (i.e., Humalog, Novolog or Apidra):
  - Rapid acting insulin
  - Given before most meals and snacks with carbohydrates
  - Your dietitian will help you understand when a bolus dose is needed
- It is still important to eat 3 balanced meals per day on this insulin regimen. Snacks may also be eaten based on appetite.
- Skipping meals in order to have fewer shots during the day is not healthy. It may lead to not getting the nutrients you need for normal growth and development.
- Even though you may change how many carbohydrates you eat, it is important to be aware of your individual goal carbohydrates ranges.
- It is best to provide all rapid acting insulin doses 15 minutes before you eat.

My Basal/bolus goal carbohydrate gram ranges:

Per Meal:	
Per Snack:	
Use measuring cups or a food scale to figure out correct portion sizes!	

If you have questions before your follow-up, please call the Center for Nutrition at 617-355-4677 or email nutritiondept@childrens.harvard.edu

Label Reading

Follow these steps to figure out the total grams of carbohydrates in your food.

Step 1:

Find the amount that the manufacturer calls the serving size.

✓ Answer: 1 cup or 30 grams (weight if measured on a scale)

Step 2:

Find total grams of carbohydrates for the serving size listed. **You do not have to count sugars!**

✓ Answer: 23 grams

Step 3:

How much cereal will you be eating? If you plan to have 2 servings (2 cups), what would be the total grams of carbohydrates?

✓ Answer: 2 servings x 23 grams of carbohydrates per serving = 46 grams of total carbohydrates

Cereal

Serving Size: 1 cup, 30g
Servings Per Container 10

Amount Per Serving	
Calories 110	Cal from Fat 16
	% Daily Value
Total Fat 2 g	3%
Saturated Fat 0 g	2%
Trans Fat 0 g	
Cholesterol 0 mg	0%
Sodium 210 mg	9%
Total Carbohydrate 23 g	8%
Dietary Fiber 3 g	11%
Sugars 1 g	
Protein 3 g	

*** Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.**

Healthy Eating Tips

- Choose whole grains, beans, starchy vegetables, fruits and dairy as your carbohydrate sources.
- Fiber slows digestion and helps you feel full.
- Choose non-starchy vegetables to help balance meals and snacks.
- Aim to include 5 servings of fruits and vegetables each day.
- Choose lean protein sources at each meal to help curb hunger.
- Choose healthier fats for heart health. See inside for examples of healthier fats.
- It may take 15-20 times to try a kind of food before you know if you like it. Don't give up!

Handy Portion Guide

These are based on the hand size of adult woman.

- Thumb tip = 1 teaspoon (from tip of thumb to first knuckle)
- Thumb = 1 Tablespoon (from tip of thumb to second knuckle)
- Palm = 3 ounces
- Tight fist or one open hand = ½ cup or 4 oz. liquid
- Open hand or two hands cupped together = 1 cup

Boston Children's Hospital
Nutrition Center

My Nutrition Plan

It is important for children with diabetes to balance food, insulin and exercise. Use this handout as a tool to work diabetes management into your family's lifestyle!

Name: _____

Date: _____

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Carbohydrate Foods

Carbohydrates are the part of food that causes the biggest rise in blood glucose. It is important to count the grams of carbohydrates in meals and snacks to balance with insulin. Whole grain choices are best.

Breads and grains	Grams of carbohydrates
Bagel (small, 2 oz.)	30 g
(large, 4-5", 4 oz.)	60-70 g
Bread, white or wheat, 1 slice	14 g
Bread crumbs, 3 Tablespoons	15 g
Cereal, bars	15-35 g
cooked, unsweetened, ½ cup	11-19 g
instant cooked, sweetened, 1 pkt	26-36 g
dry, unsweetened, ¾ cup	15-18 g
dry, sweetened, ½ cup	14-19 g
Cornbread or Biscuit, 2" square	12–17 g
English muffin	25 g
French toast, 1 slice	16 g
Muffin, small, 2"	25-35 g
Pancake, 4" across	14 g
Pasta, cooked, ½ cup	21 g
Rice, brown or white, cooked, ½ cup	22 g
Rolls	
- Dinner (1 oz.)	15 g
- Bulkie, Hamburger, Hotdog (1.5-2 oz.)	21–30 g
Pita bread (6")	30 g
Tortilla/wrap (8")	24 g
Waffle, frozen, 4"	14 g

