Beyond the headlines: What really is a healthy diet?

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Objectives

- Discuss nutrition recommendations for all kids
- Discuss what the literature says about diet and kids with diabetes
- Discuss popular diet trends related to diabetes
  - Low carb
  - Glycemic Index (GI)
- Discuss food choices and bolus strategies to improve post-prandial blood sugars
- Discuss tools for accurate carb counting
Nutrition Recommendations for ALL Kids

- Balance dietary calories with physical activity to maintain normal growth
- 60 minutes of moderate to vigorous physical activity daily
- Eat vegetables and fruit daily
- Limit juice intake
- Reduce intake of sugar-sweetened beverages and foods
- Use nonfat or low-fat milk and dairy products daily
Nutrition Recommendations (cont)

- Eat whole grain breads and cereals, rather than refined grain products (at least ½ grains should be whole)
- Eat legumes (lentils, beans, peas)
- Limit intake of saturated and trans fats (found in animal products, snack foods, fast foods)
- Choose lean cuts of meat and remove skin from poultry
- Choose oily fish (salmon, tuna, mackerel, sardines)
- Reduce salt intake, including salt from processed foods

Pediatrics. 2006 Sep;118(3):1323
### TABLE 3
Daily Estimated Calories and Recommended Servings for Grains, Fruits, Vegetables, and Milk/Dairy by Age and Gender

<table>
<thead>
<tr>
<th>Kilocalories&lt;sup&gt;a&lt;/sup&gt;</th>
<th>1 y</th>
<th>2–3 y</th>
<th>4–8 y</th>
<th>9–13 y</th>
<th>14–18 y</th>
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<tbody>
<tr>
<td>Female</td>
<td>900</td>
<td>1000</td>
<td>1200</td>
<td>1600</td>
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<td></td>
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<td>1400</td>
<td>1800</td>
<td>2200</td>
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<tr>
<td>Milk/dairy, cups&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2&lt;sup&gt;c&lt;/sup&gt;</td>
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<td>3</td>
<td>3</td>
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<tr>
<td>Lean meat/beans, oz</td>
<td>1.5</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Female</td>
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<td></td>
<td>3</td>
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<tr>
<td>Male</td>
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<td>4</td>
<td>6</td>
<td></td>
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<tr>
<td>Fruits, cups&lt;sup&gt;d&lt;/sup&gt;</td>
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<td>1</td>
<td>1.5</td>
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<td>1.5</td>
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<tr>
<td>Male</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetables, cups&lt;sup&gt;d&lt;/sup&gt;</td>
<td>3/4</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Male</td>
<td></td>
<td></td>
<td>1.5</td>
<td>2.5</td>
<td>3</td>
</tr>
<tr>
<td>Grains, oz&lt;sup&gt;e&lt;/sup&gt;</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Female</td>
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<td></td>
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<td></td>
<td></td>
<td>5</td>
<td>6</td>
<td>7</td>
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</tbody>
</table>

Calorie estimates are based on a sedentary lifestyle. Increased physical activity will require additional calories: by 0 to 200 kcal/day if moderately physically active and by 200 to 400 kcal/day if very physically active.
Are kids meeting nutrition recommendations?

- In general---NO!
- Most consumed “vegetable” is fried potatoes
- Many kids do not eat breakfast (often results in less healthy choices and snacking later)
  - Many kids get at least 1/3 calories from snacks
- Kids are not meeting recommendations for fiber or calcium
- Most kids do not meet recommendations for fruit, vegetable, dairy, whole grain, lean meat, and fish intake
- Adolescents get most calories from sweetened drinks, French fries, pizza, and fast food
- Screen time has increased and physical activity has decreased

Pediatrics. 2006 Sep;118(3):1323
Are kids with diabetes eating healthfully?

- Multiple studies have found higher intakes of fat and saturated fat
  - Many “free” foods are higher in fat (i.e. cheese, bacon, beef jerky, nuts)
  - Packaged foods are easy to carb count
  - “sugar-free” and “diet” foods often have more fat and calories
- Only 17-20% eat recommended fruit intake
- Only 9-15% eat recommended vegetable intake
- Intake of both fruits and vegetables declined over time since diagnosis
- 54-63% meet dairy recommendations
  - Most kids are choosing low fat dairy
  - Milk consumption decreased after diagnosis
- SEARCH study found 0% met recommendation for whole grain or fiber intake

Diabetes Edu. 2009 Jan-Feb;35(1):97-107
Does emphasis on carbs affect nutrition?

