Formula for Success: Healthy Meal Planning for Pediatric Patients with Diabetes and Obesity

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Faculty Disclosure

- None

Practice Gap/Need

- Rates of diabetes and obesity in children & adolescents are increasing

- Despite technical diabetes tools and support including advanced blood glucose meters & insulin delivery systems, diabetic patients continue to struggle to achieve treatment goals of HbA1c<7.5
  - Goals of treatment by medical professional and goals of child/adolescent do not always align

Objectives

- Describe differences between pediatric and adult patients with diabetes and obesity and account for these differences in developing meal plans to manage these disorders.

- Outline meal plans in clinical practice for children and adolescents with obesity and/or diabetes by utilizing a meal planning formula described in the presentation.

Outcomes

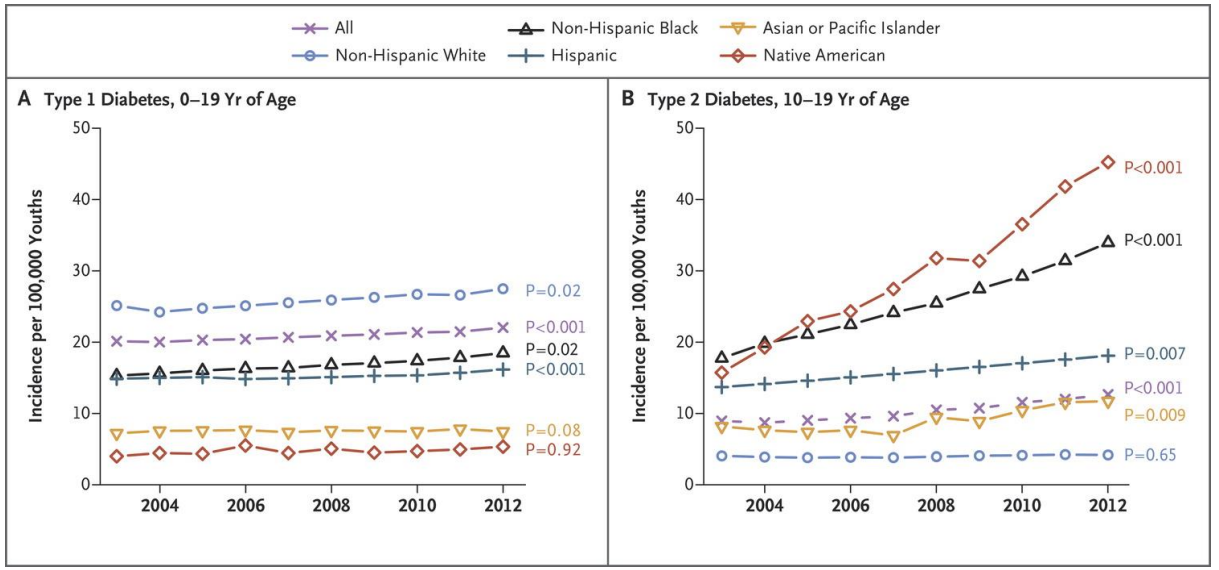
- Medical nutrition therapy when used in combination with other components of diabetes care can improve clinical and metabolic outcomes

- MNT targets healthy eating principles, optimizes glycemic control, reduces cardiovascular risk factors, assists with psychosocial well-being, & incorporates family dynamics

Prevalence of Diabetes in Youth

Incidence of both type I and type 2 DM among youths increased significantly during 2002-2012

- 1.4% type I
  - (19.5 cases /100,000 vs 21.7/100,000 p=0.03
  - High relative increase among Hispanic youths (4.2% vs 1.2%, p<0.001)
- 7.1% type 2
  - 9.0 cases/100,000 vs 12.5/100,000, p<0.001



Mayer-Davis et al *N Engl J Med* 2017; 376: 1419-29

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The State of Childhood Obesity-Kentucky

Childhood Overweight and Obesity New Data

2- to 4-year-old WIC participants

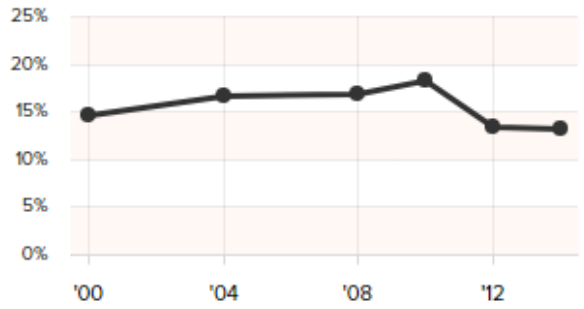
Current obesity rate (2014)

13.3%

Rank among states (2014)

32/51

Historical rates (2000-2014)



Source: stateofobesity.org/wic

10- to 17-year-olds*

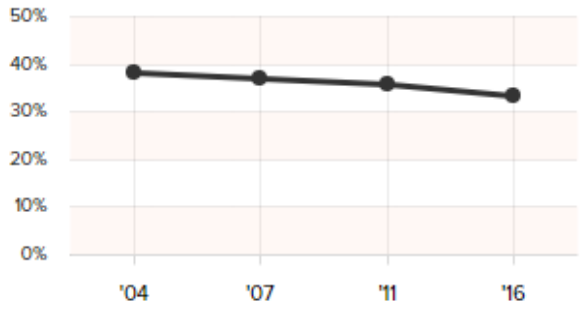
Combined overweight & obesity rate (2016)

33.5%

Rank among states (2016)

14/51

Historical rates (2004-2016)



Source: stateofobesity.org/children1017

High school students

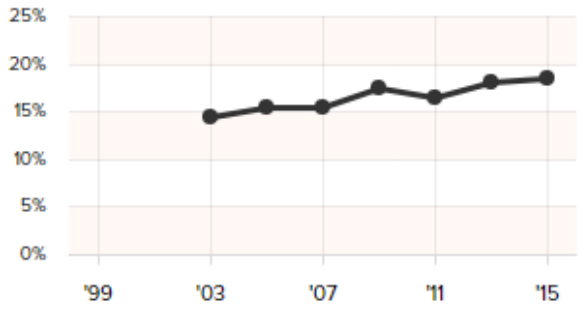
Current obesity rate (2015)

18.5%

Rank among states (2015)

3/43

Historical rates (1999-2015)



Source: stateofobesity.org/high-school-obesity

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Children are Not Small Adults

- They differ from adults in development, physiology, psychology, & behavior
- Nutritional management of pediatric diabetes requires a family-based approach
- Growth monitoring is an essential part of pediatric diabetes treatment
  - Energy intake aimed to maintain ideal body weight, optimal growth, health, & development

A1C and Blood Sugar Targets by Age

Test	Toddlers & Preschoolers (<6 yrs)	School Age (6-12 yrs)	Teens (13-19 yrs)
A1C	Below 8.5%	Below 8%	Below 7.5%
Blood Sugar (before meals)	100-180 mg/dl	90-180 mg/dl	90-130 mg/dl
Blood sugar (before bedtime/ overnight)	110-200 mg/dl	100-180 mg/dl	90-150 mg/dl

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Specific Insulin Regimens

- Conventional Therapy
  - Twice daily insulin regimens of short & longer lasting insulin require consistency in carbohydrate (CHO) intake
  - Prescription of CHO in a fixed meal plan requires regular review of growth of child
  - Usually requires CHO intake before bed to prevent nocturnal hypoglycemia
- MDI Therapy & Insulin Pumps
  - More flexible approach by using Insulin:CHO ratio to match insulin to amount of CHO that is individualized for each child by age, sex, pubertal status, and physical activity
  - Primarily used by most pediatric diabetes centers
  - Even though regimen is flexible, mealtimes should be regular and healthy eating practices followed!

ICR continued

- Families match insulin doses to amt of CHO eaten
- Foods contain mixture of protein, CHO, & fat
  - CHO should NOT be restricted

How to Adjust Insulin for Changing Carb Amount

1) Insulin-to-Carb Ratio
   1) Varies from child ~1 unit/15 g CHO
   2) Determine how much rapid or short-acting insulin is needed for amt of carbs eating EX: 3 units for 45 g CHO
2) Blood sugar correction factor
   1) Determine how much rapid or short-acting insulin is needed to lower your blood sugar to target level
      1) EX: 1 unit for every 70 mg/dl above target (150 mg/dl)

Case Scenario

- Client History
  - 7 y/o female presents to PCP with 3 week hx of polydipsia, polyuria, nocturia, emesis, lethargy, and 8 lb weight loss. PCP advised patient to go to ED.

- Biochemical Data:
  - HgbA1c, 14.1%; anion gap: 20, CO2: 11, glucose=451 mg/dl; ketones, qualitative=large
- Anthropometrics:
  - Weight: 20 kg, 18th percentile
  - Height: 121cm, 44th percentile
  - BMI: 13.7, 7th percentile
  - Wt hx: Parents report usual weight is 23.6 kg, recent wt loss of 8 pounds in 1 month. Patient has lost 15% of usual body weight.

