

GET COUNTING

CARBOHYDRATES AND DIABETES

What you need to know

WHY CARBS COUNT

Carbohydrates are important since they provide energy and essential vitamins and minerals. Carbohydrates are the primary foods that affect glucose levels. Nearly 100% of digestible starches and sugars become glucose soon after eating. Glucose is then released into the bloodstream to provide immediate energy needs, or stored in the muscle and liver as glycogen. Excess glucose is converted to fat for storage.^{1,2}

GET TO KNOW YOUR CARBS¹⁻³

Carbohydrates consist of:



- Grains and starches (rice, quinoa, oats, corn, potato, breads, cereals, some beans and legumes)



- Fruits



- Milk and yogurt



- Sweets and treats (baked goods, candy, juice, pop, etc.)

FIBRE MAKES A DIFFERENCE^{1,2}

Although most dietary fibre is not digestible, it contributes to digestive health by helping to keep you regular and feeling full after a meal. It also helps slow down digestion to better match the timing of insulin's action.

Fibre can be found in plant-based carbohydrates such as:

- Fruits and vegetables
- Whole grains
- Legumes



THE IMPORTANCE OF COUNTING CARBOHYDRATES¹

Carbohydrate counting is a technique that is used to help you plan your meals and manage your insulin dosing. It allows you to dose your insulin at meal time based on the amount of carbohydrates you intake.

This method uses an insulin-to-carbohydrate ratio or IC Ratio that is provided to you by your healthcare provider.

In order to understand IC ratios, it is important to first understand basal insulin and bolus doses.

Basal insulin

You may not realize that even when you are not eating, your body still produces and releases glucose into the blood. This is to ensure your muscles and other cells have the fuel necessary to function.

Insulin pumps deliver small amounts of insulin every few minutes. This is referred to as the basal rate or "background insulin". The **basal rate** stabilizes blood-glucose levels between meals and during sleep.

Bolus doses

On top of basal insulin, additional insulin is needed in anticipation of foods that are likely to raise your blood glucose levels, such as carbohydrates, and/or to correct an elevated blood glucose. This additional dose of insulin is called a **bolus dose**.

IC ratios are used to determine your meal bolus dose. This ratio helps you calculate how many units of rapid-acting insulin are needed for the amount of carbohydrates (in grams) you plan on eating.

Example⁴:

IC Ratio of 1 unit: 10 g
 10 g carbohydrates → needs 1 unit bolus
 60 g carbohydrates / 10 = 6 units bolus

Using this method, the amount of insulin you take for your meals is better customized to what you are going to eat. If you eat more carbohydrates, you take more insulin. If you eat less carbohydrates, you take less insulin.

GET TO KNOW THE NUTRITION FACTS LABEL⁵

The nutrition facts label can be a helpful tool to determine the amount of carbohydrates you are consuming.

Nutrition Facts			
Per 90 g serving (2 slices)			
Amount	% Daily Value		
Calories 170			
Fat 2.7 g	4 %		
Saturated 0.5 g	5 %		
+ Trans 0 g			
Cholesterol 0 mg			
Sodium 200 mg	8 %		
Carbohydrate 36 g	13 %		
Fibre 6 g	24 %		
Sugars 3 g			
Protein 8 g			
Vitamin A 1 %	Vitamin C 0 %		
Calcium 2 %	Iron 16 %		

The amount listed is for the serving size given. Are you eating more, less or the same amount? Compare your serving size to figure out the amount of carbohydrates you are consuming.

The total amount of carbohydrates is listed first (in grams). This number includes starch, sugars and fibre.

Fibre does not raise blood sugar and should be subtracted from the total carbohydrate (i.e. 36 grams of carbohydrate – 6 g of fibre = 30 g of available carbohydrate)

THE 3 STEPS TO COUNTING YOUR CARBS¹

STEP 1 | Identify your carbs

For example, if you have a meal of grilled chicken, mashed potatoes, green beans, corn and a fruit cup, you would focus on just the potatoes, corn and fruit for your carbohydrate count.

STEP 2 | Estimate the portion

After you have identified the carbohydrates in your meal, it is time to estimate how much you plan to eat. There are several ways to do this:

- Measuring cups
 - Initially, you will find it helpful to use measuring cups to get an understanding of how much certain foods look like. After a while, you may be able to "eyeball" an accurate portion
- Nutritional food scales
 - Although not widely used, this may be the most accurate way to determine carbohydrates in grams
- Estimate by comparison
 - You may find these comparisons helpful when estimating portions:

1 cup is the size of a fist



1 ½ ounces is the size of four stacked dice



½ cup is the size of a tennis ball



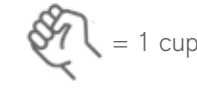
STEP 3 | Calculate the grams

Once you know the portion size of the carbohydrates included in your meal, it's time to count the grams of carbohydrates using the nutrition label or food lists.

STEP 1 | Identify the carbohydrates



STEP 2 | Estimate the portion



STEP 3 | Calculate the grams



30 g of carbs total

COMMON FOODS AND THEIR CARB COUNT⁶

To begin carbohydrate counting, you need to know how many carbs you are consuming. The table below shows examples of foods that are equivalent to 15 grams of carbohydrates.

1/2 cup of pasta	= 15 g
1/3 cup of rice	
1/2 of medium sizes potato	
1/2 cup of mashed potatoes	
1/2 cup of corn	
1 cup of blueberries	
2 cups of strawberries	

So for example, if you have a **cup** of mashed potatoes, then the total amount of carbohydrates you are consuming is **30 g**

GET STARTED

Keeping a food diary may help you keep track of your glucose levels and the amount of carbohydrates you are consuming – especially when you first get started.

Use the following as an example of what to keep track of:

FOOD LOG	Date:		
Breakfast	Glucose level	Food	Carbs (g)
Before meal:			
After meal:			
Medication(s):			
Other notes:			
Lunch	Glucose level	Food	Carbs (g)
Before meal:			
After meal:			
Medication(s):			
Other notes:			
Dinner	Glucose level	Food	Carbs (g)
Before meal:			
After meal:			
Medication(s):			
Other notes:			
Snack(s)	Glucose level	Food	Carbs (g)
Before meal:			
After meal:			
Medication(s):			
Other notes:			

 Reach out to your healthcare provider if you have any questions

References: **1.** Walsh J and R Roberts. (2016). Pumping insulin (6th ed.). San Diego, CA: Torrey Pines Press. **2.** Health Canada. Carbohydrates. Accessed January 2019 at: <https://www.canada.ca/en/health-canada/services/nutrients/carbohydrates.html>. **3.** Health Canada. Sugars. Accessed January 2019 at: <https://www.canada.ca/en/health-canada/services/nutrients/sugars.html>. **4.** St. Michael's Hospital. Insulin dosing using an insulin-to-carb ratio and correction factor. Accessed January 2019 at: <http://www.stmichaelshospital.com/pdf/programs/diabetes/insulin-dosing-using-insulin-to-carb-ratio.pdf>. **5.** Diabetes Canada. Basic carbohydrate counting for diabetes management. Accessed January 2019 at: <https://guidelines.diabetes.ca/docs/patient-resources/basic-carbohydrate-counting.pdf>. **6.** Diabetes Canada Association. Beyond the basics: Meal planning for healthy eating, diabetes prevention and management. Accessed January 2019 at: <http://family-medicine.ca/images/DM-Carb-list-beyond-the-basics.pdf>.