CHILDHOOD OBESITY

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QUOTE FROM FORMER SURGEON GENERAL RICHARD CARMONA

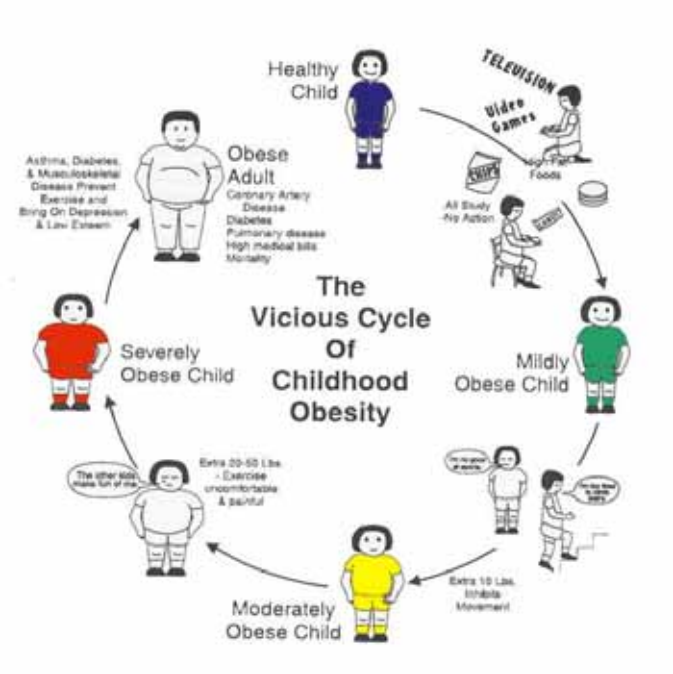
- "Because of the increasing rates of obesity, unhealthy eating habits and physical inactivity, we may see the first generation that will be less healthy and have a shorter life expectancy than their parents."

OBJECTIVES

1. DEFINE THE EPIDEMIOLOGY/ETIOLOGY OF CHILDHOOD OBESITY IN THE UNITED STATES
2. CLINICAL EVALUATION
3. DISCUSS COMORBIDITIES ASSOCIATED WITH CHILDHOOD OBESITY

DEFINITIONS

- Overweight – excess body weight
- Obesity – excess amount of adipose tissue



USING BMI

- Norms for children vary with age and sex (cannot use adult BMI ranges to demonstrate overweight/obesity)
- AAP recommends annual BMI as a part of normal health supervision
- BMI ranges for Age 2-20 years of age
  - Underweight - <5th Percentile
  - Normal Weight – 5th through 85th percentile
  - Overweight – 85th to 95th percentile
  - Obese - >95th percentile

EPIDEMIOLOGY

- Overweight or obese (>85th percentile)
  - 26.7 % of Preschool (2-5 years)
  - 32.6 % of school-age (6-11 years)
  - 33.6 % of adolescents (12-19 years)
- Obese(>95th percentile)
  - 12.1 of preschool
  - 18.0 of school-age
  - 18.4 of adolescents

CHILDHOOD OBESITY FACTS

- Non-Hispanic whites
  - 30.1 % of males
  - 25.6% of females
- Non-Hispanic blacks
  - 36.9 % of males
  - 41.3% of females
- Mexican Americans
  - 40.5% of males
  - 38.2% of females

ETIOLOGY

- Environmental Factors
  - Portion sizes of prepared foods
  - Fast food service
  - Diminishing family presence at meals
  - Decreased structured physical activity
  - Increasing computer-oriented play activity
  - School meal nutrition content
- Sugar Sweetened Beverages (including juice)
  - Supply 270 kcal/day (10-15% of total caloric intake)

ETIOLOGY (CONTINUED)

- Television
  - Amount of time directly correlated to prevalence of obesity
  - Displacement of physical activity
  - Decrease diet quality
- Nutrition or other stressors during gestation and early life
  - Infants born SGA or LGA have higher rates of insulin resistance during childhood and young adulthood
  - Mothers pre-pregnancy weight and weight gain during pregnancy are important predictors of the child's birth weight
  - Maternal pre-eclampsia is associated with higher BMI offspring by adolescence
  - Children born to women who had gastric bypass surgery prior to birth have a lower prevalence of obesity than those born before gastric bypass

CLINICAL EVALUATION - HISTORY

- Onset of overweight
- Child's eating and exercise habits
  - Children who eat less frequent meals are more likely to be obese
- Identification of caretakers who feed the child
- ID of foods high in calories and low in nutritional value (i.e. juice and soda)
- Evaluation of time spent in play
- Evaluation of school recess and physical education
- Assessment of after-school and weekend activities
- Assessment of screen time
  - TV, DVD/bluerays, or video games

CLINICAL EVALUATION – FAMILY HISTORY

- Information about obesity in first degree relatives
- Common comorbidities in first and second degree relatives
  - CV disease
  - Hypertension
  - Diabetes
  - Liver disease
  - Gall bladder disease

