Diabetic Diet – CHO Counting

Purpose

Carbohydrate counting is a method of meal planning that is based on the number of grams of CHO in food. Carbohydrate-rich foods are made up primarily of starch and the sugar glucose, which is the body's main fuel source. Therefore, carbohydrates have the greatest impact on blood glucose levels. People with diabetes must pay close attention to the amount of carbohydrates they are consuming. The purpose of monitoring carbohydrate intake, tracking portion sizes and having set times for meals is to maintain stable blood glucose levels. Keeping within a healthy blood glucose range helps to avoid hypoglycemia, hyperglycemia and to prevent or delay the complications of diabetes. It is important for diabetics to monitor their dietary intake of carbohydrates, not cut them out from their diet. Eating consistent amounts of carbohydrate at meals and snacks can make carbohydrate counting a simpler and more effective method of meal planning.

Population

Both individuals with Type 1 and Type 2 diabetes need to monitor their carbohydrates. The amount of carbohydrate you should eat is based on several factors including: sex, weight, level of physical activity, medications (including insulin), and blood glucose goals. By eating the same amount of carbohydrate at each meal at approximately the same time each day, you will be able to better maintain proper blood glucose levels. A registered dietitian, diabetes educator, or other health care member can help you develop a meal plan that is right for you.

General Guidelines

Examples of carbohydrate-containing foods are grains such as bread and cereal, fruits and starchy vegetables such as potatoes, and dairy products. These foods provide important nutrients such as vitamins, minerals, and fiber for good health. Although foods like cake and cookies also contain carbohydrates, these foods are typically high in fat and calories and low in vitamins, minerals, and fiber. These foods may make it more difficult for you to manage your weight, therefore you should try to limit these and eat more whole grain breads and low-fat dairy products.

<u>Carbohydrate Group</u> (40-60% of your diet should be carbohydrate)
Starch
Fruit
Milk
Starchy Vegetables

<u>Meat and Meat Substitute Group*</u>
Lean
Fat group
*Meats and fats are not counted as carbohydrates, but they cannot be ignored because their calorie and fat content is still a large contribution to your total dietary intake.

Food Group	Carb Grams	Food Group	Carb Grams
Bread/Starch	15	Vegetable	5
Fruit	15	Meat	0
Milk	12	Fat	0

Some common serving sizes are listed below, based on 15 grams of carbohydrate:
•1 small piece of fresh fruit (4 oz)
•1 slice of bread (1 oz)
•1/2 cup of oatmeal
•1/3 cup of pasta or rice
•4-6 crackers
•1/2 cup of black beans or starchy vegetable
•2 small cookies
•1/2 cup ice cream or sherbet
•1 Tbsp syrup, jam, jelly, sugar or honey
•2 Tbsp light syrup
•6 chicken nuggets
•1 cup of soup
•1/4 serving of a medium French fry

Three Levels of Carbohydrate Counting

Level 1: Basic Carbohydrate Counting Skills
Knowing carbohydrate sources
Knowing how to count grams of carbohydrate in foods
Understanding the relationship between portion size and carbohydrate content
Recording your usual carbohydrate intake and sharing it with an RD
Determining target amounts of carbohydrates for meals and snacks determined

Level 2: Intermediate Carbohydrate Counting Skills
Pattern management
- Identify blood glucose patterns impacted by food, insulin, and PA
- Identify and interpret patterns to make adjustments in diabetes regimens

Rapid of short-acting insulins matched to carbohydrate content of usual meals
Insulin doses adjusted when deviations from usual carbohydrate content are made
- For every 15-20 g CHO added or subtracted from a meal, 1-2 units rapid- or short-acting insulin suggested.
- Each person's requirements should be individualized

Level 3: Advanced Carbohydrate Counting Skills
Used by individuals on intensive insulin therapy
Insulin adjusted on basis of ratio of grams of carbohydrate intake to doses of rapid or short-acting insulin
RD calculates carbohydrate-to-insulin ratio for each meal
- Uses food, insulin, blood glucose monitoring records
- Ratios may vary from meal to meal, from workdays to weekend days, from exercise to non-exercise days, and they may change over time

- Periodic reevaluation is required

Calculation of carbohydrate-to-insulin ratios

- Grams of CHO eaten at a meal divided by number of units of rapid- or short-acting insulin necessary to meet blood glucose goals. For example:
- 45 g CHO (3 CHO choices) at a meal and requires 5 units insulin
- Ratio of 1 U insulin to 9 g CHO or 2 U insulin for every 1 carbohydrate choice