Case Scenario

- Diet history (“loves to eat”)
  - Breakfast: bowl of cereal with milk, 1 cup OJ or two toaster pastries and 1 cup milk
  - School lunch: pizza/chicken nuggets, green beans, fruit cup, chocolate milk, apple juice
  - Afterschool snack: chips, pudding cup, juice box
  - Dinner: chicken/hot dogs, spaghetti/mashed potatoes/ mac and cheese, corn/broccoli/green beans, milk
  - Dessert: bowl of ice cream
  - Lately, family reports decrease in appetite and increase in thirst and drinking.
- Social history
  - Lives with family
  - In 2nd grade, good student
  - Likes TV shows/Netflix on tablet
  - Not enrolled in any type of sports, likes to dance

Case Scenario

- Family history
  - Patient's paternal grandmother has type 2 diabetes and maternal second cousin has type I diabetes
  - Cardiovascular disease and HTN in first degree relatives including her father

- Others
  - Engaged during counseling session
  - Mom and Dad asked relevant questions, very worried about daughter's health

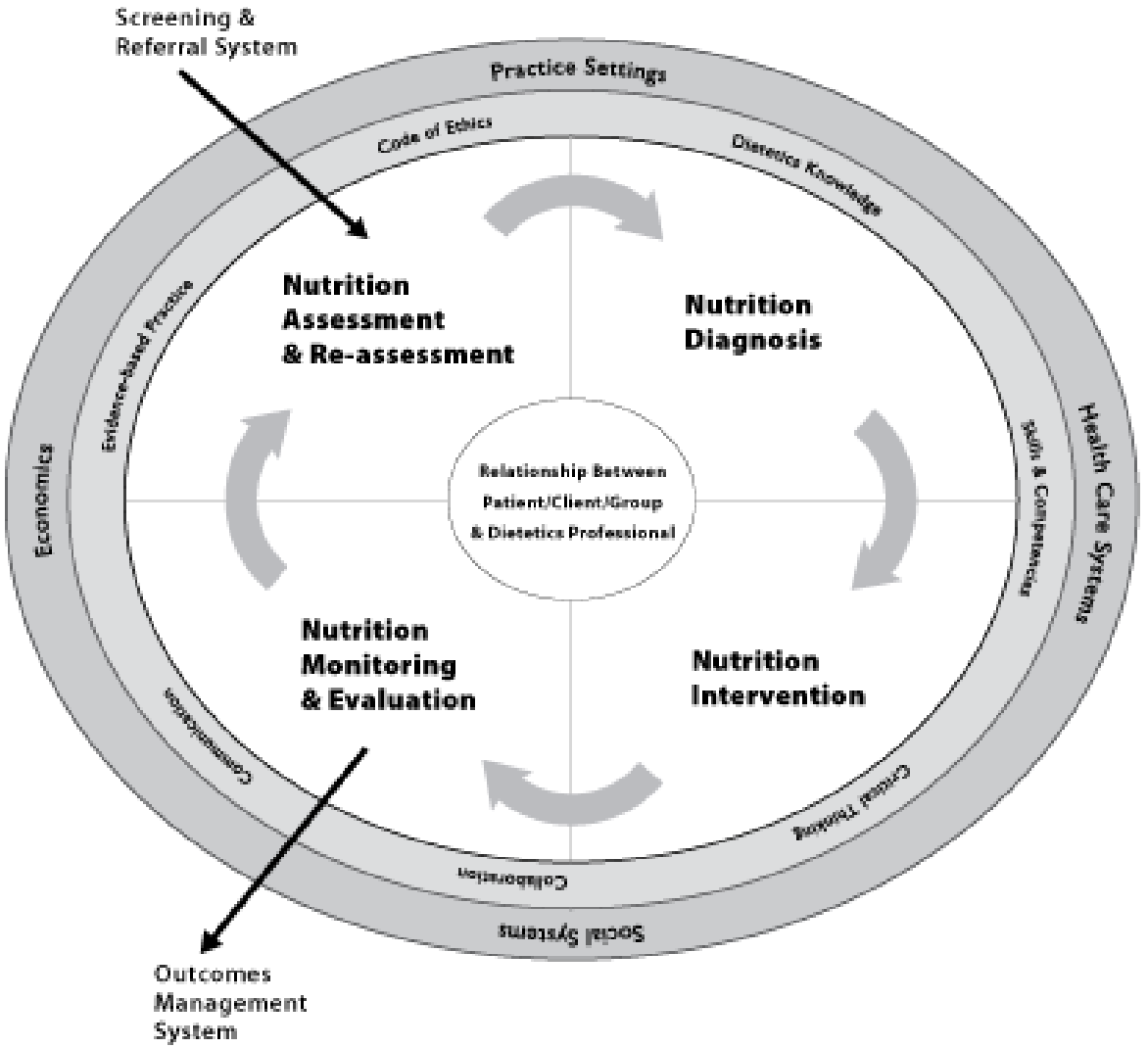
Case Scenario

- Assessment
  - Patient in diabetic ketoacidosis admitted likely for evaluation of new onset of diabetes, likely type I
  - Family ready for change but need assistance to establish a strategy on how to do so
- Plan
  - Counseling on lifestyle changes by Registered Dietitian

Medical Nutrition Therapy for Pediatric Diabetes & Obesity

Medical nutrition therapy (MNT): An evidence based application of the Nutrition Care Process. The provision of MNT (to a patient/client) may include one or more of the following: nutrition assessment/ re-assessment, nutrition diagnosis, nutrition intervention and nutrition monitoring and evaluation that typically results in the prevention, delay or management of diseases and/or conditions.

Reference: Medicare MNT Benefit US Code- 42USC§1395x(vv). *Source:* A.N.D. Scope of Dietetics Practice, Definition



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Nutrition Assessment

- Clinical Data:
  - HgbA1c, 14.1%; anion gap: 20, CO2: 11, glucose=451 mg/dl; ketones, qualitative=large
  - Height: 121cm; 44%, z-score: -0.19. Weight: 20 kg, 18%, z-score: -0.95; BMI: 13.7, 8%, Z-score: -1.371
- Assess Nutrition Needs from Anthropometrics
  - Estimated Energy needs: 1400 kcal/day (70kcal/kg), Fluids: 1500 ml,
  - Protein: 20kg (1.0 g/kg based on ABW)
  - 60 g CHO/meal to provide 55% energy from CHO and 15 g CHO from snacks
- Nutrition Interview:
  - Establish rapport with family
  - Review family history
  - 24 hour dietary recall and food frequency (diet history)
  - Physical activity history
  - Address family and patient concerns regarding diabetes
  - Assess readiness to change, discuss barriers
  - Goal setting

Nutrition Prescription & Intervention

Nutrition Diagnosis: Altered nutrition-related laboratory values related to new onset of diabetes as evidenced by glucose initially in the 400s and HgbA1c=14.1
Food-and nutrition-related knowledge deficit related to limited prior knowledge of carbohydrate counting as evidenced by parent interview stating that they do not currently count carbohydrates or look at food labels.

Interventions:

- Recommend Carbohydrate-modified diet Goal: 60 g CHO per meal & 15 g CHO per snack

- Provide nutrition education on a) CHO, blood glucose, & insulin relationship b) CHO sources c) CHO counting/reading food label d) signs/symptoms of hypoglycemia & how to treat e)treatment for sick days f) correlation between physical activity, blood glucose, and insulin and g) meal planning and CHO counting with insulin dosage
- Self-monitoring: Finger-sticks before and after meals Goal: Team will be able to assess appropriate insulin needs to correspond with food pattern

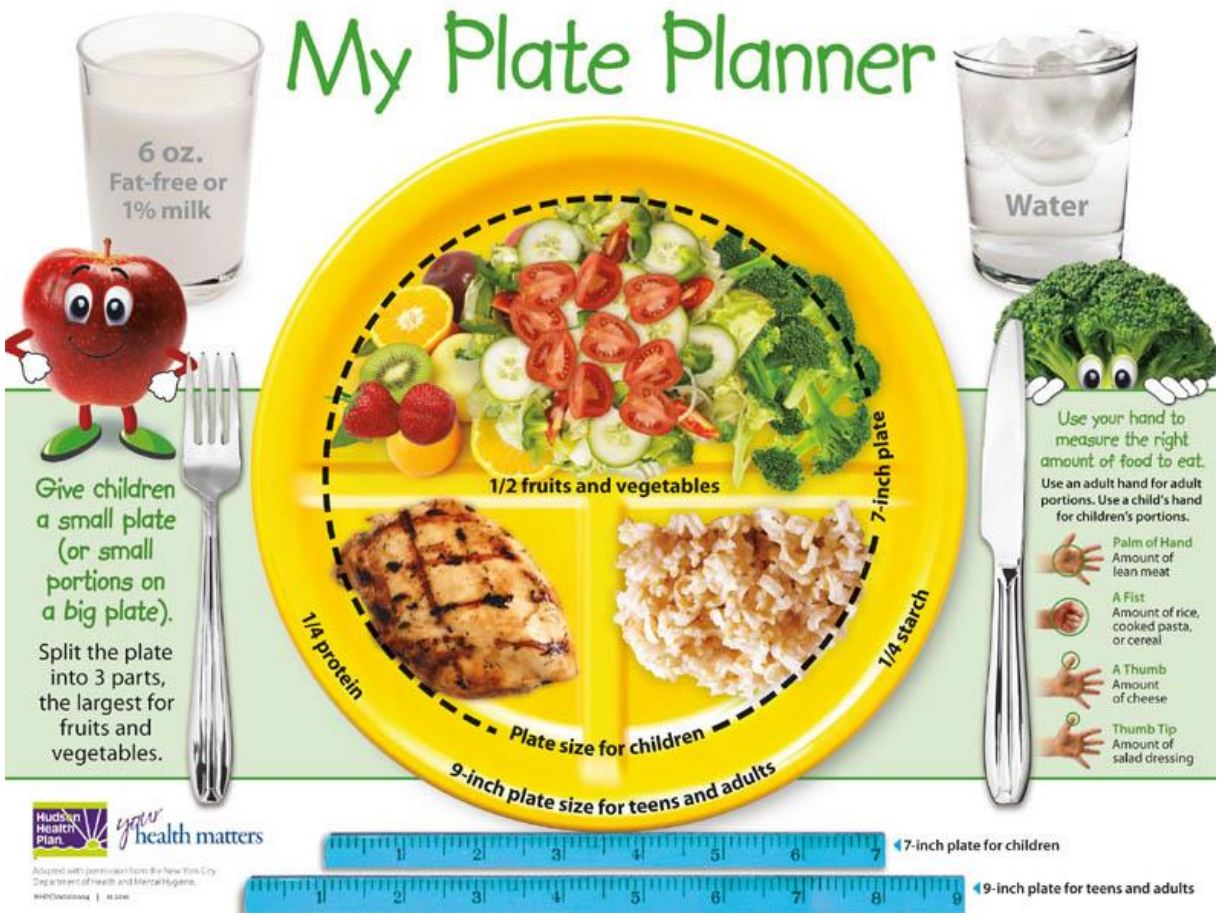
Nutrition Monitoring & Evaluation

Indicator	Criteria
Food and nutrition knowledge/skill: Level of knowledge regarding diabetes nutrition management	-Pt/family able to assess sample menu & determine CHO count for food items at each meal/snack & calculate appropriate insulin dose based on insulin-to-CHO ratio -Pt/family identify CHO sources & appropriate methods to treat hypoglycemia -Follow-up in outpatient clinic in 1 month
Food and beverage intake	-Patient selected and followed 60 g CHO meals and 15 g CHO snacks in the hospital
Glucose/endocrine profile	Blood glucose trends, as measured by finger-stick monitoring, will improve to between 90 and 180 mg/dl
Adherence: nutrition visit attendance	Pt/family will follow up in outpatient clinic within 1 month after discharge.