CLINICAL EVALUATION – PYSCHO-SOCIAL FACTORS

- Depression
  - Sleep issues
  - Hopelessness
- Information about school and social issues
  - Friends?
  - Bullying?
- Tobacco use
  - Increases longterm CV risks

CLINICAL EVALUATION – PHYSICAL EXAM

- General Appearance
  - Dysmorphic features
  - Affect
  - Fat distribution
- Blood Pressure
  - Greater than the 95th percentile for gender, age, and height on three separate occasions
- Stature and height velocity
  - Exogenous obesity drives linear height (obese children are tall for their age/gender)
  - Obesity secondary to an endocrine disorder or genetic disorder are associated with short stature

CLINICAL EVALUATION – PHYSICAL EXAM CONTINUED

- Skin and Hair
  - Dry course or brittle hair (hypothyroidism)
  - Acanthosis nigricans (type 2 diabetes or insulin resistance)
  - Hirsutisim (PCOS or Cushing Syndrome)
- Abdomen
  - Tenderness in RUQ (gallbladder disease)
  - Hepatomegaly (NAFLD)
  - Striae (likely from rapid accumulation of subcutaneous fat but may be from Cushing syndrome)
- Musculoskeletal
  - Non-pitting edema (hypothyroidism)
- Genitourinary
  - Undestended testes, small penis, and scrotal hypoplasia (Prader-Willi syndrome)

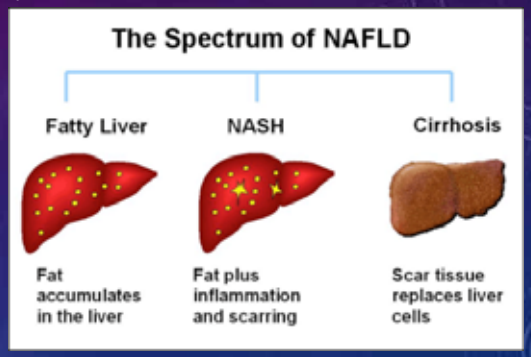
CLINICAL EXAM – LABORATORY STUDIES

- Routine Screening for Diabetes Type 2, dyslipidemia, hypertension, and fatty liver disease.
  - Fasting Lipid Panel
    - Screening between 2-8 with BMI >95th percentile (NHLBI)
    - Older if BMI >85th Percentile
  - Fasting Glucose
    - After age of 10 in overweight/obese with two additional risk factors
      - Family History of type 2 DM, high risk ethnicity, acanthosis nigracans, or PCOS
  - Serum ALT
  - Vitamin D Deficiency
    - Possible from vitamin/mineral deficiencies due to poor diet or sequestion in excess adipose tissue

COMORBIDITIES

- Endocrine
  - Impaired Glucose Tolerance
  - Diabetes Mellitus
  - Hyperandrogenism in females
    - Early onset PCOS
  - Abnormalities in growth and puberty
    - Accelerated linear growth initially with accelerated bone age, and subsequent decreased in actualized height
- Cardiovascular
  - Hypertension
  - Dyslipidemia

COMORBIDITIES (CONTINUED)



- Gastrointestinal
  - Non-alcoholic fatty liver disease (NAFLD)
    - Could lead to NASH, fibrosis, and cirrhosis
- Pulmonary
  - Obstructive Sleep Apnea (OSA)
  - Obesity Hypoventilation Syndrome (OHS)
    - Hypoventilation during wakefulness
- Cancers
  - Breast, colon, endometrium, esophagus, kidney, pancreas, gall bladder, thyroid, ovary, cervix, prostate, multiple myeloma, and Hodgkin's lymphoma.

COMORBIDITIES (CONTINUED)

- Orthopedic
  - Slipped Capital Femoral Epiphysis (SCFE)
    - Displacement of capital femoral epiphysis from femoral neck through the physeal plate
  - Blount Disease (tibia vara)
    - Progressive bowed legs and tibial torsion
    - Inhibited growth for medial proximal tibial growth plate due to excessive weight bearing
  - Increase fractures
    - Obese children have a reduced bone mass when adjusted for body size
  - Genu valgum
  - Musculoskeletal Pain
  - Impaired mobility
  - Lower extremity misalignment

COMORBIDITIES (CONTINUED)

- Neurologic
  - Idiopathic Intracranial Hypertension (pseudotumor cerebri)
    - Typical presentation is headache
    - Could include nausea, vomiting, retroocular eye pain, transient visual obscurations, visual loss, and diplopia
    - Can cause severe visual impairment or blindness
- Dermatologic
  - Intertrigo
  - Furunculosis
  - Hidradenitis Suppurativa
  - Acanthosis Nigracans
- Psychosocial (increased in females)
  - Alienation
  - Distorted peer relationships
  - Poor self esteem
  - Distorted body image
  - Anxiety
  - depression