Starchy vegetables and beans	Grams of carbohydrates
Corn, ½ cup or 6" cob	15-20 g
Peas, green, ½ cup	13 g
Plantain, 1 medium	57 g
Potato, white, baked or boiled, med, 4"	36 g
Potatoes, mashed, ½ cup,	17 g
French fries, regular or crinkle cut, 10-15	15-20 g
Baked beans, ½ cup	27-30 g
Beans (kidney, navy, pinto, lima) and lentils, ½ cup	19 g

Fruit and Fruit Juices	Grams of Carbohydrates
Apple, medium (4.9 oz.)	19 g
Applesauce, unsweetened, ½ cup	14 g
Banana, medium, 7 – 7.5"	27 g
Berries - blueberries, 1 cup	21 g
raspberries, strawberries, 1 cup	11-14 g
Fruit, canned in light syrup or juice, ½ cup	10-18 g
Grapes, 15	13 g
Juice - apple, grapefruit, orange, ½ cup	11-15 g
cranberry, grape, pineapple, ½ cup	16-20 g
Melon - cantaloupe, honeydew, watermelon, 1 cup	12-16 g
Orange, medium (4.6 oz.)	15 g
Peach, medium (3.5 oz.)	10 g
Pear, 1 small (4.9 oz.)	22 g
Pineapple, ¾ cup	15 g

Milk	Grams of carbohydrates
Milk, white, 1 cup	12 g
Milk, chocolate, 1 cup	26 g
Yogurt, artificially sweetened or plain, ¾ - 1 cup	11-19 g
Yogurt, sweetened, kid's cup, ½ cup	17-23 g
Soy or rice drink, 1 cup	5-12 g

Snacks and sweets	Grams of carbohydrates
Animal crackers, 6-7	17 g
Brownie, unfrosted, 2" square	15 g
Cake, frosted, 2" square (2.3 oz.)	35 g
Chips, potato or tortilla, 10-15 chips	17 g
Cookie, 2 ½"	13-20 g
Cookie, sandwich, small, 2	15 g
Goldfish® crackers, ½ cup	19 g
Graham crackers, 3 squares	16 g
Crackers, sandwich, PB or cheese, 4	15-17 g
Frozen yogurt, ½ cup	17-23 g
Ice cream, ½ cup	16 g
Popcorn, 3 cups	12-15 g
Pretzel, tiny twists, 17 (1 oz.)	23 g
Pudding, sugar-free, ½ cup	13 g
Vanilla wafers, 5	13 g

Combination foods	Grams of carbohydrates
Casserole or hot dish, 1 cup	34-38 g
Chicken nuggets, 5	15 g
Fish sticks, breaded, 3	10-18 g
Hamburger with bun	25-35 g
Lasagna, 3" x 4"	26 g
Macaroni and cheese, 1 cup	48 g
Pizza, take-out, thick crust, large, 1/8th	35-47 g
Pizza, take-out, thin crust, large, 1/8th	26-33 g
Sandwich, cheese or meat	24-32 g
Sandwich, chicken or fish, breaded	39-60 g
Sandwich, peanut butter and jelly	43-50 g
Soup, (noodle, rice, vegetable), 1 cup	9-20 g
Soup (cream), 1 cup	15-30 g
Taco, 5" across hard shell	9 g
Taco, 6" soft tortilla	16-22 g

Sweeteners and spreads	Grams of carbohydrates
Agave nectar, 1 Tbsp	12 g
Honey or table sugar, 1 Tbsp	12-17 g
Jam or jelly, regular, 1 Tbsp	13-15 g
Syrup, regular, 2 Tbsp	24-27 g
light, 2 Tbsp	13 g
sugar-free, 2 Tbsp	0-4 g

Low-carb snacks (less than 5g carb but more than 20 calories)