- Carb counting may negatively influence diet quality
- Families consider foods that cause higher increase in postprandial blood sugars “unhealthy”
  - Including fruits and whole grains
  - Some consider lower amount of carb as more healthy, regardless of food type
- Families report choosing packaged foods over whole foods for ease in carb counting
- Many families consider “diet” and “sugar-free” foods healthy
- Basal-bolus therapy has lead to increase in snacking

Diabetes Care. 2009 32:2174-2176
What is considered a low carb diet?

- Low carb is 21-70 grams per day
- Moderately low is 30-40% calories from carbs
- Moderate carb is 40-65% calories from carbs
- High carb is >65% calories from carbs

- Literature shows mixed reviews about effect of low carb on A1C
  - Some show improvement, where as some did not
  - High drop out rate as diet is hard to follow
  - Few long term studies

Are low carb diets safe for kids?

- Limited research in kids
- No long term studies to evaluate effect of high protein/low carb on kidneys and heart

- Most doctors believe low carb diets are too restrictive for kids
  - Kids need more calcium, vitamins, and minerals
  - Too few carbs can inhibit growth and may negatively affect thinking ability

- Low carb diets cause body to go into starvation mode = KETONES!

- However a moderate carb intake can be safe, may improve postprandial blood sugars, and is beneficial if trying to control weight gain

J Am Diet Assoc. 2006; 106(12): 2086-94
Take home message about low carb diets

- Nutrition goals for kids should be individualized
  - Talk to the dietitian in your clinic about how many carbs are optimal for you/your child

- Carbs are important for growth, development, and brain function in kids
  - Starvation diets can stop growth
  - Starvation diets can cause DKA

- Less than 70 grams carbs per day is not recommended without speaking with your doctor

- However, if you are eating a very carb-heavy diet, there is benefit to choosing a moderate carb intake (45-65% calories from carbs)
What is the glycemic index (GI)?

- A measurement of how much a carbohydrate food raises blood sugar in test subjects
- Foods are ranked based on how they compare to a reference—either 50 grams glucose or white bread
  - Ranked from 0-100
  - Blood sugar is checked before eating and at intervals over 2 hours after eating
- Foods classified as high/medium GI are expected to raise blood sugar more than low GI
- In general, low GI foods have more fiber and fat
- In general, high GI foods or more cooked or processed

Low GI foods (55 or less)

- Stone ground whole wheat bread or pumpernickel bread
- Corn tortilla
- Oatmeal (rolled or steel cut)
- High fiber cereal (>5 grams)
- Pasta, barley, bulgur
- Legumes/beans, peas, lentils
- Most fruits
- Non-starchy veggies, carrots
- Milk, ice cream, yogurt
Medium GI foods (56-69)

- Whole grain bread, rye, pita bread
- Quick oats
- Brown rice, wild rice, basmati rice
- Rice noodles
- Sweet potato, yam
- Corn
- Couscous
- Popcorn, potato chips
- Bananas, pineapple
High GI foods (>70)

- White bread
- Corn flakes, puffed rice, most cereals
- Instant oatmeal
- Short grain white rice
- Boxed macaroni and cheese
- White potato
- Pretzels, rice cakes, saltine crackers
- Melons
Variables and limitations of GI

- **Ripeness and storage time**
  - the more ripe a fruit or veggie, the higher the GI

- **Processing**
  - more processed food is digested faster
  - i.e. mashed potato has higher GI than baked; wheat bread has higher GI than whole grain

- **Cooking**
  - raw food typically has lower GI than cooked food
  - the longer food is cooked, the higher the GI as starch molecules swell and are digested faster
  - i.e. al dente pasta has lower GI than soft-cooked
What else can affect GI?

- Portion sizes—the more you eat, the more blood sugar will be affected
- Available insulin
  - when did you bolus
  - what type of bolus did you use
- Exercise (both before and after eating)
- Degree of insulin sensitivity or resistance
  - Everyone will have their own response to foods
- GI of food is different if eaten alone or combined with other foods
What about fat and protein?

http://www.ghc.org/popup.jhtml?item=/common/healthAndWellness/conditions/diabetes/foodRates.html
How does GI affect BG?

