



Education

Diabetes: Counting Carbohydrates Meal Plan

What is the counting carbohydrates meal plan?

Counting carbohydrates is a food plan in which you adjust the insulin dose based on the amount of carbohydrates your child plans to eat.

How is this plan different from other carbohydrate meal plans?

This plan is different from other plans because the insulin dosage and carbohydrates are not always the same day to day. This plan is more flexible and is usually started after you are familiar with food choices and insulin.

How does this plan work?

Carbohydrates affect your child's blood sugar more than any other kind of nutrient. Insulin works with carbohydrates to supply energy for the body. The main goal is to balance insulin with the carbohydrates your child eats throughout the day.

First, you and your diabetes care provider need to figure out how much insulin your child needs to take in relation to the amount of carbohydrate your child plans to eat. There are two approaches to take when figuring this out:

Units per carb choice (exchange): Count carbohydrates in portion sizes of 15 grams. This is called a "carb choice" or an exchange. Divide the number of grams of carbohydrate in a food by 15 to determine carb choices. For example, if a container of yogurt with fruit has 45 grams of carbohydrate, it equals 3 carb choices.

Units insulin are then adjusted at every meal to match the number of carb choices. To use this method, your provider needs to tell you how many units of insulin you need for each carb choice. For example, if your child needs 1 unit of insulin for every carb choice, then for 3 carb choices, he would need 3 units of insulin ($1 \times 3 = 3$).

Units of insulin per carb choice X # of carb choices = units of insulin needed.

I/C ratio: Most people use an Insulin to Carbohydrate ratio (I/C ratio) to figure out how much insulin to use. If you use a ratio, you do not need to convert the number of carbohydrates to carb choices. An example of an I/C ratio is 1 unit of insulin for every 10 grams of carbs eaten.

For example, if you plan to eat 60 grams of carbohydrate and your I/C ratio is 1/10 (.10), then you would need 6 units of insulin ($60 \times .10 = 6$).

Grams of carb X I/C ratio = units of insulin.

Your dietitian will help you figure out your I/C ratio.

Adjustments to the insulin dose

Changes to the dose may be needed because of planned exercise, blood sugar levels, or other factors that may affect blood sugar (such as illness, stress, or menstrual periods). For example, your child may need less insulin if the blood sugar level is low (below 70 mg/dl) or more insulin if the blood sugar is too high (above 200 mg/dl). Your dietitian and health care provider will give you guidelines for making these adjustments. The insulin dose calculated from the I/C ratio is usually reduced by half if it is given before strenuous exercise or at bedtime.

Which foods have carbohydrates?

Carbohydrates are found in foods such as:

- Starchy foods (such as breads, cereals, rice, starchy vegetables, and pasta)
- Fruits
- Milk and yogurt
- Sweets

Most vegetables, meats, and fats are not high in carbohydrates. They have less of an effect on blood sugar levels. You can adjust your child's insulin dose based on meats and fats, if needed, after you have learned how to count carbohydrates.

To see a list of carb choices, you can order the Exchange List for Meal Planning from The American Diabetes Association and the American Dietetic Association (1-800-342-2383). This book lists the carbohydrate content for lots of foods and is very useful. Nutrition labels on food packages also list the grams of carbohydrate in a serving of food.

When should my child take insulin?

In general, your child should take his insulin so that it starts working as the blood sugar begins to rise. Sugar is absorbed into the blood about 10 minutes after eating.

- **Humalog/NovoLog/Apidra:** Starts working in 10 minutes. The peak activity of this insulin is 30 to 90 minutes after taking. Take this insulin right before eating.
- **Regular insulin:** Starts working in 20 to 30 minutes. The peak activity is 2 to 4 hours after taking. Take this insulin 20 to 30 minutes before eating.

Sometimes insulin can be given after eating. Your child's doctor and dietitian will help you create a schedule for when to take insulin and when to eat.

How do I get started?