- Beef jerky
- Celery with 1 Tbsp peanut butter
- Dill pickle, 1 large
- String cheese
- Salsa, ¼ cup
- Vegetables, raw, with 2 Tbsp. dip
- Hard-boiled egg
- Cottage cheese
- Nuts, 2 Tbsp
- Olives (up to 15)
- Sunflower seeds in shells, ½ cup

Low-carb / low-calorie foods (less than 5g carb but more than 20 calories)

- Bouillon or broth
- Candy, hard, sugar-free, 1*
- Choc milk mix, sugar-free, 1 Tbsp*
- Coffee or tea
- Drink mixes, sugar-free
- Garlic
- Herbs and spices
- Jam or jelly, sugar-free, 1 Tbsp*
- Jello, sugar-free
- Ketchup, 1 Tbsp*
- Lemon/lime juice
- Mustard
- Pancake syrup, sugar free, 2 Tbsp*
- Popsicles, sugar-free, 1*
- Salad dressing, fat-free, 2 Tbsp*
- Soft drinks, diet
- Soy sauce
- Steak sauce, 1 Tbsp*
- Sugar substitutes
- Whipped topping, 2 Tbsp*

Vegetables:

Non-starchy vegetables are full of vitamins, minerals and fiber. They are also low in carbohydrates! Each ½ cup cooked or 1 cup raw serving of the vegetables listed below has only about 5 grams of carbohydrates.

- Asparagus
- Beans, green/wax
- Bean sprouts
- Beets
- Broccoli
- Brussels sprouts
- Cabbage (all kinds)
- Carrots
- Cauliflower
- Celery
- Cucumber
- Eggplant
- Green onions/scallions
- Leafy greens (all kinds)
- Mushrooms
- Okra
- Onions
- Pea pods (all kinds)
- Peppers (all kinds)
- Radishes
- Rutabaga
- Salad greens
- Sauerkraut
- Spinach
- Summer squash
- Tomatoes
- Tomato/Vegetable juice
- Turnips
- Zucchini

Proteins:

Protein plays a big role in growth and building strong muscles. These foods have little to no carbohydrates but are not considered "free foods" because they have calories, fat, and can raise blood sugar values a small amount. Choose lean or low-fat sources.

- Beef
- Cheese
- Chicken
- Cottage cheese
- Deli meats
- Eggs
- Egg substitute
- Fish or seafood
- Lamb
- Peanut butter*
- Pork or ham
- Salmon
- Sausage
- Tuna
- Turkey

Fats:

Fats are a major energy source and help to absorb some vitamins. They are important for growth and staying healthy. Fats have little to no carbohydrates. Choose healthier fats whenever possible.

Unsaturated fats (more healthy)

- Avocado*
- Margarine (soft tub,low-fat)
- Mayonnaise (reduced calorie)
- Nuts, mixed*
  - Peanuts*
  - Walnuts*
- Oil
- Olives*
- Peanut butter*
- Salad dressing* (light*)
- Seeds, pumpkin, sesame, sunflower and others*

Saturated fats (less healthy)

- Butter
- Bacon
- Coconut*
- Cream (heavy, light)
- Cream cheese (light)
- Gravy
- Shortening
- Sour cream (light)

* These foods contain carbohydrates. Please use carbohydrate counting resources to identify the carbohydrates in your portion size.

Family Education Sheet

"Free" Foods and Diabetes

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What are "free" foods?

This is one of the most common questions parents and caregivers have about their child's diabetes. It is normal to want to know about "free" foods that can be eaten without having to take insulin.

Foods with little to no carbohydrates are often called "free." But many of them can affect blood glucose levels. This information can help you better understand.

Proteins

Protein foods are encouraged because they help your child feel full and have little impact on blood glucose levels. Because of this, proteins like meat and cheese often become go-to snacks. These foods can be part of a healthful diet, but portion sizes are important.

Large portions of protein:

- May cause blood glucose to rise
- May contribute to unwanted weight gain due to high amounts of calories and fat
- Should not take the place of snacks with carbohydrate in order to avoid insulin injections

We recommend eating age-appropriate serving sizes of protein with meals and snacks. A dietitian can explain portion sizes right for your child.

