

 The Children's Hospital *of Philadelphia*®

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## Carbohydrate Counting and Diabetes Basal/Bolus Regimen



# Objectives

- ❖ You will be able to:
  - Explain why we count carbohydrates
  - Read a food label for carbohydrate count
  - State what to do when your child wants an extra snack
  - Describe the meal plan for your child using basal/bolus insulin



# Insulin Action

## ❖ Insulin:

- Helps the body use food for energy
- Keeps blood sugars in a healthy range

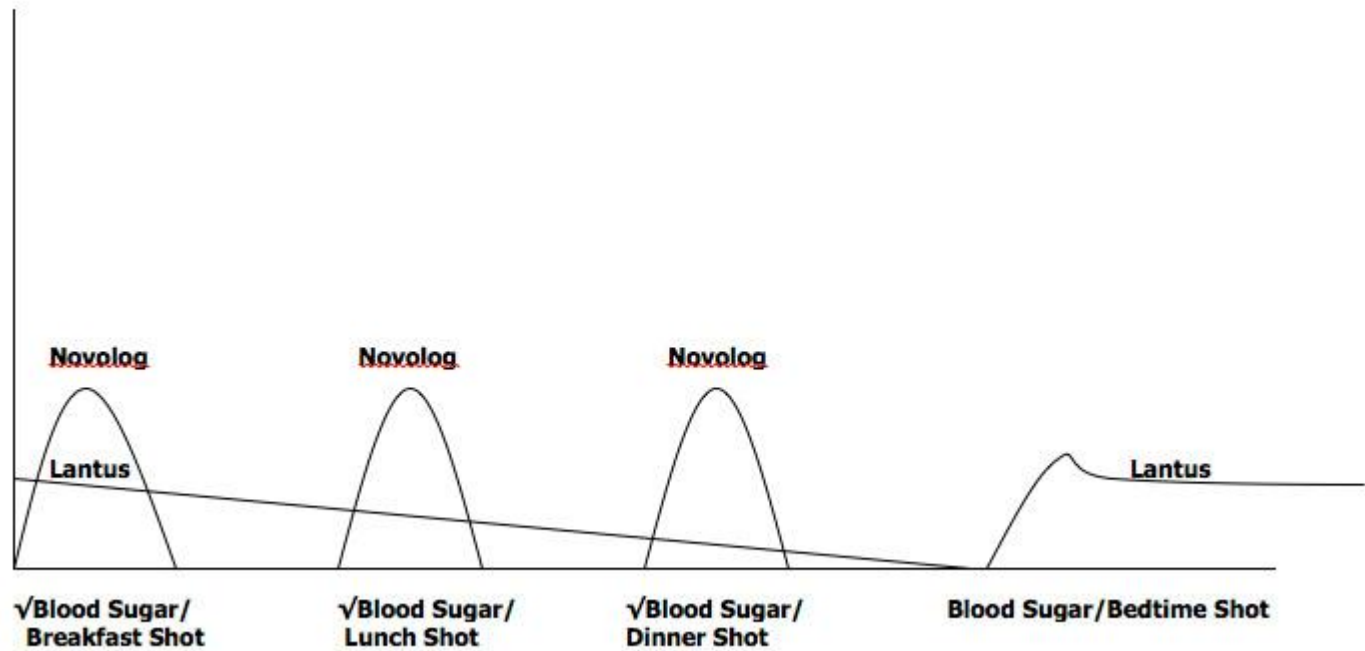
## ❖ Two types of Insulin:

- Long acting (basal) insulin keeps blood sugars healthy between meals and overnight
- Fast acting (bolus) insulin is given at meals and snacks to help the body use the energy in food



# Insulin Action

## Insulin Action



# How Do Carbohydrates Affect Blood Sugars?

## ❖ Carbohydrates (carbs)

Carbs break down into sugar

Insulin helps the sugar enter the cells of the body

Sugar is used for energy



# What Foods Have Carbs?

## Healthy Carbs

- Fruit
- Vegetables
- Low fat milk/yogurt
- Whole grains (bread, pasta, rice, cereal)

## Unhealthy Carbs

- Desserts
- Drinks containing sugar
- Snacks (chips, crackers)



# Carbs found in other foods...

- ❖ Salad dressing
- ❖ Ketchup
- ❖ Tomato sauce
- ❖ BBQ sauce
- ❖ Nuts
- ❖ Peanut butter
- ❖ Soy products (soy burgers, nuggets, etc)



# Does Eating Protein Affect Blood Sugars?

## ❖ Protein

- Helps build muscle
- Healthy protein foods: lean meats, grilled or baked turkey, chicken or fish, low fat cheese, eggs

## ❖ Healthy foods that have protein and carbs

- Nuts, beans, tofu, veggie burgers and other soy products

❖ *Breaded meats also have protein and carbs*





# Does Eating Fat Affect Blood Sugars?

## ❖ Fat

- Helps the brain and nervous system work
- Does not turn into sugar

## ❖ Healthy fat choices:

- Olive oil, canola oil, low fat tub vegetable spread and reduced fat cream cheese



# How to Match Food and Insulin

- ❖ Bolus insulin (fast-acting)
- ❖ Amount to give at a meal or snack is based on:
  - How much insulin your child needs to cover carbs (called the “insulin to carb ratio”)
  - AND
  - How much insulin your child might need to correct a high blood sugar (called the “correction factor”)



# What is an Insulin to Carb Ratio?

- ❖ The amount of bolus insulin needed to cover a specific number of grams of carbohydrates
  - A 1:10 insulin-to-carb ratio means 1 unit of bolus insulin covers 10 grams of carbs.
  - The diabetes team will determine these numbers for your child



# What is a Correction Factor?

- ❖ The amount of bolus insulin needed to correct a high blood sugar
  - A 1:50 correction factor means 1 unit of bolus insulin needed to lower the blood sugar 50 points
  - The diabetes team will determine these numbers for your child



# How to Match Food and Insulin?

- ❖ Try to leave 3 hours between meals and snacks
  - This allows the food and insulin work together to keep blood sugars within range before your child eats again

- ❖ **If** your child eats closer than 3 hours apart:

Example:

Your child eats dinner at 6 pm, then wants to eat a snack at 7 pm. What should you do?