What is Healthy Eating For Children with Diabetes?

- Same as healthy eating for ALL children
- Scheduled meal times- 3 meals/day with appropriate snacks
- Optimize calories, nutrients, & protein to promote growth, development, and healthy rate of weight gain
- Focuses on whole grains, fruits, vegetables, low-fat dairy, lean meats, poultry, fish, beans, eggs, & nuts

- http://www.eatingwell.com/video/7678/what-does-a-1-day-diabetes-meal-plan-look-like/



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What are Carbs (CHO)?

- Provide essential energy for your child and are broken down into glucose
- Includes sugars, fiber, and starches (bread, cereal, and starchy vegetables like potatoes)
- Fruits, vegetables, milk, yogurt, rice, cereals, bread, and other grains provide carbohydrates as well as vitamins, minerals, & fiber.
- Snack foods (i.e. pretzels, chips, popcorn) contain CHO as well as sweets (i.e. cakes, candy, cookies, & pastries).
- Should NOT be restriced in children & adolescents with type I diabetes

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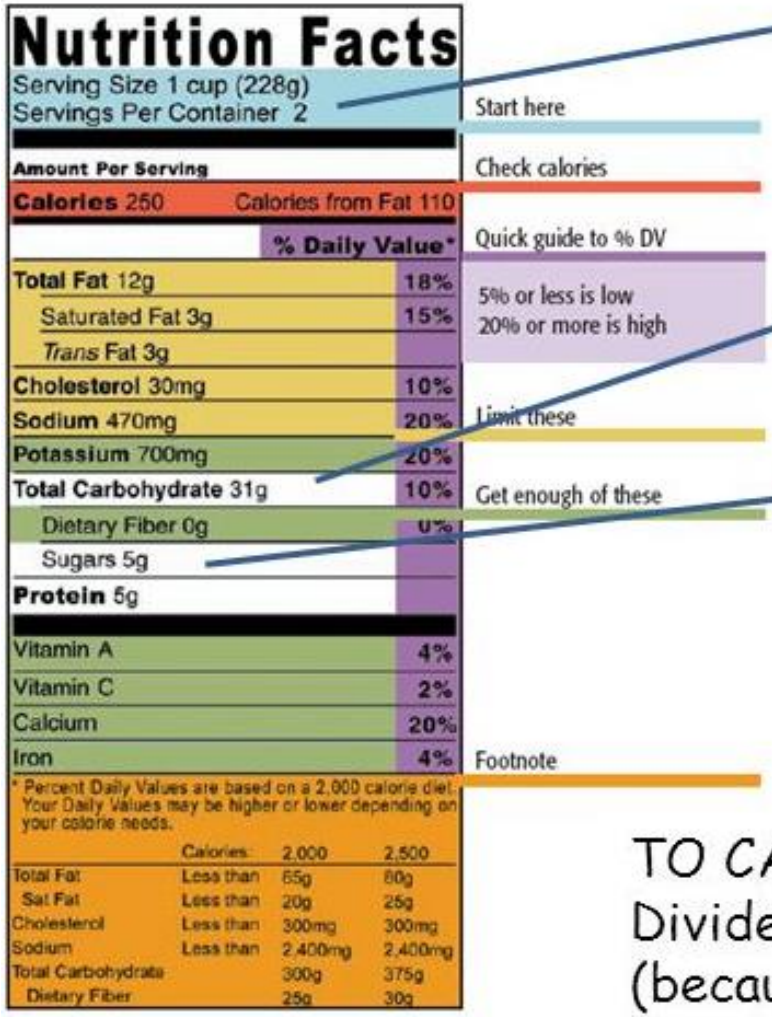
How to Read the Food Label



Nutrition Facts

Serving Size 1 cup (228g)
Servings Per Container 2

Start here

Amount Per Serving

Check calories

Calories 250 Calories from Fat 110

	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 3g	
Cholesterol 30mg	10%
Sodium 470mg	20%
Potassium 700mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

Quick guide to % DV

5% or less is low
20% or more is high

Limit these

Get enough of these

Footnote

* 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

Check the serving size. Is that how much you plan to eat?

Count the total carbs

You do not need to count the sugars separately because it is already counted as part of the total carbs

TO CALCULATE CARB CHOICES:
Divide the number of grams of total carbs by 15 (because 1 carb choice = 15 grams of carb).
Total carb = 31g
31 divided by 15 = about 2

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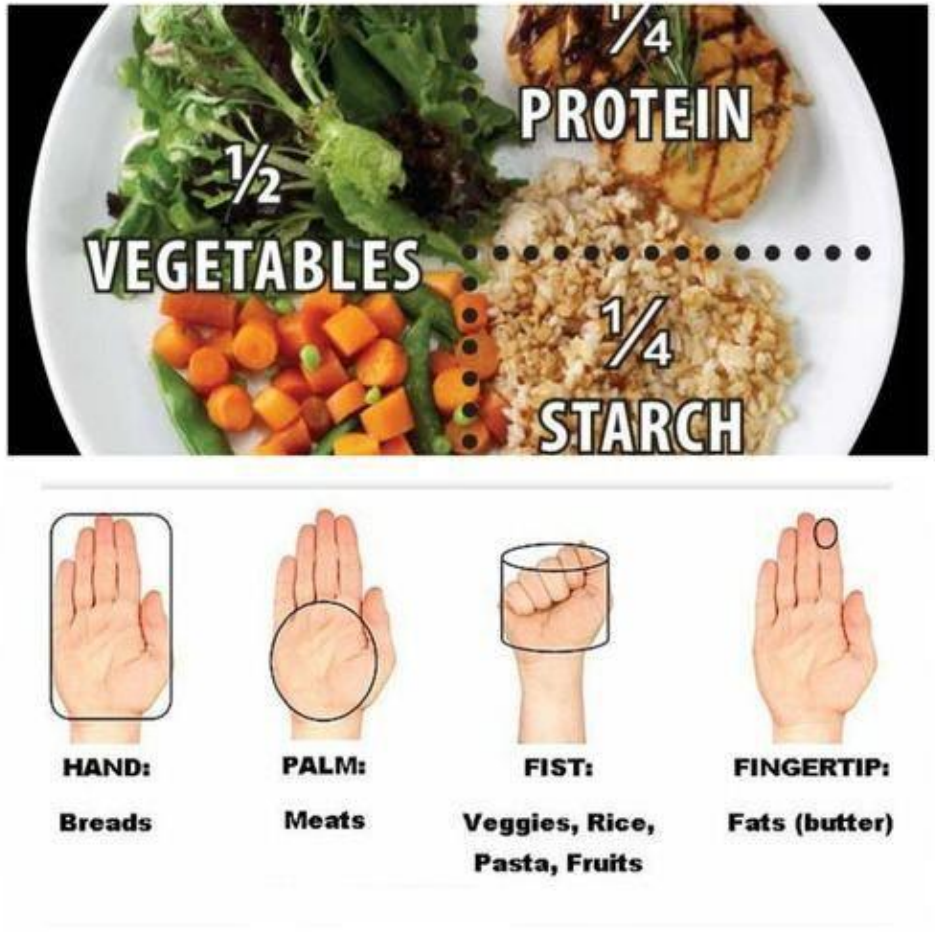
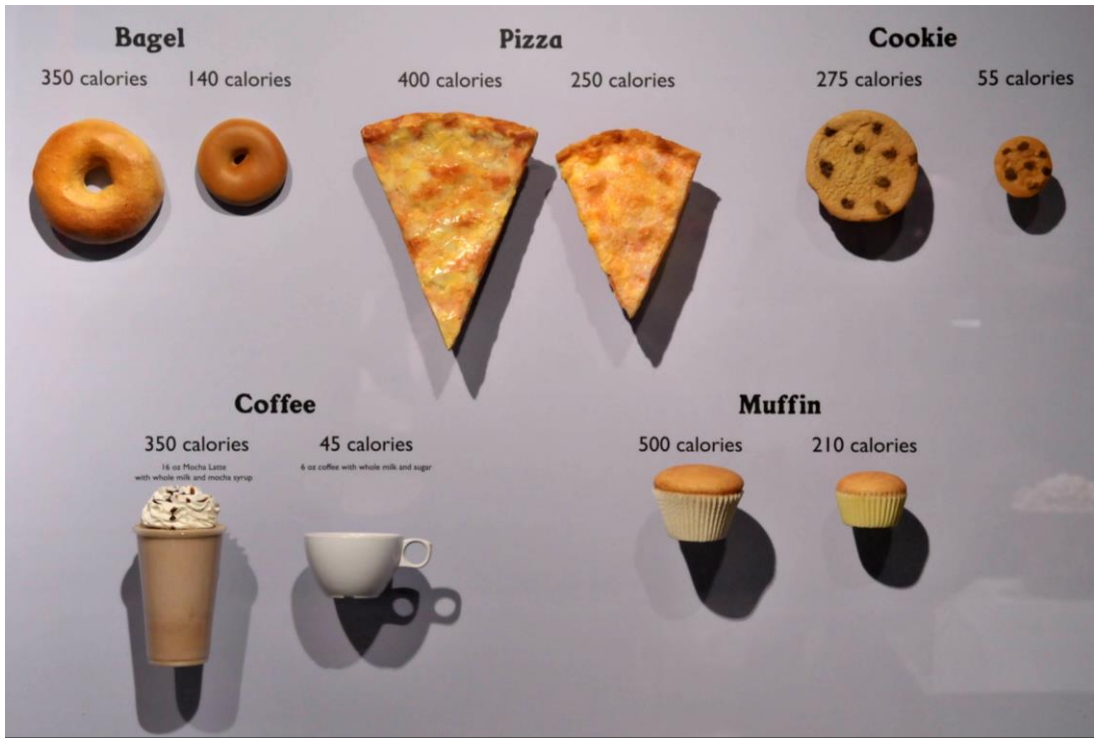
Portion Distortion





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How Much CHO is Enough?