- Pediatric patients on multiple daily injections (MDI)
  - Tested over several days and all ate same breakfast
  - Pre-prandial fast acting insulin

- High GI Meal (total 27 grams carbs)
  - White bread (1 g fiber)
  - Low fat ham and margarine

- Low GI Meal (total 33 grams carbs)
  - Low GI white bread (3 g fiber)
  - Low fat ham and margarine
How does GI affect BG?

- Pediatric patients on pump (plus non-diabetic control)
  - randomized to 100% bolus or 50:50 over 2 hr
  - Tested on consecutive days and all ate same breakfast

- Low GI Meal
  - 150 grams boiled spaghetti
  - 120 grams bolognaise sauce
  - 1 red apple
  - water

- High GI Meal
  - 280 grams boiled potato
  - 120 grams bolognaise sauce
  - Watermelon
  - water
Take home message about GI

- Eat more fiber!
  - Choose foods with at least 3-5 grams
    - May need to subtract fiber grams from total carbs if >5 grams fiber
- Choose more fruits and vegetables
- Eat higher GI foods combined with other foods
- Choose fewer processed foods
- Check blood sugar before and 2 hours later to see how foods affect you***
- Keep in mind that a lower GI does not mean the food is more nutritious***
  - Should balance use of GI with nutrition recommendations
Tips to Improve Post Meal Blood Sugars

Bolus BEFORE eating!

Same high fiber meal.

Pre-Bolused
Tips to Improve Post Meal Blood Sugars

Add protein to meals and snacks!

If you are eating a lot of protein (>25-30 grams in a meal), keep a food diary and talk to your dietitian/doctor about the amount. Sometimes protein needs to be included in insulin calculation.

Source: JACC © 2008 American College of Cardiology Foundation
Tips for Slower Digesting Meals

Using a standard Bolus

Using a dual wave/extended bolus on a pump 50/50 over 2-3 hours is a good place to start

If on injections, may need to give a little less insulin up front, and check and correct 2-3 hours after eating
Tips for Post-Breakfast Blood Sugars

- Breakfast is important...should not skip it
- Cereal is tricky
  - If you are going to eat cereal, choose cereal with at least 3-5 grams of fiber
  - Choose rolled/steel cut over instant oatmeal
- If choosing a breakfast bar, look at ingredients and choose nuts over cereal-based
- Have protein with breakfast
  - Can bake eggs in muffin tins ahead of time and heat in morning
  - Greek yogurt has twice as much protein
- Make sure carb counts are accurate
  - May need to plan ahead of time
Carb Counting Resources

- **Useful apps**
  - Calorie king
  - Figwee portion explorer
  - My fitness pal
  - Carb counting with Lenny for younger kids

- **Restaurant websites**

- **Books**
  - Calorie King Calorie, Fat & Carb Counter (new version each year ~$8)
  - ADA Complete Guide to Carb Counting by Hope Warshaw
  - Ultimate Guide to Accurate Carb Counting by Gary Scheiner

- **Tools**
  - Measuring cups and spoons
  - Food scale with nutrition label (Perfect Portions food scale is ~$40)
Take home message about healthy eating

- Kids/teens are NOT meeting nutrition and activity guidelines
  - In fact kids with diabetes are often eating LESS healthy than their peers

- There is no recommended “diet” for health or blood sugar control in kids with diabetes
  - Low carb diets can be dangerous for kids
    - However, if eating >65% calories from carbs may be some benefit to eat a more moderate carb intake
  - GI has lots of variables and effects different people in different ways
    - However, eating more fiber and less processed foods is healthy and can improve post-meal blood sugars
Take home message about healthy eating

- Healthy food choices most of the time are important for EVERYONE!
  - Non-starchy veggies, fruits, low-fat dairy, whole grains (>3 grams fiber), lean protein
  - Can work on incorporating healthier choices as a family
    - Important to model healthy eating
    - Include kids in food selection and preparation when able
    - Sometimes must try new foods several times before you know if you like it or not
  - Raw veggies are great low carb snacks

- Sugary drinks should be avoided (unless treating a low)
  - Empty calories and no nutritional value
Thank You!

QUESTIONS????