Fats

Fats, like protein, do not have carbohydrate. Not much glucose is formed from eating fat, but fat can impact blood glucose levels. Eating fat helps children feel full and is necessary for the body. But it is important to understand how eating large portions of fat affect blood glucose levels.

Large portions of fat:

- Slow the rate of digestion (which slows the rise of blood glucose from carbohydrates)
- Increases insulin resistance (which increases the amount of insulin needed)
- May cause weight gain due to high amounts of calories
- Should not take the place of snacks with carbohydrate in order to avoid insulin injections

We recommended eating fats as a part of a balanced diet. A dietitian can explain how to eat healthful amounts of fat.

Low-carbohydrate foods

Some foods have very little carbohydrate. Foods that have less than 5g of carbohydrate usually can be eaten without a significant effect on blood glucose levels. Examples of these foods are:

- 1 cup raw (or ½ cup cooked) non-starchy vegetables (i.e. cucumbers, bell peppers, broccoli)
- 1 sugar-free popsicle

Low-carbohydrate foods *(continued)*

- 1 sugar-free hard candy
- 2 Tbsp. nuts/seeds
- 1 cup popcorn
- 1 cheese stick
- 1 hardboiled egg
- 1 oz. deli meat
- Low-carb specialty foods, like yogurt or bars

It is important to keep track of portion sizes of these low carbohydrate foods. If your child eats more than 1 portion, it increases the chance of affecting the blood glucose level. Even with just 1 portion, blood glucose could still rise. Track blood glucose levels to see if you need to cover low-carbohydrate foods with insulin.

Low-calorie, zero carbohydrate foods

There are some foods that are very low in calories and have zero carbohydrates. These may be eaten in moderate portion sizes without an effect on blood glucose levels. Unfortunately, these foods are usually not satisfying. Here are some examples:

- Bouillon or broth
- Coffee or tea (without milk or sugar)
- Sugar-free drink mixes
- Sugar-free Jell-O
- Herbs and spices
- Garlic
- Lemon/lime juice
- Mustard
- Diet soda
- Soy sauce
- Sugar substitutes

Does this mean free foods do not exist?

Except for the zero carbohydrate, low-calorie products listed, there are no real free foods. And we recommend limiting these for overall health.

This does not mean that your child will need insulin for everything that is eaten. However, you will need to monitor blood glucose levels and consider the effect of all foods when making decisions around the amount of insulin to give.

Contact us

If you have questions about free foods, please contact your registered dietitian. To set-up an appointment, please call (617) 355-4677 or email nutritiondept@childrens.harvard.edu.

Family Education Sheet

Healthy Snacking for Children with Diabetes

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- Your child may need to eat snacks in between meals to help keep blood glucose levels steady.
- To build healthful, well-balanced snacks, start with a protein. Then pair it with a fruit, vegetable or grain.
- The foods below have carbohydrates. CARBOHYDRATES MAY VARY—READ THE FOOD LABEL IF THERE IS ONE.
- The portion sizes listed may vary based on your child's age.

First, pick 1 protein

Protein starters

1 Light string cheese	1–2 oz. diced turkey or chicken
2 Tbsp. Peanut butter (7g) (carbs vary, look at the label)	6–8 oz. yogurt (carbs vary, look at the label) *Greek yogurt is highest in protein*
¼ cup hummus (8g)	1 hard boiled egg
1–2 slices lean deli meat—turkey, ham, roast beef	1 cup low-fat milk (12g)
¼ tuna fish	1 closed handful of nuts or seeds (7g)
15 slices turkey pepperoni	½ cup cooked beans/legumes (20g)
½ cup cottage cheese (3g)	

Choose 1 fruit, vegetable or grain

Fruit options

1 mini box of raisins–0.5 oz. (11g)	¾ cup pineapple (16g)
1 cup of sliced strawberries (13g)	15 grapes (13g)
½ cup unsweetened applesauce (14g)	1 cup raspberries—4.3 oz. (15g)
1 small apple—5.4 oz. (21g)	1 medium orange—6.3 oz. (15g)
1 medium banana—7" (27g)	1 small pear—5.8 oz. (23g)
1 medium peach—5.5 oz. (15g)	1 cup blueberries (21g)
1 cup cubed melon—5.5 oz. (12–14g) cantaloupe, honeydew, watermelon	

