Childhood Obesity

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Childhood Obesity: Facts

- Childhood obesity has more than doubled in children and quadrupled in adolescents in the past 30 years
- Obese children 6-11 years in the US: 7% in 1980, 18% in 2012
- Obese adolescents 12-19 years in the US: 5% in 1980, ~21% in 2012
- In 2012 > 1/3 of children and adolescents were overweight or obese

What is Obesity?

- Weight > 95th %ile on growth chart
- Consider weight and body composition
- CDC has body mass index charts that consider age, gender, height and weight
- Adult charts should not be used

Overweight in Children

Distribution:

- For non-Hispanic whites, 17.5% of males and 14.7% of females
- For non-Hispanic blacks, 22.6% of males and 24.8% of females
- For Mexican Americans, 29.9% of males and 18.6% of females

A GROWING PROBLEM

Childhood Obesity

1. Underweight: < 5th %ile
2. Healthy weight: 5th through 85th %ile
3. Overweight: 85th to < 95th %ile
4. Obese: Equal to or > 95th %ile
Body Mass Index (BMI)

- What is it?
- How do you measure it?

Body Mass Index

- Uses height and weight measurements
- From the age of 2 and is age dependent
- Good indicator of body fat, but not perfect
- Old way: weight (kg)/ height (m)²

CDC BMI for age growth charts

Obese Youth Over Time


Percentage of high school students who were obese* — selected U.S. states, Youth Risk Behavior Survey, 2003

Percentage of high school students who were obese* — selected U.S. states, Youth Risk Behavior Survey, 2005
**Percentage of high school students who were obese* — selected U.S. states, Youth Risk Behavior Survey, 2007**

**Percentage of high school students who were obese* — selected U.S. states, Youth Risk Behavior Survey, 2009**

**Percentage of high school students who were obese* — selected U.S. states, Youth Risk Behavior Survey, 2011**

**Percentage of high school students who were obese* — selected U.S. states, Youth Risk Behavior Survey, 2013**

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**Childhood Obesity: Myths and Truths**

**MYTH**: Childhood obesity is genetic, nothing to be done about it.

**TRUTH**: Genes do influence the weight, healthy eating habits outweigh the genetic risk of obesity.

**MYTH**: Children who are obese or overweight should be put on a diet.

**TRUTH**: Treatment of obesity is not weight loss, rather growing into his/her ideal weight.

**MYTH**: It’s just baby fat. Children will outgrow the weight.

**TRUTH**: Childhood obesity doesn’t always lead to obesity in adulthood, but raises the risk dramatically. Overweight in preschool – overweight as a teen. Most kids do NOT outgrow the problem.
Childhood Obesity: Get the whole family involved

- Lead by example
  - What you eat: tell your child about the healthy food you are eating
  - When you cook: Cook healthily in front of your children
  - How you move: exercise and invite your kids
  - Your free time: Avoid TV and computer time
  - Recognize that you have more control than you think: turn off the TV, get off one bus stop earlier and walk.
  - Think about immediate benefits
  - Make small, easy changes over time

Childhood Obesity: Encourage healthy eating habits

- Make healthier food choices
  - Eat the rainbow
  - Make breakfast a priority
  - Cut back on fat
  - Schedule regular meal times
  - Limit dining out

Childhood Obesity: Be smart about snacks and sweets

- Don’t ban sweets entirely
- Limit juice and soda
- Keep snacks small
- Focus on fruit

Childhood Obesity: Watch portion sizes

- Learn what a regular portion size looks like
- Read food labels
- Use smaller dishes
- Dish up in the kitchen
- Divide food from large packages into smaller containers
- Downsize orders
Childhood Obesity: Get your kid moving

- Play active indoor games
- Get outside with your child
- Do chores together
- Enroll children in after school sports or other activities
- Sign up for a 5 or 10K ‘race’ with your child

Childhood Obesity: Reduce screen time

- Limit daily screen time (<2 hours)
- Stop eating in front of the TV
- Pick a different reward of punishment (instead of rewarding your child with more time in front of the computer or TV)

Childhood Obesity: Get involved

- Talk to your children
- Be in touch with teachers
- Defy busy schedules
- Spend time with your children

http://www.helpguide.org/mental/childhood_obesity.htm

Centers for Disease Control and Prevention’s School Health Guidelines to Promote Healthy Eating and Physical Activity Presentation

October 2011

Learning Objectives

1. Define the terms overweight and obesity.
2. Describe three health consequences of childhood obesity.
3. Explain the purpose of CDC’s School Health Guidelines to Promote Healthy Eating and Physical Activity.
4. Identify at least two healthy eating and two physical activity policies or practices that can be implemented in schools to address obesity.
5. Prioritize two guidelines to address obesity, physical activity, and nutrition in your state, region, city, or school district.
6. Name three groups of stakeholders in your state, region, city, or school district that need to be informed about the Guidelines.

Overweight and Obesity Defined

- **Overweight:** having extra body weight, for a particular height, from fat, muscle, bone, or water.
- **Obesity:** having a high amount of excess body fat.