- There are 2 methods of meal planning using carb counting:

1) Following a consistent carb meal plan with a consistent amount of insulin

2) Changing carb intake with an adjustable amount of insulin.

**Your RD will help decide which meal planning method is best for your family

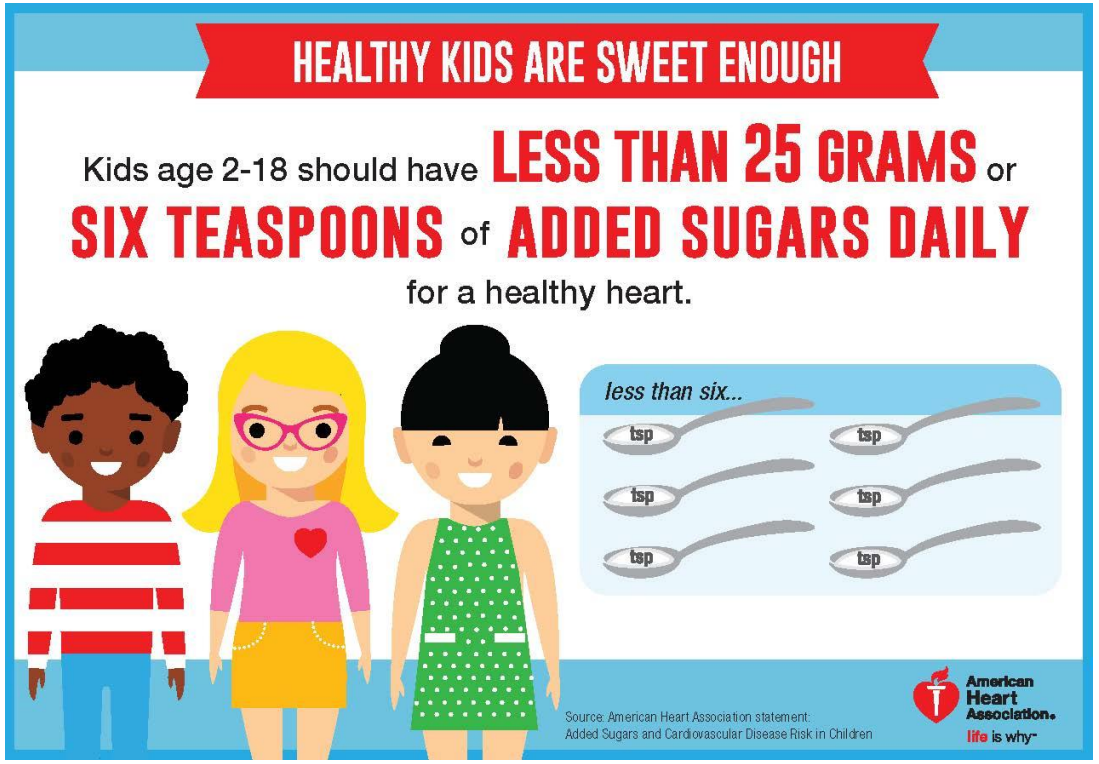
** No studies indicate a preferred method

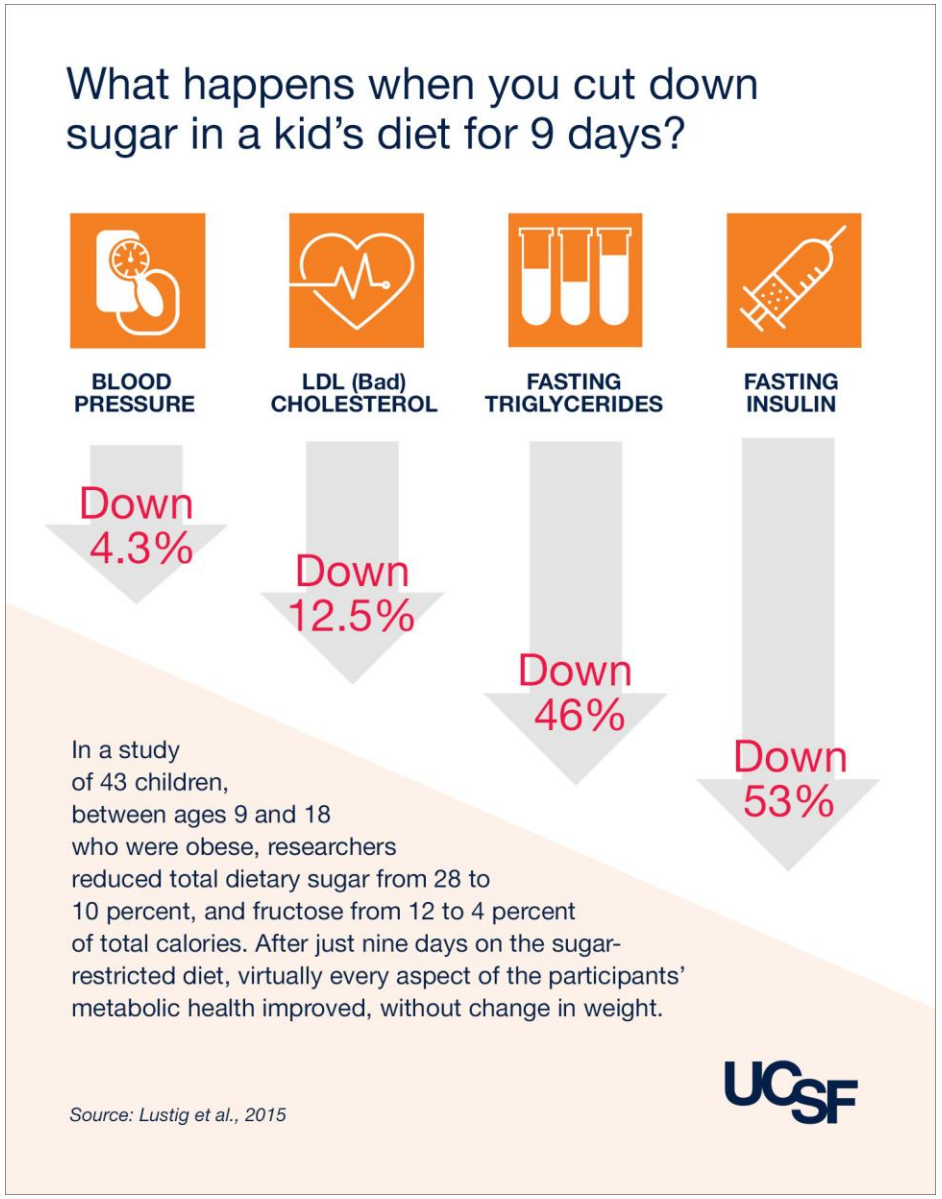
Carbohydrate Amounts by Age:

	<5 years	**5-12 years**	**Teens**
Boys	30-45 g/ meal	45-60 g/meal	60-75 g/meal
Girls	30-45 g/ meal	45-60 g/meal	45-75 g/meal

Snacks are usually 15-30 g CHO

New Guidelines for Pediatric Added Sugar Intake





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Ways to Reduce Sugar

- Limit Sugar Sweetened Beverages
- Buy fresh fruits or fruits canned in water
- Buy unsweetened products (applesauce, yogurt, nut butters)
- Flavor with extracts and spices including cinnamon, allspice, nutmeg, and ginger
- Be a food ingredient detective!
- Don’t use sugar substitutes

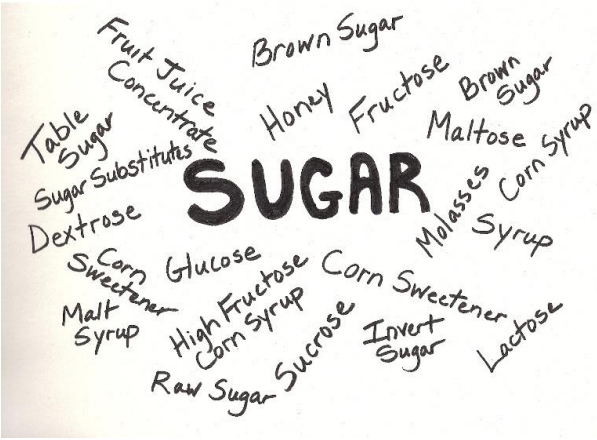
Nutrition Facts

Serving Size: 1 bottle (20 oz)

Serving Per Container: 1

Amount Per Serving	
Calories 275	
	% Daily Value*
Total Fat 0 g	**0%**
Sodium 175 mg	**7%**
Total Carbohydrate 78 g	**26%**
Sugars 65 g	
Protein 0 g	

INGREDIENTS: WATER, SUCROSE, GLUCOSE, HIGH FRUCTOSE CORN SYRUP, NATURAL FLAVORS, ARTIFICIAL COLORS, ASCORBIC ACID.



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Pediatric Type II Diabetes

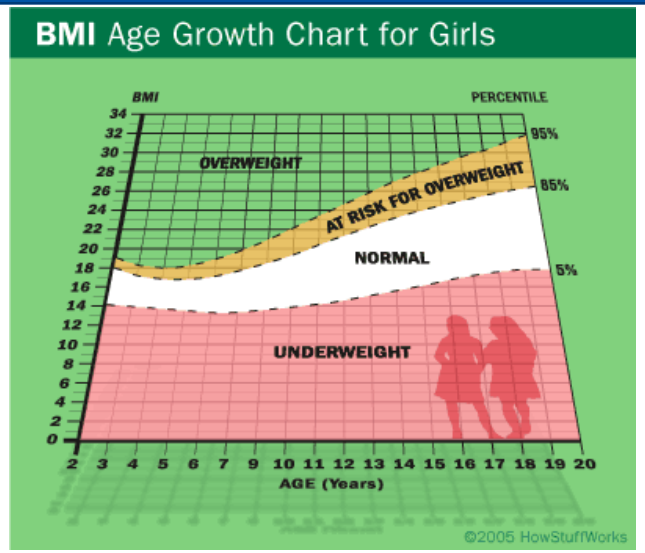
- Associated with obesity and insulin resistance
- Cornerstone of treatment is lifestyle intervention including nutrition and exercise to promote weight loss
- No studies have been published that examine nutrition therapy & lifestyle interventions specific to youth with type II diabetes—majority of recommendations are from studies examining childhood obesity & type 2 diabetes in adults
- Individual and family based counseling with motivational interviewing and behavioral therapy is recommended.