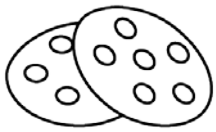
Vegetable options: all portions are for 1 cup raw

Carrot strips (12g)	Pea pods (5g)
Pepper strips (4g)	Cherry tomatoes (6g)
Celery sticks (3g)	Salad greens (2g)
Cucumbers (3g)	Zucchini or summer squash (4g)
Broccoli or cauliflower flowerets (4g)	

 **Grain options: choose *whole grain* products when possible**	1 oz. multigrain or bite-size round tortilla chips (18 g) (_____ chips)	1 granola bar (carbs vary, look at label) *Look for bars less than 6g sugar and ≥ 3 grams fiber per serving*
	16 animal crackers (24 g)	1 slice bread (carbs vary, look at label)
	1 serving crackers (carbs vary, look at label)	3 cups of 95% fat free microwave or air popped popcorn (14–16g)
	1 English muffin (25g)	1 frozen waffle (14g)
	1 mini pita bread (15g)	1, 6-inch tortilla or wrap (15g)
	1 cup whole grain dry cereal (carbs vary, look at label)	

Treats

It is OK for your child to have sweets now and then. Carbohydrates are the same, whether they come from treats or the grains listed above.

 **Occasional sweet treats**	Newman's Own Chocolate Chip cookies, 5 (22g)	Banana Babies®, 1 chocolate dipped banana (18g)
	Annie's Bunny Grahams Chocolate Chip, 28 cookies (21g)	Homemade cookie, 2.5" (12–15g) *Oatmeal, chocolate chip, peanut butter*
	½ cup ice cream (15–20g)	Homemade brownie, 2x2" square (12g)
	½ cup frozen yogurt (20–25g)	

Protein	Fruit, Vegetable or Grain

To make a nutrition appointment, contact us at 617-355-4677 or via email at nutritiondept@childrens.harvard.edu.

Tips

- Most snacks need to be covered with insulin. Protein and fat do not usually have carbohydrates, but can still increase your child's blood glucose level. Choosing snacks that are just protein and fat in order to avoid giving your child insulin can cause higher blood glucose levels at the next meal.
- It is OK to add small portions of fat to snacks, like a light dip, dressing, avocado or nuts. Just be mindful of the portion size.
- Try to choose just 1 snack between meals (2 or 3 a day). Grazing on snacks all day makes it hard to interpret blood glucose levels. It can also fill your child up so he may not want to eat the next meal.
- Packaged snacks are easy because you can read the label, but they are not always healthful options. Talk with your child's dietitian if you need help carbohydrate counting foods without food labels.

Family Education Sheet

Physical Activity & Type 1 Diabetes

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Physical activity can improve overall health and fitness and is recommended for all children. It may have benefits for your child's weight, heart, muscles, mood, sleep and confidence. And for children with type 1 diabetes, regular physical activity may also help manage blood glucose levels. Talk with your child's diabetes team before your child starts any physical activity.

How do I manage blood glucose levels when my child is physically active?

During physical activity, hypoglycemia (low blood sugar) is a risk for people with type 1 diabetes. Physical activity affects every child's blood glucose levels differently. So managing blood glucose levels using food and insulin adjustments is different for every child.

The following should be considered when exercising.

- Type of physical activity
- Intensity of physical activity
- Duration of physical activity
- Blood glucose values before, during, and after physical activity

How can I keep my child safe during physical activity?

It is very important to closely watch your child's blood glucose levels and keep good records.

- Check your child's blood glucose 15–20 minutes before activity.
- If your child is physically active for more than 1 hour, plan to check blood glucose again during the activity.

Your child will likely need a meal or snack with carbohydrates before prolonged physical activity. The amount your child needs will vary depending on the type, duration, and intensity of exercise. Use blood glucose levels to know if you need to adjust carbohydrate or insulin around activity!