DIETARY RECOMMENDATIONS FOR HEALTHY CHILDREN

- Breast Feeding
  - Supports optimal growth and development for the first 4-6 months after birth
  - Should maintain for 12 months when possible
- Delay introducing 100 % juice until 6 months of age
  - No more than 4-6 ounces/day
- Don't overfeed children
  - Don't force children to finish meals
- Introduce healthy food
  - Keep offering if they initially refuse
  - Don't give foods without overall nutritional value to simply provide calories

DIETARY RECOMMENDATIONS (CONTINUED)

	1 year	2-3 year	4-8 year	9-13 year	14-18 year
Calories	900 kcal	1000 kcal			
Female			1200 kcal	1600 kcal	1800 kcal
Male			1400 kcal	1800 kcal	2200 kcal
Fat	30-40%	30-35%	25-35%	25-35%	25-35%
Milk Dairy	2 cups	2 cups	2 cups	3 cups	3 cups

DIETARY RECOMMENDATIONS (CONTINUED)

	1 year	2-3 year	4-8 year	9-13 year	14-18 year
Lean Meat/Beans	1.5 oz	2 oz		5 oz	
Female			3 oz		5 oz
Male			4 oz		6 oz
Fruits	1 cup	1 cup	1.5 cup	1.5 cup	
Female					1.5 cup
Male					2 cup

DIETARY RECOMMENDATIONS (CONTINUED)

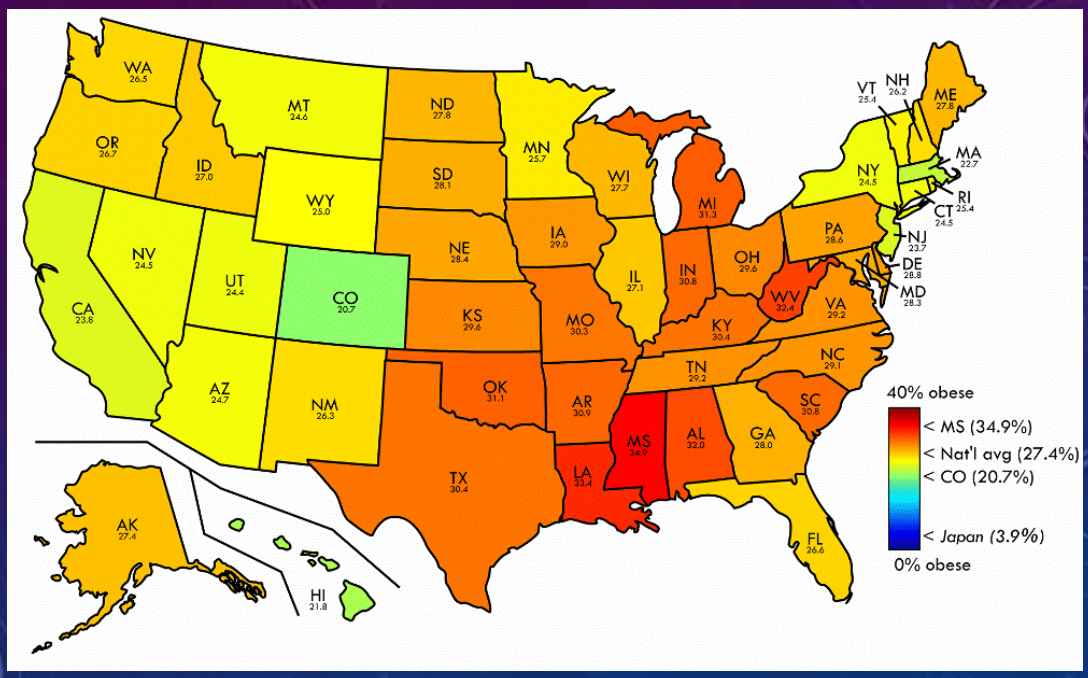
	1 year	2-3 year	4-8 year	9-13 year	14-18 year
Vegatables	¾ cup	1 cup			
Female			1 cup	2 cup	2.5 cups
Male			1.5 cup	2.5 cup	3 cup
Grains	2 oz	3 oz			
Female			4 oz	5 oz	6 oz
Male			5 oz	6 oz	7 oz

PHYSICAL ACTIVITY AND CHILDREN

- AHA recommends at least 60 mins of moderate to vigorous activity every day
  - Could be two 30 min periods or four 15 min periods
- Associated with increased life expectancy and decreased risk of CV disease
- Should be fun
- Parents should be a role model for active lifestyles
  - Allows for social support with regular physical activity and dietary intervention from those preparing food

OBESITY RATES ON DECLINE?

- Small but significant decreases were found in 18 states
  - Largest changes were in Florida, Georgia, Missouri, New Jersey, South Dakota, and the U.S. Virgin Islands
- 20 states held steady with no change
- Pennsylvania, Colorado, and Tennessee saw increases in the obesity rates



WHAT CAN WE DO TO HELP?

- 1. MOTIVATIONAL INTERVIEWING
- 2. EDUCATE AT RISK FAMILIES
- 3. DISCUSS LEGISLATIVE CHANGES

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