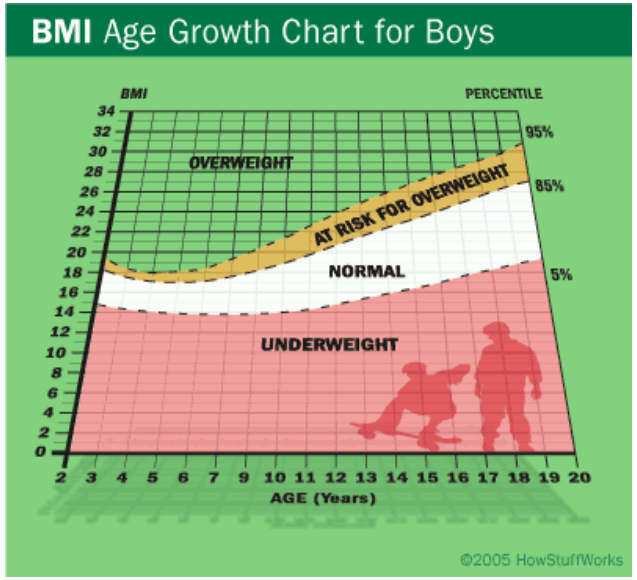
Screening for Pediatric Obesity

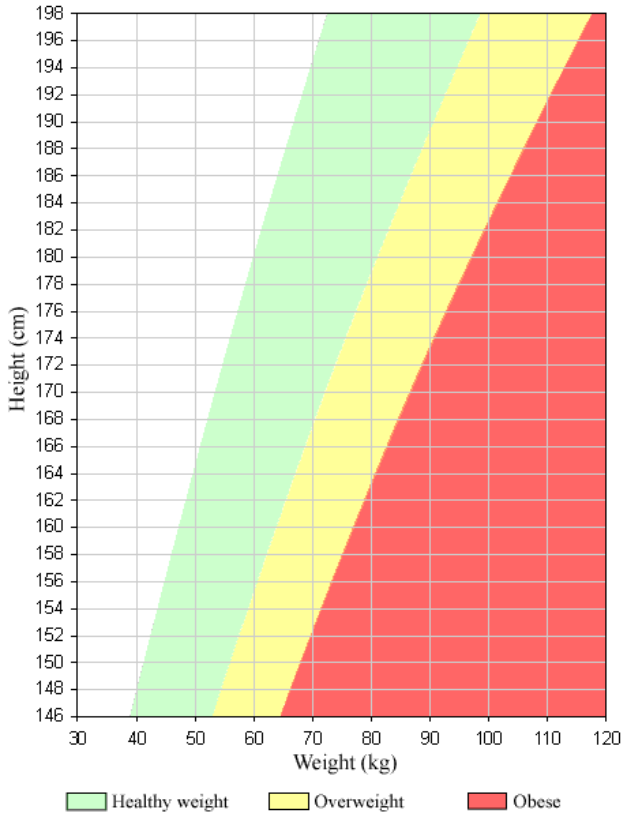
- BMI based on growth curves unlike adult population
- Plot BMI on CDC BMI-for age and sex growth chart (overweight: BMI between 85th-95th percentile, obese: BMI >95th percentile, Severe obesity: BMI >99th percentile

Additional Risk Factors:

- Having one or both parents overweight
- Low socio-economic status
- Having chronic illness or limited mobility
- Certain racial/ethnic groups







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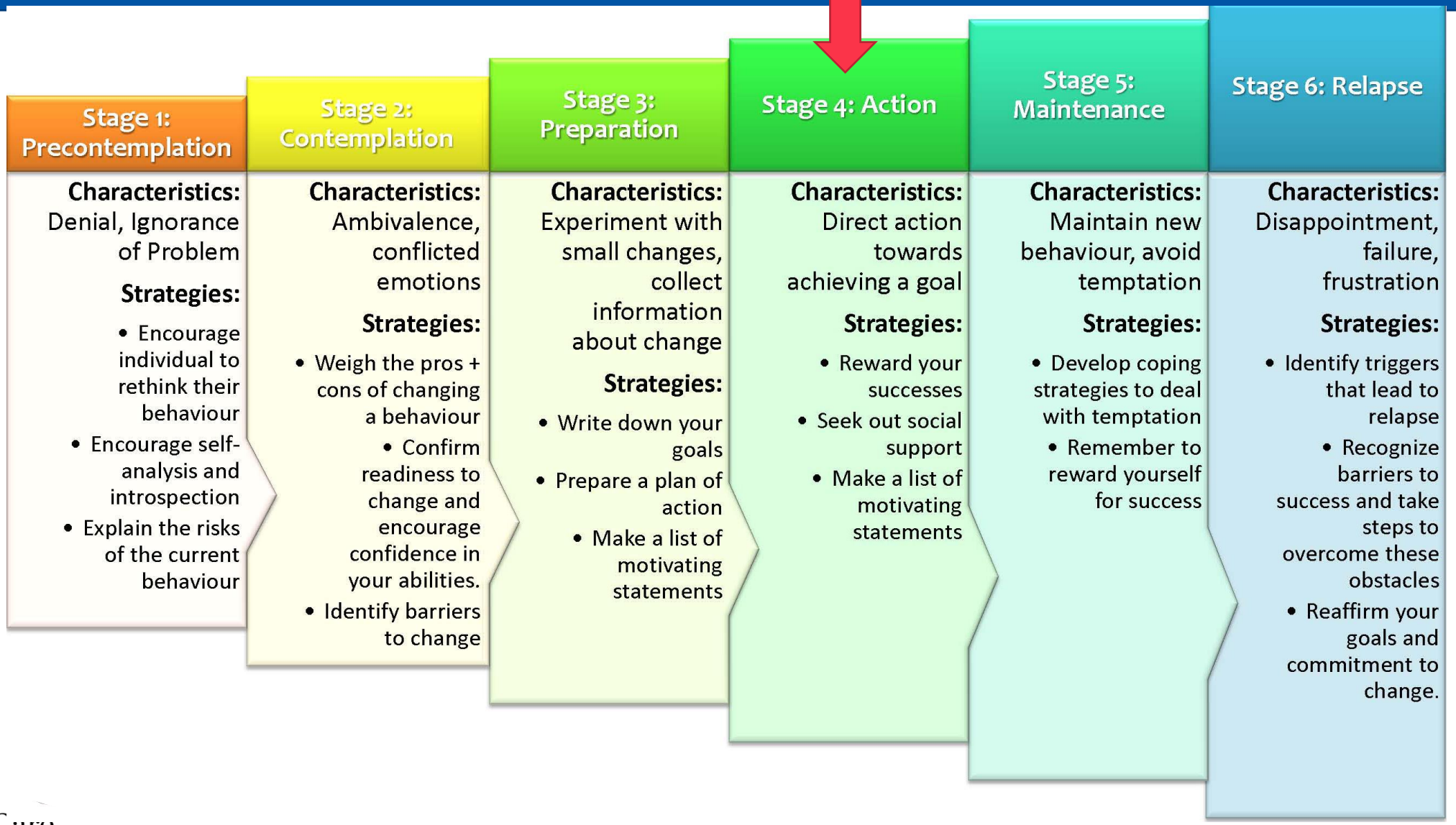
Targeted Behaviors for Intervention

- Limit consumption of sugar-sweetened beverages
- Limiting consumption of energy-dense foods
- Consumption of 9 servings of fruits and vegetables daily, high-fiber, rich in calcium, balanced diet
- Eating breakfast daily
- Review school menus and provide healthy alternatives
- Limiting eating out (esp. fast food)
- Encouraging family meals where parents eat with children
- Limiting portion size

- Limiting television and screen time to 2 hours
- Promoting moderate to vigorous physical activity for at least 60 min daily
- Promoting adequate sleep and sleep hygiene
  - Sleep deprivation associated with obesity in children as young as 7
  - For every hour increase in sleep, the risk of overweight was reduced by 9% in children younger than 10

Daniels, *Pediatrics,* 2015

Stages of Change



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Rhee 2005

Weight Loss Guidelines

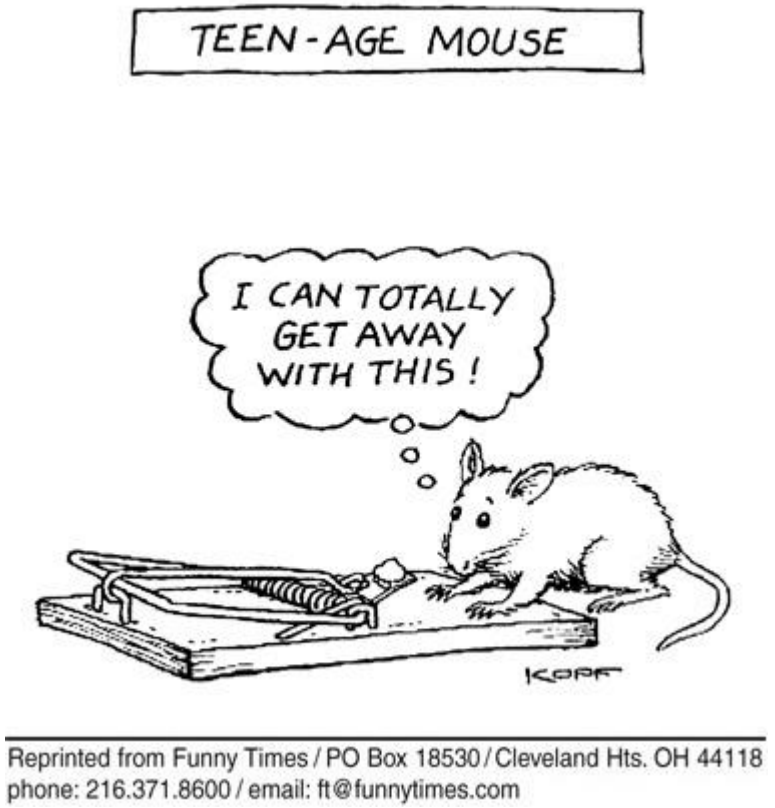
- 1388 overweight adolescents participated in behavioral weight treatment at a specialized outpatient obesity center to determine BMI reduction to improve CV risk factors including insulin resistance measured through HOMA
- BMI-SDS reduction of 0.25-0.5 was related to a decrease in HOMA (-0.5 ± 0.3 mmHg); Reinehr et al *J Clin Endocrinol Metab* 2016
  - equivalent to BMI reduction of 0.5 kg/m2 in a 7 year old or 1.0 kg/m^2 in a 13 y/o
  - weight loss of 5 kg in a male adolescent or stable weight in children growing 5 cm/year