Energy Balance

\[ \text{Energy In} = \text{Energy Out} \]
**Obesity**

Not just an adult concern anymore…

**Conditions Seen in Children**
- High Cholesterol
- Type 2 Diabetes/Impaired Glucose Tolerance
- High Blood Pressure
- Social Problems and Poor Self-Esteem
- Sleep Disturbances
- Orthopedic Problems

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**Obesity in Adults**

Obese children and adolescents are more likely to become overweight or obese adults

- Heart Disease
- Cancer
- Stroke
- Type 2 Diabetes
- Osteoarthritis
- Physical Disability
- High Blood Pressure
- Sleep Apnea

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**Factors Contributing to Obesity**

- Genetics
- Environment
- Unhealthy Diet
  - Sedentary Lifestyle
  - Lack of Physical Activity

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**Childhood Obesity: Prevention**

- Healthy lifestyle habits: healthy eating, physical activity
- Dietary and physical activity behavior – multifactorial:
  - Influenced by many sectors of society
    - Families
    - Communities
    - Schools
    - Child care settings
    - Medical care providers
    - Faith based institutions
    - Government agencies
    - The media
    - Food and beverage industries
    - Entertainment industries

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**Percentage of U.S. Children and Adolescents Classified as Obese, 1963–2008**

- *With percentiles for BMI by age and sex based on 2000 CDC BMI-for-age growth charts.*
- *Source: NCHS. Health, United States, 2010: With Special Feature on Death and Dying. Hyattsville, MD, 2011*
Social and Emotion Complications

- Low self-esteem and bullying
  - Get teased or bullied by peers
  - Suffer a loss of self-esteem
- Behavior and learning problems
  - Anxiety
  - Poorer learning skills
  - At the other extreme, they might act out
- Depression
  - At increased risk for secondary to above

School Environments

School Food Environment

Low-nutrient, energy-dense foods and beverages are
- Served in vending machines, à la carte lines, school stores, fundraisers, and classroom parties.
- Marketed to students.

School Environments

School Physical Activity Environment

- Daily physical education is not provided in most schools.
- Daily recess for elementary school students is not offered at many schools.
- Walking or biking to school is less common.

Rationale

Physical activity and healthy eating are linked with

- Academic Success
- Health and Well-being
- Risk for Obesity
- Risk for Chronic Conditions (e.g., osteoarthritis)
- Risk for Chronic Diseases (e.g., cancer)

School Health Guidelines to Promote Healthy Eating and Physical Activity

Purpose: To provide science-based guidance for schools on establishing a school environment supportive of healthy eating and physical activity.

The Guidelines support the
- Dietary Guidelines for Americans
- Physical Activity Guidelines for Americans
- U.S. Healthy People 2020 objectives

School Health Guidelines

1. Policies and Practices
2. School Environments
3. Nutrition Services
4. Physical Education and Physical Activity
5. Health Education
6. School Health Services
7. Family and Community
8. School Employee Wellness
9. Professional Development
GUIDELINE 1

Policies and Practices
Use a coordinated approach to develop, implement, and evaluate healthy eating and physical activity policies and practices.

GUIDELINE 2

School Environments
Establish school environments that support healthy eating and physical activity.

GUIDELINE 3

Nutrition Services
Provide a quality school meal program and ensure that students have only appealing, healthy food and beverage choices offered outside of the school meal program.
Nutrition Services

Institute of Medicine’s Nutrition Standards for Foods Served in School

www.cdc.gov/healthyyouth/nutrition/standards.htm

Guideline 3

Physical Education and Physical Activity

Implement a comprehensive physical activity program with quality physical education as the cornerstone.

Guideline 4

Physical Education and Physical Activity

A Quality PE Program:

1. Curriculum
2. Supportive Policies and Environment
3. Instruction
4. Student Assessment

Guideline 4

Walk- or Bike-to-School Programs
Daily Recess for Elementary Schools
Intramural and Physical Activity Clubs
Quality Physical Education

Guideline 4

Comprehensive School-Based Physical Activity Program

Guideline 5

Health Education

Implement health education that provides students with the knowledge, attitudes, skills, and experiences needed for healthy eating and physical activity.
GUIDELINE 6

School Health Services
Provide students with health, mental health, and social services to address healthy eating, physical activity, and related chronic disease prevention.

GUIDELINE 7

Family and Community
Partner with families and community members in the development and implementation of healthy eating and physical activity policies, practices, and programs.

GUIDELINE 8

School Employee Wellness
Provide a school employee wellness program that includes healthy eating and physical activity services for all school staff members.
Employ qualified persons, and provide professional development opportunities for physical education, health education, nutrition services, and health, mental health, and social services staff members, as well as staff members who supervise recess, cafeteria time, and out-of-school-time programs.