1. Keep a food, insulin, blood sugar level, and exercise record for at least 3 days. The more blood sugar tests you can do 2 hours before meals and 2 hours after meals, the better the advice your dietitian can give you. It is also important to record all doses of insulin or oral medicines taken.
2. The dietitian will review the report and work with your provider to decide what your child's Insulin to Carb (I/C) ratio is. Some people can use 1 unit of short acting insulin per 15 grams of carb for all meals and snacks (an I/C ratio of 1/15). Your child's ratio may vary from one time of day to another. For example, a 1/15 ratio for breakfast, a 1/30 ratio for lunch, and a 1/10 ratio for dinner.
3. Start counting carbs and adjusting the insulin dose accordingly. You need to keep careful records for the first 1 to 2 weeks of:
 - number of carbohydrates your child eats at each meal or snack
 - insulin dose given
 - blood sugar levels (especially levels 2 hours after meals)
4. After a week or two, review your records with a dietitian to check if any adjustments need to be made. If the blood sugar values are not in the desired range, then your child's I/C ratio needs to be changed. If the blood sugar value is always high 2 hours after a meal, more insulin is needed for the grams of carb in the I/C ratio. For example, your child would need to change from an I/C ratio of 1/15 to 1/10.

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Food Guidance System My Pyramid Plan



The My Pyramid Plan is based on your age, gender, and how much exercise you get each day. You can find out how many calories you should eat each day and the amount of the foods you should eat by going to www.mypyramid.gov. The examples below are for a diet of 2000 calories per day.



Healthy Eating Tips

- Half of the grains you eat should be whole grains.
- Vary your veggie choices. Eat some dark green, orange, and creamy vegetables every week.
- Make most of your fruit choices whole or cut up fruit rather than juice so you get more fiber.
- Choose fat-free or low-fat milk and yogurt.
- Choose lean cuts of meat. Also eat beans such as black, soy, or pinto beans for protein.
- Look for foods that are low in saturated fats, trans fats, and cholesterol to help reduce your risk of heart disease.

Sugar Content of Some High-Carbohydrate Foods

Food Item	Portion Size	Sugar Content in Teaspoons*	# "Carb Choices"
Beverages			
Cola Drinks	12 oz	10	2
Flavored Milk	12 oz	7	2
Orange Juice, or Apple Juice	8 oz	5	1 1/2
Milk Products			
Syrup	1 spoon	3	2
Ice Cream Cone	1 cone	3 1/2	1
Chocolate Milk Drink	12 oz glass	11	4
Milk	8 oz glass	0	1
Chocolate Milk	8 oz glass	6 1/2	3
Fruit Yogurt	8 oz tub	3	3
Sweets and Cookies			
Angel Food Cake	4 oz piece	2	2
Chocolate Cake, Plain	4 oz piece	4	2
Chocolate Cake, w/ Frosting	4 oz piece	15	3
Cupcake, w/ Frosting	1	5	2
Biscuits, w/ Frosting	1 oz piece	3	1
Single Cookie	1	1 1/2	1/2
Chocolate Chip	1	2	1
Crust, Plain	1	2	1
Crust, Sweet	1	3	2
Desserts			
Ice Cream	1/2 cup	4 1/2	1 1/2
Pudding	4 oz portion	4	1
Jelly Pie	1 slice	7	2
Berry Pie	1 slice	12	3
Chocolate Pudding	1/2 cup	4	1
Snacks			
Chocolate Candy Bar	1 oz bar	3 1/2	1
Chocolate Lovers	1 stick	25	1
Hard Candy	4 oz	20	1
LEGO BRICKS™	1	1 1/2	1/2
M&M's™	1 packet	1 1/2	1/2
Chocolate Candy	1 piece	2	1
Unsweetened			
1 Teaspoon	1 Tbsp	4 to 8	2
1 Teaspoon	1 Tbsp	4	1
1 Teaspoon	1 Tbsp	3	1
1 Teaspoon	1 Tbsp	3	1
1 Teaspoon	1 Tbsp	3	1
1 Teaspoon	1 Tbsp	3	1

*1 tsp = 1 Tbsp = 1 "carb choice" = 10 grams of carbohydrate