Age	BMI	Weight Change Goal to Achieve BMI <85th percentile
2-5	85-94%	Maintain Weight
	94-98%	Maintain Weight, or if complications lose 1 lb/mo
	99%	Lose 1 lb/mo
6-11	85-94%	Maintain Weight
	94-98%	Lose 1 lb/mo
	99%	Lose 2 lb/wk
12-18	85-94%	Maintain Weight
	94-98%	Lose 2 lb/wk
	99%	Lose 2 lb/wk

CURRENT Diagnosis & Treatment: Pediatrics 22e

Case Scenario

- D.A. is 13 year old female teenager with hx of type I DM diagnosed 3 years ago, referred to Nephrology for elevated blood pressure, microalbuminuria.
- No headaches, edema or gross hematuria.
- Physical exam:
  - Weight: 268 pounds (99th percentile)
  - Height: 5’4” (80th percentile)
  - Normal exam otherwise
  - Blood pressure 142/88



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Case Scenario

- Diet history
  - Loves fast food including hamburgers and pizza
  - Admits to stress eating at night
  - Basal insulin 35 units at bedtime
  - Mealtime ICR- B: 1:10; L and D: 1:8 CF: 1:20>120
  - Denies issues with CHO counting
  - Been hyperglycemic at night
- Social history
  - Lives with Mom; Dad not in picture since early childhood
  - In 8th grade
  - Not enrolled in any type of sports, sedentary
- Family history
  - Obesity and Hypertension: mother
  - Type II DM: maternal grandmother
- Other
  - Mom very engaged during counseling session
  - Patient very quiet, appears anxious, excellent artist

Case Scenario

- Assessment
  - Microalbuminuria concerning for secondary causes but hypertension likely related to morbid obesity
  - Type I DM with HgbA1C=7.9%
  - Family ready for change but unsure of how to formulate a plan

- Plan
  - Basic evaluation for secondary causes of hypertension
  - Counseling on weight management/lifestyle changes by Registered Dietitian

Assessment of Dietary Patterns

- Calorie and protein needs using Total Energy Expenditure equations based on gender, age, height, weight
- 24 hour recall & verbal food frequency questionnaire to determine:
  - Frequency of eating out (esp. fast food)
  - Excessive consumption of sugar sweetened beverages
  - Consumption of excessive portion sizes for age
  - Excessive consumption of fruit juice
  - Breakfast quality
  - Excessive consumption of energy-dense foods
  - Low consumption of fruits and vegetables
  - Meal frequency & snacking patterns
- Self-efficacy and readiness to change of patient and/or family

Nutrition Assessment

- Clinical Data:
  - Systolic: 142, RUE, Supine Diastolic: 88, RUE, Supine, Manual (Patient on placed on Lisinopril)
  - Height: 164.3 cm; 82%, z-score:0.90. Weight: 121.9 kg, 99%, z-score: 3.21; BMI: 45.2, 100%, Z-score: 2.77
  - Weight gain of 3.2 kg in 2 months, HgbA1C: 8.6%
- Assess Nutrition Needs from Anthropometrics
  - REE: 2838 kcal/day (23 kcal/kg), Fluids: 3540 ml, IBW: 56.8 kg ABW=73 kg
  - Protein: 73 kg (1.0 g/kg based on ABW); Recommend 60 g CHO per meal and 15 g per snack to account for 48% CHO in an 2000 kcal/day.
- Nutrition Interview:
  - Review family history-hx of diabetes and obesity in family
  - 24 hour dietary recall and food frequency (diet history)-skips breakfast except milk from school, consumes school lunch, has a snack after school usually consisting of 2 cans of fish, dinner consists of baked meat, rarely consumes potatoes or vegetables, and an occasional salad with lots of blue cheese dressing. Binge eats a night after Mom has gone to bed.
  - Very sedentary
  - Pt afraid she will become 600 pounds and immobile
  - Assess readiness to change, discuss barriers—neighborhood not safe; find a walking buddy or use elliptical

Assessment of physical activity

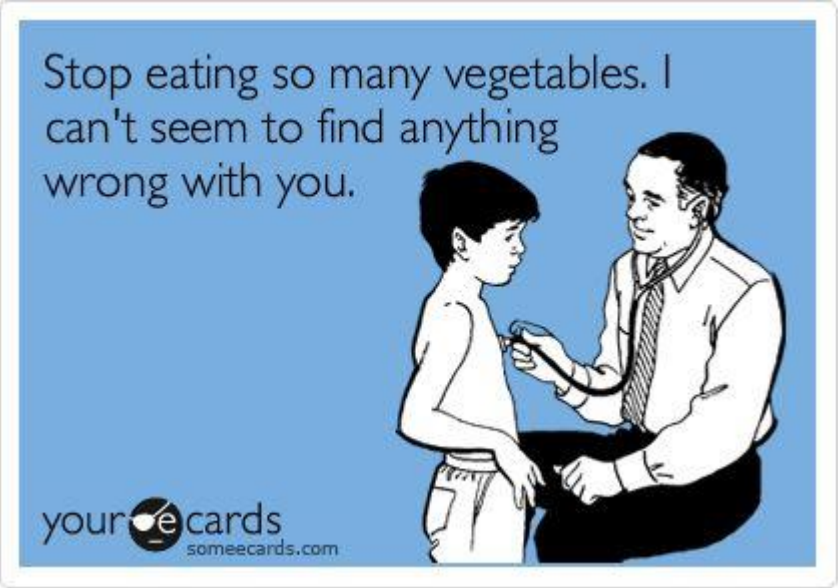
- Is the child meeting guideline of 60 minutes of daily physical activity?
- Barriers to physical activity
- Levels of sedentary behavior (screen time)
- Environment and social support
- Self-efficacy & readiness to change

Nutrition Prescription

- Nutrition Diagnosis: Obese as evidenced by BMI >95TH percentile related to excessive energy intake.
- Recommend 2000 kcal/day with 60-75 g CHO plus 15 g for meals and snacks
- Provide dietary education including meal planning, cooking techniques
- Developed weight loss goal of 10 pounds in 3 months
  - Adhere to Lower Sodium/CHO consistent diet
    - How to Read sodium labels
    - Low-sodium replacements
  - Eliminate sugar-sweetened beverages
    - Switch to skim or 1% milk from whole
    - Water bottle daily
    - Family agreed to drink water at dinner as well
  - Obtain 60 minutes physical activity daily
    - Will exercise on elliptical, walk with Mom and friends, and dance for 15 minutes with Mom in the garage

1 month telephone follow-up

- Mom reports several dietary changes including
  - Elimination of soda
  - More fruits and vegetables in diet
  - Weight loss of 4 pounds (self-reported)
  - Walking with friend who is diabetic daily and using elliptical
  - D.A. discouraged at rate of weight loss



6 month follow-up

- Clinical Data:
  - Systolic: 136, RUE, Supine Diastolic: 78, RUE, Supine, Manual (Lisinopril dose increased to 10 mg)
  - Height: 164.3 cm; 73%, z-score: 0.62. Weight: 126.7 kg, 99%, z-score: 3.12; BMI: 46.9, 100%, Z-score: 2.77
- Nutrition Diagnosis: Obese as evidenced by BMI >95TH percentile related to excessive energy intake.
  - Weight trend worsening with weight gain of 4.8 kg in 6 months.
  - Pt seen by Adolescent Medicine for depression and anxiety, placed on an SSRI
- Food/Nutrition Behavior
  - Patient reports eating more FV
  - Elimination of fried foods, cooking at home with spices and olive oil, using George Foreman
  - Nighttime eating continues and anxiety worsening
  - Self-monitoring of portion sizes lacking
  - Eliminated sugar sweetened beverages
  - Friend moved away so physical activity stopped
- Set a new weight loss goal (10 pounds in 3 months)
  - 2000 kcal/day with closer monitoring of CHO
  - Dance daily in the garage for 15 minutes

Are current strategies working?

- Research has not demonstrated that one method of CHO counting is better
  - Diabetes pts esp. pediatric patients struggle to meet treatment goals of HbA1c <7.5%
  - Pediatric pts can measure CHO but often underestimate portion size
  - Recent research suggests utilization of visualization tools via software and Apps increases empowerment, efficacy, & self-treatment in adolescents with diabetes Froisland et al (2015) *Journal of Diabetes Science and Technology*
- Regular review of CHO important as children grow and new foods are introduced

So What Does A Healthy Serving of Carbs Look Like?