- Check blood sugar at 6 pm and give bolus insulin to correct for high blood sugars (if high) and for carb grams
- At 7 pm, give insulin **ONLY** for the carbs in the snack
- Do not check blood sugars at 7 pm. It has been less than 3 hours since your child last took bolus insulin.



# How Can We Count Carbs?

- ❖ Use these tools to get the carb count for a serving size of food
  - Carb counting books- Calorie King
  - Carb counting web sites
    - [www.calorieking.com](http://www.calorieking.com)
    - [www.sparkrecipes.com](http://www.sparkrecipes.com)
  - Phone Apps
    - Calorie King, Figwee, Spark recipes, My Fitness Pal
  - Food Labels
- ❖ Measure food using measuring cups and food labels
- ❖ Add up the carb grams your child plans to eat



# How to Read a Food Label



**Ingredients:** Dehydrated Potatoes, Modified Food Starch, Sugar, Corn Oil, Salt, Soy Lecithin, Leavening (Monocalcium Phosphate and Sodium Bicarbonate), and Dextrose.

## Nutrition Facts

Serving Size 1 oz. (28g/About 11 crisps)  
Servings Per Container 10

### Amount Per Serving

**Calories** 110      Calories from Fat 15

### % Daily Value\*

**Total Fat** 1.5g      **2%**

Saturated Fat 0g      **0%**

Trans Fat 0g

**Cholesterol** 0mg      **0%**

**Sodium** 150mg      **6%**

**Total Carbohydrate** 23g      **8%**

Dietary Fiber 2g      **6%**

Sugars 2g

**Protein** 2g

Vitamin A 0%      •      Vitamin C 2%

Calcium 4%      •      Iron 2%

Thiamin 4%      •      Niacin 6%

Vitamin B6 4%      •      Phosphorus 8%

Zinc 2%

\* 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	300g	375g
Dietary Fiber	25g	30g

Calories per gram:  
Fat 9      •      Carbohydrate 4      •      Protein 4

## ❖ What to Look For

- Serving size
- Servings per container
- Total carbohydrate grams per serving

## ❖ What to Do

- Measure how many servings your child will eat
- Add up the total carb grams your child will eat



# Practice!

## ❖ Calculate carbs in this meal

- ½ cup cooked broccoli
- 1 cup cooked rice
- 4 ounces cooked chicken breast
- 8 ounces low fat milk
- ½ cup light ice cream

## ❖ Calculate the Novolog insulin dose for food

- Insulin to carb ratio is 1 unit for 10 grams of carbs





# Practice!

## ❖ Calculate carbs in this meal

- ½ cup cooked broccoli- 5 grams
- 1 cup cooked rice- 45 grams
- 4 ounces cooked chicken breast- 0 grams
- 8 ounces low fat milk- 12 grams
- ½ cup light ice cream- 20 grams
- Total- 82 grams

## ❖ Calculate the Novolog insulin dose for food

- Insulin to carb ratio is 1 unit for 10 grams of carbs- need 8 units for 82 grams



# Estimating Carbs When Eating Out

- ❖ Always underestimate instead of overestimating carbohydrates when dosing insulin for food
- ❖ *It is better to get a little less insulin than needed and have a high blood sugar than to get too much insulin and have a low blood sugar*



# What About Low Carb Foods as Snacks?

- ❖ Do not eat high protein foods alone as a snack
  - Meats, cheeses and eggs do not have carbs but do require insulin for your body to use them
  - Eat these foods as part of meals or snacks that are covered by insulin



# Can My Child Eat a Snack Without Insulin?

- ❖ Carb count must be half of the carb ratio or less
  - Example: Your child takes  $\frac{1}{2}$  unit bolus insulin for 20 g carb
    - If they eat less than 10 g carb, they will not need insulin
  - Eating snacks closer to 20 g carb and not giving insulin can cause high blood sugars
  - Eating many snacks below the ratio will cause high blood sugars
  
- ❖ Low carb snacks
  - Sugar free Jell-O
  - Non-starchy vegetables
  - Popsicles made with sugar-free drinks



# I'm Still Hungry!

- ❖ If an extra snack is needed between meals, limit it to
  - Half of carb ratio or less
  - Less than 20 calories
  
- ❖ Choices for low carb, extra snacks
  - 4 ounces of sugar free jell-o
  - 1 cup non-starchy vegetables
  - Popsicles made with non-calorie drinks



# Drink Choices

- ❖ Drinks with carbs are OK with meals or snacks
  - Include the carbs in the total carb count
  - Milk is the best choice
- ❖ Use non-calorie drinks between meals and snacks
  - Water
  - Crystal Lite or similar drink sugar-free beverage



# What about 'Sugar Free' or 'Diabetic' Foods?

- ❖ Be careful with foods that have sugar alcohols
  - Will be listed on the label
  - Still makes blood sugars rise
  - May cause diarrhea
- ❖ OK to use lite or reduced sugar foods that do not have sugar alcohols



# How Many Carbs Should My Child Eat?

- ❖ The recommended meal plan is individualized- based on age, height, weight and activity level
- ❖ The dietitian can provide an estimated average carb need and recommended meal plan for your child
- ❖ To follow-up with a Diabetes Center Dietitian, call: 215-590-3174