Examples of snacks for physical activity:

- Fruit
- Granola bars
- Trail mix
- Crackers/bread and cheese or peanut butter

Rule of Thumb for Exercise
15-30 grams of carbohydrates for every 60 minutes of moderate exercise

- For some activities shorter than 30 minutes or high intensity activities (weight training, interval training), your child may not need carbohydrate.

What supplies should I always have when my child is exercising?

Pack these supplies and snacks in case of hypoglycemia (and to prevent it):

- Blood glucose meter with supplies
- Glucose tabs
- Hard candy, dried or fresh fruit, juice boxes, crackers with peanut butter or cheese, granola bars, water

What else should I do to keep my child safe?

- Be sure to check blood glucose levels more than usual after your child exercises. Blood glucose levels can drop many hours after your child is done exercising. This is especially true if your child exercises for a long time.
- Help your child's exercise partners—teammates, coaches or people your child exercises with—understand signs of hypoglycemia and how to help treat hypoglycemia.
- Make sure your child always wears a medical ID bracelet.

Contact us

Please contact your child's registered dietitian if you have questions about exercise and Type 1 Diabetes. Call (617) 355-4677 or email nutritiondept@childrens.harvard.edu to set up an outpatient appointment.

Guidelines for Increasing Carbohydrate When Exercising

Length of Exercise Session	Exercise Effort	Less than 90 mg/dL	90 – 150 mg/dL	150 – 250 mg/dL
30 minutes	Mild	15	0-15	0
	Moderate	15	15	0-15
	Hard	15	15	0 -15
30 – 60 minutes	Mild	15 – 30	15 – 30	0 – 15
	Moderate	15 - 45	15 – 30	15
	Hard	30 - 45	15 – 30	15 - 30
60 – 90 minutes	Mild	15 – 45	15 – 45	15 – 30
	Moderate	30 – 45	30 – 45	30 – 45
	Hard	30 – 60	30 – 45	30 – 45
More than 90 minutes	Mild, moderate, or hard	Follow guidelines for 60 to 90 minutes of activity. Check blood glucose and consume carbohydrate if below 150 mg/dL for every 30 – 45 minutes of activity.		

Examples of Mild, Moderate, and Hard Exercise

Mild	Moderate/Hard	
• Brisk walking	• Baseball	• Basketball
• Canoeing/kayaking	• Cycling	• Lacrosse
• Leisure swimming	• Football	• Running
• Playing on playground	• Gymnastics	• Soccer
	• Jogging	• Tennis

Remember, exercise intensity is different for every child. Exercise intensity may also vary between sports practices and sports games.

- Mild activity feels "light" or easy to do.
- Moderate activity takes more effort. You may be slightly out of breath but still able to talk to someone while exercising.
- Hard activity is vigorous and requires a lot of effort. Breathing may be more labored.

Talk to your child, coaches and athletic trainers to learn more about the intensity of practices and games.

These charts were used with permission from the American Dietetic Association, Physical Activity, 2006.