1/2 whole-wheat English muffin
= 13 grams carbs
= 67 calories

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Tomato & Smoked Mozzarella Sandwiches

1 slice whole wheat bread
=12 g CHO
=71 calories

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Flower Power Oats

1/2 cup cooked oatmeal
= 14 grams carbs
= 83 calories

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Mashed Potatoes

1 cup mashed potatoes
= 30 grams carbs
= 243 calories

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Easy Brown Rice

1/2 cup cooked brown rice
= 22 grams carbs
= 103 calories

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Lime & Parmesan Popcorn

3 cups popped popcorn
= 19 grams carbs
= 93 calories

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Breakfast Ideas for 45-60 g CHO per meal

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Raspberry Yogurt Cereal

- Serving size: about 1¾ cups each
- Per serving: 290 calories; 5 g fat(2 g sat); 6 g fiber; **48 g carbohydrates;** 18 g protein; 48 mcg folate; 5 mg cholesterol; 24 g sugars; 0 g added sugars; 30 IU vitamin A; 10 mg vitamin C; 520 mg calcium; 2 mg iron; 190 mg sodium; 817 mg potassium
- Nutrition Bonus: Calcium (52% daily value)
- Carbohydrate Servings: 3
- Exchanges: 1½ starch, ½ other carbohydrate, 1½ nonfat milk, ½ fat

Yogurt Parfait

- Serving size: about 1½ cups
- Per serving: 285 calories; 8 g fat(1 g sat); 6 g fiber; 37 g carbohydrates; 17 g protein; 73 mcg folate; 6 mg cholesterol; 22 g sugars; 7 g added sugars; 30 IU vitamin A; 98 mg vitamin C; 174 mg calcium; 2 mg iron; 50 mg sodium; 577 mg potassium
- Nutrition Bonus: Vitamin C (163% daily value)
- Carbohydrate Servings: 2½
- Exchanges: 1 starch, 1 fruit, 1 nonfat milk, 1 fat

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Kitty Cat Oatmeal

- Serving size: 1¼ cups
- Per serving: 314 calories; 8 g fat(4 g sat); 5 g fiber; 50 g carbohydrates; 13 g protein; 40 mcg folate; 20 mg cholesterol; 20 g sugars; 4 g added sugars; 480 IU vitamin A; 11 mg vitamin C; 323 mg calcium; 2 mg iron; 116 mg sodium; 606 mg potassium
- Nutrition Bonus: Calcium (32% daily value)
- Carbohydrate Servings: 3½
- Exchanges: 2 starch, 1½ fruit, 1 reduced-fat milk, ½ other carbohydrate

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But Maggie, I don't have time to cook!

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Lunch Ideas for 45-60 g CHO per meal

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Secrets to A WELL-BALANCED LUNCH

…that will satisfy your kid's taste buds

Follow this simple guideline to pack a healthy and budget-friendly lunch for your kid.
*Direction: **Select one** item from each of the boxes below and combine your selections.*
**Preferable to buy in season to get optimum nutritional value.*

Grain

Whole wheat bread
Pita bread
Tortilla
Whole wheat crackers
Sandwich thins

_____
_____
_____

Protein

Chicken
Turkey
Ham
Hard boiled egg
Cottage cheese
Low fat cheese
Nut butters
Lean roast beef

_____
_____

Vegetable*

Baby Carrots
Broccoli
Cauliflower
Cucumbers
Pepper rings or strips
Vegetable juice
Sugar snap peas
Cherry tomatoes

_____

Fruit

Any fresh fruit (leave skin on if possible)
Fruit cups in light juice
A frozen fruit smoothie

_____
_____
_____

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A delicious and nutritious lunch

perfect for school and many other occasions

Bento Box

- Per serving: 503 calories; 22 g fat(4 g sat); 7 g fiber; **52 g carbohydrates;** 29 g protein; 97 mcg folate; 191 mg cholesterol; 21 g sugars; 2 g added sugars; 3,013 IU vitamin A; 51 mg vitamin C; 233 mg calcium; 5 mg iron; 554 mg sodium; 755 mg potassium
- Nutrition Bonus: Vitamin C (85% daily value), Vitamin A (60% dv), Iron (28% dv), Folate (24% dv), Calcium (23% dv)
- Carbohydrate Servings: 3½
- Exchanges: 2 fat, 2 lean protein, 2 starch, 1 fruit, 1 medium-fat protein, ½ vegetable

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Crunch-Time Wraps

- Serving size: 1 wrap
- Per serving: 205 calories; 8 g fat(1 g sat); 13 g fiber; 30 g carbohydrates; 12 g protein; 34 mcg folate; 8 mg cholesterol; 6 g sugars; 53 mg vitamin C; 93 mg calcium; 2 mg iron; 610 mg sodium; 318 mg potassium
- Nutrition Bonus: Vitamin C (88% daily value)
- Carbohydrate Servings: 2
- Exchanges: 2 vegetable, 1 starch, 1 lean meat, 1 fat

Chipotle Ranch Egg Salad Wraps

- Per serving: 256 calories; 13 g fat(3 g sat); 5 g fiber; 25 g carbohydrates; 10 g protein; 53 mcg folate; 189 mg cholesterol; 4 g sugars; 1,009 IU vitamin A; 25 mg vitamin C; 128 mg calcium; 2 mg iron; 476 mg sodium; 237 mg potassium
- Nutrition Bonus: Vitamin C (42% daily value), Vitamin A (20% dv)
- Carbohydrate Servings: 1½
- Exchanges: ½ vegetable, 1½ starch, 1 medium-fat meat, 1½ fat

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Teddy Bear Sandwich

- Serving size: 1 sandwich
- Per serving: 136 calories; 4 g fat(1 g sat); 4 g fiber; 20 g carbohydrates; 6 g protein; 43 mcg folate; 0 cholesterol; 3 g sugars; 2 g added sugars; 66 IU vitamin A; 1 mg vitamin C; 55 mg calcium; 2 mg iron; 242 mg sodium; 175 mg potassium
- Carbohydrate Servings: 1½
- Exchanges: 1 starch, ½ fat, ½ vegetable

15g CHO Snack Ideas

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Peanu Butter-Covered Pretzel Rod

- Per serving: 108 calories; 6 g fat(1 g sat); 1 g fiber; 11 g carbohydrates; 3 g protein; 1 mcg folate;0 cholesterol; 3 g sugars; 2 g added sugars; 0 vitamin A; 0 vitamin C; 1 mg calcium; 1 mg iron;230 mg sodium; 25 mg potassium
- Carbohydrate Servings: ½
- Exchanges: 1 fat, ½ starch

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Black Bean and Corn Salsa

- Serving size: ¼ cup
- Per serving: 35 calories; 1 g fat(0 g sat); 1 g fiber; 5 g carbohydrates; 1 g protein; 7 mcg folate; 0mg cholesterol; 1 g sugars; 227 IU vitamin A; 5 mg vitamin C; 11 mg calcium; 0 mg iron; 106 mg sodium; 75 mg potassium
- Carbohydrate Servings: ½
- Exchanges: ½ starch

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Cactus Snack Jar

- Serving size: 1 snack jar
- Per serving: 69 calories; 0 g fat(0 g sat); 3 g fiber; 17 g carbohydrates; 1 g protein; 52 mcg folate;0 mg cholesterol; 12 g sugars; 638 IU vitamin A; 5 mg vitamin C; 58 mg calcium; 1 mg iron; 110mg sodium; 434 mg potassium
- Carbohydrate Servings: 1
- Exchanges: 1 fruit, 1 vegetable

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Just Peachy Smoothies

- Serving size: 1 cup
- Per serving: 102 calories; 1 g fat(0 g sat); 2 g fiber; 20 g carbohydrates; 5 g protein; 7 mcg folate;4 mg cholesterol; 4 g sugars; 767 IU vitamin A; 6 mg vitamin C; 141 mg calcium; 0 mg iron; 50 mg sodium; 345 mg potassium
- Carbohydrate Servings: 1½
- Exchanges: ½ fruit

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Mini Cucumber Caterpillars

- Serving size: 2 caterpillars
- Per serving: 73 calories; 7 g fat(1 g sat); 1 g fiber; 3 g carbohydrates; 1 g protein; 6 mcg folate; 4mg cholesterol; 2 g sugars; 1 g added sugars; 1,384 IU vitamin A; 3 mg vitamin C; 14 mg calcium; 0 mg iron; 144 mg sodium; 104 mg potassium
- Nutrition Bonus: Vitamin A (28% daily value)
- Carbohydrate Servings: 0
- Exchanges: 1½ fat, ½ vegetable

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But Maggie, I still don't cook!

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Dinner Ideas for 45-60 g CHO daily

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Carnitas Tacos

- Serving size: 2 tacos
- Per serving: 301 calories; 8 g fat(2 g sat); 4 g fiber; 28 g carbohydrates; 29 g protein; 69 mg cholesterol; 7 g sugars; 329 mg sodium;
- Carbohydrate Servings: 2
- Exchanges: 1 vegetable, 1½ starch, 3 lean meat, ½ fat

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Caccitore-Style Chicken

- Serving size: 2 chicken drumsticks, ¾ cup sauce, and ½ cup cooked pasta
- Per serving: 324 calories; 5 g fat(1 g sat); 4 g fiber; 35 g carbohydrates; 33 g protein; 98 mcg folate; 98 mg cholesterol; 7 g sugars; 3,939 IU vitamin A; 74 mg vitamin C; 59 mg calcium; 3 mg iron; 408 mg sodium; 667 mg potassium
- Nutrition Bonus: Vitamin C (123% daily value), Vitamin A (79% dv), Folate (24% dv)
- Carbohydrate Servings: 2½

Mexican-Stuffed Squash

- Serving size: 1 stuffed squash half
- Per serving: 262 calories; 11 g fat(3 g sat); 5 g fiber; 29 g carbohydrates; 15 g protein; 59 mcg folate; 47 mg cholesterol; 4 g sugars; 1,786 IU vitamin A; 54 mg vitamin C; 143 mg calcium; 3 mg iron; 419 mg sodium; 1,005 mg potassium
- Nutrition Bonus: Vitamin C (90% daily value), Vitamin A (36% dv)
- Carbohydrate Servings: 2
- Exchanges: 1 vegetable, 1½ starch, 1½ lean meat, 1½ fat

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Super-Simple Beef Stew

- Serving size: 1/ serving
- Per serving: 317 calories; 9 g fat(3 g sat); 4 g fiber; 22 g carbohydrates; 35 g protein; 38 mcg folate; 92 mg cholesterol; 5 g sugars; 7,046 IU vitamin A; 20 mg vitamin C; 92 mg calcium; 5 mg iron; 396 mg sodium; 1,205 mg potassium
- Nutrition Bonus: Vitamin A (141% daily value), Vitamin C (33% dv), Iron (28% dv)
- Carbohydrate Servings: 1½