There may be need for food-specific insulin doses

Large amounts of meat and/or fat at a meal may require adjustment of insulin administration after the meal instead of before the meal

Grams of fiber may be subtracted from total carbohydrate content of a food if it contains >5 g fiber per serving, since fiber is not considered an available source

Education Material

How to measure grams of CHO:

CHOs are measured in grams

15 grams CHO = 1 CHO choice

Total CHO (grams) per day ÷ 15 grams CHO = number of CHO choices per day

Ideas for Compliance:

Making sure that an individual stays within a healthy blood glucose range will prevent the chance of hypoglycemia, hyperglycemia, and many other risk factors. If a person becomes hypoglycemic, they should be given ½ cup fruit juice, ½ cup soda, or 3-4 glucose tablets. If a person becomes hyperglycemic, they may need to adjust their insulin regimen and/or see a physician if it gets too high, which could cause diabetic ketoacidosis or other complications.

Reading food labels is a simple and easy way to know how many carbohydrates are in a food. Be sure to pay attention the serving size, in case you would need to double the amount of carbohydrate. Also pay close attention to the "total carbohydrate" which includes sugar, starch, and fiber. Not all foods are labeled, therefore, it is important to be well educated so that you can estimate how much carbohydrate is in it. Knowing general serving sizes will help you estimate how much carbohydrate you are eating.

Exercise is encouraged for diabetics because it can improve glycemic control, improve blood lipids and blood pressure with subsequent lower cardiovascular risks and overall mortality, have a positive impact on metabolic abnormalities characteristic of T2DM for individuals at high risk for developing diabetes or with pre-diabetes and help to enhance quality of life.

Checking your blood glucose levels before and after eating is important in determining whether you need to change your meal plan or modify it. Your physician may need to make adjustments to your diabetes medications or insulin doses.

Sample Menu

Foods that contain carbohydrates are:

•starchy foods like bread, cereal, rice, and crackers
•fruit and juice
•milk and yogurt
•dried beans like pinto beans and soy products like veggie burgers

•starchy vegetables like potatoes and corn
•sweets and snack foods like sodas, juice drinks, cake, cookies, candy, and chips

*Non-starchy vegetables have a little bit of carbohydrate but in general are very low.

Sample carbohydrate counting menu

Breakfast	1 cup oatmeal	27 grams total carbohydrates = 2 carbohydrate choices
	1 cup skim milk	12 grams total carbohydrates = 1 carbohydrate choice
	¾ cup blueberries	15 grams total carbohydrates = 1 carbohydrate choice
		TOTAL: 4 carbohydrate choices
Lunch	1 small apple	15 grams total carbohydrates = 1 carbohydrate choice
	6 ounces light yogurt	20 grams total carbohydrates = 1 carbohydrate choice
	2 slices whole wheat bread	30 grams total carbohydrates = 2 carbohydrate choices
	2 ounces lean turkey and 1 slice low-fat cheese	
	Salad with greens, cucumbers, tomatoes, radishes, and 2 teaspoons of oil and vinegar	
	Sugar-free gelatin and sugar-free lemonade	TOTAL: 4 carbohydrate choices
Dinner	2/3 cup brown rice or whole-wheat pasta	30 grams total carbohydrates = 2 carbohydrate choices
	½ cup light canned peaches with 2 tablespoons light nondairy whipped topping	15 grams total carbohydrates = 1 carbohydrate choice
	1 small whole wheat dinner roll	15 grams total carbohydrates = 1 carbohydrate choice
	4 ounces lean chicken or fish	
	1½ cups steamed broccoli and cauliflower	TOTAL: 4 carbohydrate choices
Snack	3 cups low-fat/reduced-fat popcorn	15 grams total carbohydrates = 1 carbohydrate choice
		TOTAL: 1 carbohydrate choice

University of Pittsburgh Medical Center. *Basic Carbohydrate Counting.* http://www.upmc.com/HealthAtoZ/patienteducation/Documents/basicCarbCounting.pdf

Sample Menu

An individual on a 2,000 kcal diet and needs 50% of their intake coming from carbohydrate would need 250 grams of carbohydrate per day.

2,000 kcals x 50% CHO / 4 kcals/g = 250 g CHO

Websites

American Diabetes Association http://www.diabetes.org/

MayoClinic.com http://www.mayoclinic.com/

The Merck Manual. http://www.merck.com/mmpe/index.html