Family Education Sheet

Diabetes Resources

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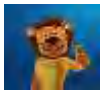
App	Platform and Price	Category	Summary of App Features
Glucose Buddy 	Free; Apple	Glucose Tracking	***Glucose Buddy*** is a data storage tank that allows users to manually enter blood glucose numbers, carbohydrate intake, insulin dosage and activities. Users can link their app with glucosebuddy.com online for complete functionality.
mySugr Diabetes Logbook 	Free; Apple and Android	Food Management Glucose Tracking	***mySugr Diabetes Logbook*** logs meals, medication, blood glucose values, activity and more. Blood glucose graph and estimated HbA1c are provided with daily, weekly and monthly analysis.
On Track Diabetes 	Free; Android	Food Management Glucose Tracking	***On Track Diabetes*** helps parents manage their child's diabetes by tracking items such as blood sugar, food, medication, blood pressure, pulse, exercise and weight.
Calorie King 	Free; Apple	Food Management	***Calorie King*** is a tool with a calorie, carbohydrate and nutritional food and restaurant database.
CRON-o-meter 	$2.99; Apple and Android	Food Management	***CRON-o-meter*** is a tracking application for nutrition, health and fitness data. You can log, track and share date for your daily foods, exercises, biometrics, and notes.
Recipes for Diabetes 	Free; Android	Food Management	***Recipes for Diabetes*** contain 140+ easy-prepare-recipes. Each has nutritional analysis such as calories, carbohydrates, sodium and cholesterol.
MyFitness Pal 	Free; Apple and Android	Food Management	***MyFitness Pal*** is a database of 5,000,000 foods and an easy-to-use calorie counter. All major nutrients are tracked, such as calories, fat, protein, carb, sugar, fiber and cholesterol. It includes step tracking.
Figwee 	$2.99; Apple	Food Management and Carb Counting	***Figwee*** is a visual database of 28,000+ images of weighed portions that allow you to fine-tune estimations when carb counting.
Diabetes App 	$6.99; Apple	Food Management, Carb Counting, Glucose Tracking	***Diabetes App*** helps with blood sugar control, tracks glucose and counts carbohydrates. It contains a database of 200,000 foods and allows you to manage and custom foods.
Carbs & Cals 	$4.99; Apple and Android	Food Management and Carb Counting	***Carbs & Cals*** helps count carbohydrates using thousands of food and drink photos. You can log meals, snacks and exercise as well as set up targets and keep track of your intake.
Carb Counting with Lenny 	Free; Apple and Android	Carb Counting	***Carb Counting with Lenny*** leads kids and parents through diabetes education games designed to help children learn to carb count.
BG Monitor Diabetes 	Free; Android	Insulin Calculation, Carb Calculation, Glucose Tracking	***BG Monitor Diabetes*** has features like insulin bolus calculation and blood glucose targets. Users can store foods' nutrition information, use a carb calculator and email data reports.
Glucose Companion 	$1.99; Apple	Insulin Calculation, Glucose Tracking	***Glucose Companion*** is a blood sugar and weight tracker. An insulin calculation function calculates the recommended dosage of fast acting insulin and users can share their charts, progress and measurements with their physician.

General Diabetes Books for Caregivers

Type 1 Diabetes in Children, Adolescents, and Young Adults *Dr Ragnar Hanas*

Think Like a Pancreas: A Practical Guide to Managing Diabetes with Insulin *Gary Scheiner*

Raising Teens with Diabetes *Moira McCarthy*

Nutrition Books

The Calorie King: Calorie, Fat & Carbohydrate Counter *Allan Borushek*

The Ultimate Guide to Accurate Carb Counting *Gary Scheiner*

Complete Guide to Carb Counting *Hope Warshaw and Karemeen Kulkarni*

The Diabetes Carbohydrate and Fat Gram Guide *Lea Ann Holzmeister*

Cookbooks

The New Family Cookbook for People with Diabetes *American Diabetes Association & American Dietetic Association*

Diabetes Snacks, Treats, and Easy Eats for Kids: 150 Recipes for the Foods Kids Really Like to Eat *Barbara Grunes*

Books for Children

A Magic Ride in Foozbah Land *Jean Betschart* (ages 5-7)

I Have Diabetes *Karri Andersen* (ages 4 – 7)

Taking Diabetes to School *Kim Goesselin* (ages 6-10)

The Bravest Girl in School *Kate Gaynor* (ages 6-10)

The Great Katie Kate *M. Maitand Deland* (ages 6-10)

Even Superheros Get *Diabetes Sue Ganz-Schmitt (*ages 5-9)

Jacob's Journery, Living with Type 1 Diabetes *Deanna Kleiman* (ages 8-12)

Ballerina Dreams: A Book for Children with Diabetes *Zippora Karz (*age 10 – 12)

Books for Adolescents

Sugar Linings: Finding the Bright Side of Type 1 Diabetes *Sierra Sandison*

Getting a Grip on Diabetes: Tips and Techniques for Kids and Teens *Spike Loy & Bo Loy*

Type 1 Teens: A Guide to Managing your Life with Diabetes *Korey K Hood*

Diabetic Athlete's Handbook *Sheri Colberg*

Internet Resources: Not all information found on the internet is accurate or useful. If you have questions about information you read on the internet, check with your child's diabetes doctor or nurse educator.