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Fireside Fajitas

- Serving size: 2 fajitas
- Per serving: 359 calories; 9 g fat(3 g sat); 6 g fiber; **38 g carbohydrates**; 33 g protein; 25 mcg folate; 83 mg cholesterol; 6 g sugars; 521 IU vitamin A; 59 mg vitamin C; 163 mg calcium; 3 mg iron; 588 mg sodium; 575 mg potassium
- Nutrition Bonus: Vitamin C (98% daily value)
- Carbohydrate Servings: 2½
- Exchanges: 1½ vegetable, 2 starch, 3 lean meat, 1 fat

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Dinner Sides

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Sweet Treats for 45-60 g CHO daily

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Blondies

- Serving size: 1 bar
- Per serving: 147 calories; 9 g fat(3 g sat); 2 g fiber; 15 g carbohydrates; 3 g protein; 7 mcg folate;21 mg cholesterol; 11 g sugars; 10 g added sugars; 82 IU vitamin A; 0 mg vitamin C; 51 mg calcium; 1 mg iron; 73 mg sodium; 101 mg potassium
- Carbohydrate Servings: 1
- Exchanges: 1 other carbohydrate, 1 fat

Mini Ice Cream Sandwiches

- Per serving: 127 calories; 3 g fat(0 g sat); 2 g fiber; 24 g carbohydrates; 2 g protein; 6 mcg folate;0 mg cholesterol; 14 g sugars; 68 IU vitamin A; 6 mg vitamin C; 2 mg calcium; 0 mg iron; 94 mg sodium; 25 mg potassium
- Carbohydrate Servings: 1½
- Exchanges: 1½ other carbohydrates

Double Ginger Frozen Yogurt Sandwiches

- Per serving: 70 calories; 1 g fat(0 g sat); 0 g fiber; 13 g carbohydrates; 2 g protein; 13 mcg folate;1 mg cholesterol; 7 g sugars; 5 g added sugars; 51 IU vitamin A; 1 mg vitamin C; 48 mg calcium; 1 mg iron; 60 mg sodium; 81 mg potassium
- Carbohydrate Servings: 1
- Exchanges: 1 other carbohydrate

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Apple Crisp with Whipped Topping

- Serving size: ½ cup
- Per serving: 141 calories; 5 g fat(3 g sat); 2 g fiber; 25 g carbohydrates; 1 g protein; 11 mcg folate; 11 mg cholesterol; 17 g sugars; 170 IU vitamin A; 3 mg vitamin C; 9 mg calcium; 1 mg iron; 35 mg sodium; 80 mg potassium
- Carbohydrate Servings: 1½
- Exchanges: 1 fruit, ½ other carb, 1 fat

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Watermelon Fruit Pizza

- Serving size: 2 slices
- Per serving: 64 calories; 1 g fat(0 g sat); 1 g fiber; 15 g carbohydrates; 2 g protein; 13 mcg folate;1 mg cholesterol; 12 g sugars; 1 g added sugars; 893 IU vitamin A; 22 mg vitamin C; 46 mg calcium; 1 mg iron; 13 mg sodium; 237 mg potassium
- Nutrition Bonus: Vitamin C (37% daily value)
- Carbohydrate Servings: 1
- Exchanges: 1 fruit

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Be Physically Active!

- At least 60 min. moderate to vigorous physical activity daily *(AAP guidelines 2015)*
- Promotes CV health & weight management
- Wear a pedometer and have a step goal (10,000 is the magic #!)
  - New data in postal workers suggests 15,000 steps
- Kid-friendly movement ideas

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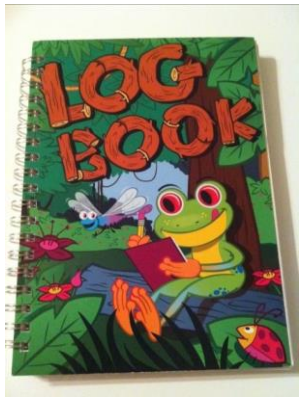
Diabetes & Physical Activity

- Children & Adolescents with diabetes have the SAME nutritional requirements as those undertaking physical activity & sports training
- Nutritional strategies to prevent hypo or hyperglycemia during exercise
  - Careful planning/individualized approach
  - BG monitoring/food intake/insulin adjustment pre and post-exercise
  - *exercise should be delayed if control is poor (BG>250 mg/dl or ketones)
  - Importance of self-monitoring



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Unplanned activity

- Hypoglycemia common
- Have rapidly absorbed CHO readily available during any exercise
  - Gatorade, orange juice or other fruit juice, dried fruit, Fig Newtons, granola or cereal bars
- Amt of CHO required during exercise depends on
  - Intensity & frequency of exercise/training
  - Insulin level
  - Insulin regimen
  - Age, gender, weight

Competitive Sports

- Appropriate insulin adjustment, adequate nutrition/CHO, & fluid intake are essential for optimal performance (50-65% calories from CHO recommended)
- Pre-competition
  - A CHO-based, low fat meal should be eaten 1-3 hours
  - PBJ sandwich
  - Fruit and yogurt smoothie + low-fat granola
  - Turkey and swiss sandwich + fruit + sports drink
- During
  - Additional ‘quick acting CHO’ may be needed prior to & during strenuous exercise lasting >60 min.
  - ~30 g CHO: banana, 16 OZ Gatorade, dates, 1 OZ pretzels
  - Fluid should be consumed before and throughout duration of activity (13 ml/kg/hr)
- Post-competition/Recovery
  - Replace depleted muscle glycogen stores
  - CHO mixed with protein to prevent post-exercise hypoglycemia
    - Greek yogurt + berries+ cereal+ water
    - Sandwich wrap with turkey, spinach + fruit bowl+ low-fat milk
    - Eggs scrambled with veggies + whole wheat toast+ apple slices

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Future Directions

- Most U.S. children with obesity do not receive evidence-based care for obesity (US Preventative Services Task Force 2015)
  - Multidisciplinary approach (Pediatrician, Behavioral Interventionist, Dietitian, Exercise Physiologist)
  - Moderate (25-75 contact hours annually) to high intensity (>75 contact hours) over 6-12 months
  - include dietary modifications, physical activity changes, behavioral strategies, & active parental involvement
  - Family-based multi-component behavioral therapy to assist in self-regulatory skills & environment control
  - Integrated care model

- Call for new approaches to determine what interventions might be effective AND need to collect data on adverse effects of interventions (dieting behaviors, low self-esteem, weight bias and stigma, & eating-disordered behaviors)

What's stress got to do with it?

- Adverse life events (early life stress), such as abuse or neglect are chronic stressors linked with greater BMI, insulin resistance & elevated blood pressure
  - low-SES youth face greater community level, family level, & individual level stressors
- Adolescence is a period of greater stress (psychosocial & physiologic); overweight youth report more perceived stress than lean counterparts
- Children & adolescents from low-income households show poorer outcomes in traditional BWC treatment (Sato et al *Pediatr Clin N Am* 2016)

Mindful Eating

- Mindful eating is paying attention to the process of eating and enjoying the experience.
- Giving full attention to the smell, taste and texture of food and the environment in which it is served.
- A growing awareness of what your body is telling you.
- Selecting the foods your body needs to be healthy.

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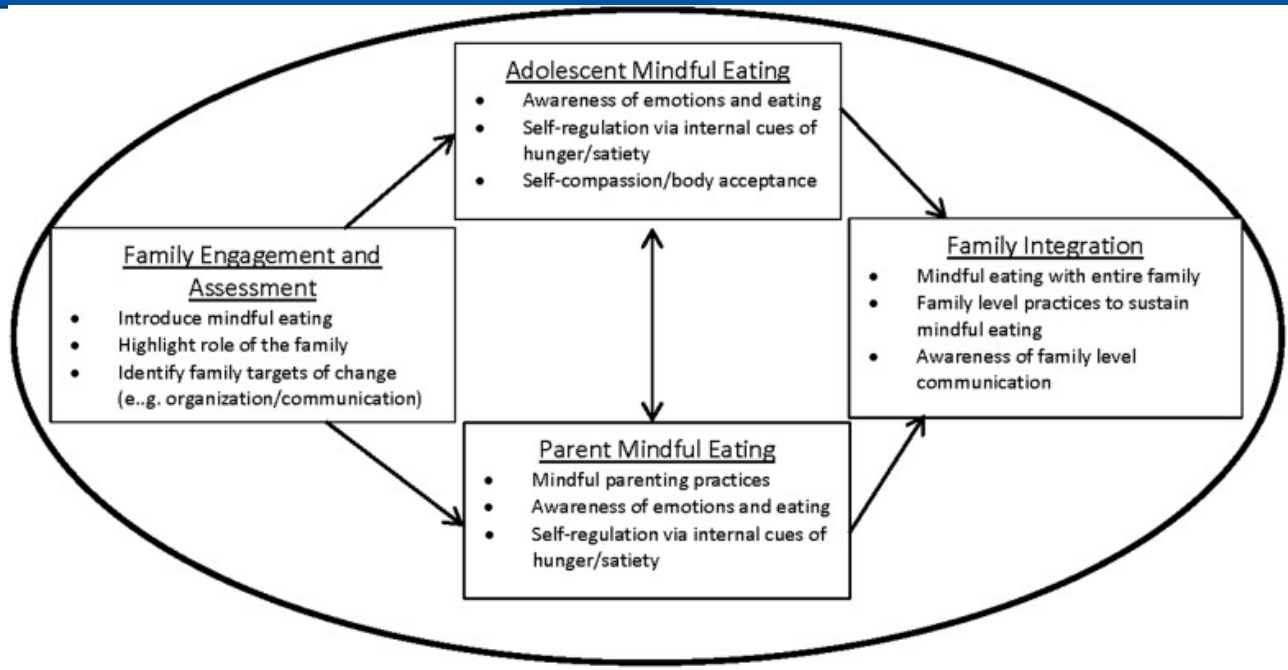
Future Directions

- Mindfulness-stress based intervention for 12 weeks
- Family-Based Therapy
- Moderate intensity (weekly visits)



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BARNSTABLE BROWN DIABETES CENTER