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
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
<table>
<thead>
<tr>
<th>Healthy Carbs</th>
<th>Unhealthy Carbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fruit</td>
<td>• Desserts</td>
</tr>
<tr>
<td>• Vegetables</td>
<td>• Drinks containing sugar</td>
</tr>
<tr>
<td>• Low fat milk/yogurt</td>
<td>• Snacks (chips, crackers)</td>
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<tr>
<td>• Whole grains (bread, pasta, rice, cereal)</td>
<td></td>
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</tbody>
</table>
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”)
  - 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

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

**Ingredients:** Dehydrated Potatoes, Modified Food Starch, Sugar, Corn Oil, Salt, Soy Lecithin, Leavening (Monocalcium Phosphate and Sodium Bicarbonate), and Dextrose.
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**
   - $\frac{1}{2}$ 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
   - $\frac{1}{2}$ 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