Name of Website:	**Web Address:**
Juvenile Diabetes Research Foundation	www.jdrf.org
American Diabetic Association	www.diabetes.org
Academy of Nutrition and Dietetics	www.eatright.org
USDA MyPlate	www.choosemyplate.gov
The Calorie King	www.calorieking.com

Family Education Sheet

Scheduling Your Outpatient Diabetes Follow-Up Appointments

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You will need to schedule outpatient follow-up appointments with the Diabetes Program to continue your family's diabetes management education, medical care and support. The outpatient diabetes team plays an important role in successfully managing your child's diabetes.

We recommend that you set up theses appointments before going home:

❑ New diagnosis of diabetes: Type 1 / Type 2 (please circle)

- 1 visit with diabetes nurse educator or doctor within 1 week: _____
- 1 visit with registered dietitian within 2 weeks: _____
- 1 visit with diabetes doctor within 6–8 weeks: _____
- 1 visit with social worker or psychologist within 6–8 weeks: _____

❑ Return admission (hospital stay) for diabetes

- 1 visit with diabetes nurse educator or doctor within 2–3 weeks: _____
- 1 visit with social worker or psychologist within 2–3 weeks: _____

Before you go home, please call the scheduling line during the hours of operation.

You will speak with an administrative assistant who will help you schedule these appointments. **Please have your personal / work schedule available when you call** so you will not have to cancel or reschedule. **It is important for you to be flexible during the scheduling process so we can make your first appointments within the necessary timeframes.**

Type 1 and Type 2 Diabetes Program Scheduling Line	
Phone number	617-355-8136
Fax number	617-730-0194
Hours	Monday–Friday 9 a.m.–5 p.m.

Family Education Sheet

Forms and Supplies for Your Child's School or Camp Nurse

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What is the School and Camp Medication Order Form?

This form allows the school or camp nurse to:

- Check your child's blood glucose
- Correct low blood glucose with a fast-acting carbohydrate and snack, if needed
- Give insulin to cover for carbohydrates and correct for high blood glucose
- Check for ketones
- Give an emergency injection of glucagon

The School/Camp Medication Order form must be signed by the provider before your child leaves the hospital.

What supplies should I bring to my school or camp nurse?

- 1 blood glucose logbook
- 1 blood glucose meter
- 1 Glucagon Emergency Kit
- Alcohol wipes
- Blood glucose test strips
- Fast-acting carbohydrate (such as glucose tabs)
- Ketone testing supplies (urine or blood ketone test strips)
- Lancets
- Snacks

If your child is on a basal-bolus insulin regimen or gets insulin based on a sliding scale, then also bring:

- _____ insulin or insulin pen
- Insulin syringes or pen needles

Family Education Sheet

Diabetes Discharge Instructions

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Who will I be in touch with when I go home?

The outpatient diabetes team will be your main contact for daily questions and concerns related to your diabetes management.

How do I contact the diabetes team?

- Call 617-355-6369 and ask for the diabetes nurse or doctor on call to be paged.
- If you need an interpreter, call 617-355-6369. The page operator will connect you to Interpreter Services.

How does the daily blood glucose review work?

Until your first outpatient appointment, please page the diabetes nurse educator on call **every day** before 3 p.m. During this call, you and the nurse educator will:

- Review the past 24 hours of blood glucose values
- Review the past 24 hours of insulin doses

You can also ask your nurse educator any questions you may have during this call.

Before calling, please have your blood glucose logbook updated and available.

Important reminder:

Check blood or urine ketones if blood glucose is greater than 300 mg/dL or if vomiting.

What should I do if I have an urgent issue or question?

Page the diabetes nurse or doctor on call right away if there is an urgent issue, such as:

- Moderate or large urine ketones or blood ketones greater than or equal to 1 mmol/L
- Vomiting (throwing up)
- Not able to eat or drink
- Blood glucose that is still low after being treated with rapidly absorbed carbohydrates (such as glucose tabs, juice, etc.)
- Low blood glucose level (hypoglycemia) that was treated with Glucagon and/or you have called 911
- You made a mistake with a dose of insulin
- You missed a dose of insulin

The Diabetes team at Boston Children's Hospital is available 24-hours-a-day, 7 days a week for any urgent issue listed above.

{NOTES}