Access to Public-Use Materials on the Guidelines

- School Health Guidelines to Promote Healthy Eating and Physical Activity
  [www.cdc.gov/healthyyouth/npao/strategies.htm](http://www.cdc.gov/healthyyouth/npao/strategies.htm)
- PowerPoint® Presentation
  [www.cdc.gov/healthyyouth/npao/presentationslides.ppt](http://www.cdc.gov/healthyyouth/npao/presentationslides.ppt)
- Facilitator’s Guide to Using the PowerPoint® Presentation
- References for PowerPoint® Presentation
  [www.cdc.gov/healthyyouth/npao/references.pdf](http://www.cdc.gov/healthyyouth/npao/references.pdf)
- Frequently Asked Questions

Diabetes Mellitus

Definition:

1. HbgA1c $\geq 6.5\%$
2. Fasting glucose ($\geq 8$ hours) $> 126$ mg/dL
3. 2-hour plasma glucose $\geq 200$ mg/dL during oral glucose tolerance test
4. Random plasma glucose $> 200$ mg/dL with symptoms of hyperglycemia
Type I Diabetes Mellitus (TIDM)

- Causes
- Treatment
- Risk Factors
- Protocols
- Literature

TIDM

Causes:
Type I DM is caused by a lack of circulating insulin secondary to autoimmune destruction of β cells resulting in absolute (complete or near complete) insulin deficiency and requiring insulin injections for management.

Diabetic Ketoacidosis (DKA)

DKA is caused by:
- Decrease in effective circulating insulin
- With elevations of
  - Counter-regulatory hormones: glucagon, catecholamines, cortisol, growth hormone
  - Leading to increased glucose production by liver, kidney and impaired peripheral glucose utilization

Diabetic Ketoacidosis

- Increased lipolysis
- With ketone body production
- Which causes hyperglycemia and acidosis
- Which results in osmotic diuresis, dehydration and obligate loss of electrolytes

Diabetic Ketoacidosis

- Mild: pH < 7.3 Bicarb < 14 mmol/L
- Moderate: pH < 7.2 Bicarb < 10 mmol/L
- Severe: pH < 7.1 Bicarb < 5 mmol/L
- Signs and Symptoms:

Cerebral Edema

- Causes 57% to 87% of all DKA deaths and its incidence has been consistent.
- Occurs in 0.3% to 1% of all DKA patients
- Typically occurs 4 to 12 hours after activation of treatment
- Anytime during or even before treatment
- Symptoms: headache, gradual decrease or deterioration of LOC, inappropriate slowing of pulse rate and increase in BP.
- Cushing’s Triad: irregular respirations (caused by impaired brainstem function), bradycardia, hypertension (widening pulse pressure)
- Treatment: Mannitol 0.25-1g/kg over 20 min, repeat in 2-6 pm, hypertonic saline (3%) may be alternative 5-10 mL/kg over 30 min
Diabetic Ketoacidosis

Protocols:
UNM Children’s Hospital
Barbara Davis Center in Denver, Colorado
Lifeguard: Adult and Pediatrics

References: See BDDC and European Society for Paediatric Endocrinology/Lawson Wilkins Pediatric Endocrine Society Consensus Statement on Diabetic Ketoacidosis in Children and Adolescents, Pediatrics, 2004, 133-140
http://pediatrics.aappublications.org/content/113/2/e133.full.html

Diabetic Ketoacidosis

DKA usually develops slowly. But when vomiting occurs, this life-threatening condition can develop in a few hours. Early symptoms include the following:

- Thirst or a very dry mouth
- Frequent urination
- High blood glucose, the main sugar found in the blood and the body’s main source of energy. Also called blood sugar.
- High levels of ketones in the urine

Diabetic Ketoacidosis

Then, other symptoms appear:
- Constantly feeling tired
- Dry or flushed skin
- Nausea, vomiting, or abdominal pain
  (Vomiting can be caused by many illnesses, not just Ketoacidosis. If vomiting continues for more than 2 hours, contact your health care provider.)
- Difficulty breathing – Kussmaul breathing
- Fruity odor on breath
- A hard time paying attention, or confusion

Type II Diabetes Mellitus

Causes:
See above

Management:
Integrate Lifestyle modifications (diet, exercise) and as above in concert with medication rather than isolated initial treatment approach.

Reference: Management of Newly Diagnosed Type 2 Diabetes Mellitus (T2DM) in Children and Adolescents, Copeland KC et al.: Pediatrics 2013;131;364
http://pediatrics.aappublications.org/content/131/2/364.full.html

Type II Diabetes Mellitus

Key action statements:
1. Clinicians must ensure that insulin therapy if initiated if ketotic or in DKA, and if distinction is unclear
   1. Random venous or plasma BG ≥ 250 mg/dL
   2. Hgb A1c is > 9%
2. Lifestyle modification + Metformin therapy

Type II Diabetes Mellitus

- Metformin—Glucophage
- Helps reduce LDL Cholesterol and Triglyceride levels
- Main actions are the suppression of gluconeogenesis and the improvement of glucose uptake and insulin sensitivity.
- Belongs to the family of Biguanides
- Works by suppressing glucose production in the liver
Type II Diabetes Mellitus

3. HgbA1C should be monitored every 3 months
4. Clinicians should advise patients to monitor finger-stick BG
   a. Who are taking Insulin or other medications that increase their risk of hypoglycemia
   b. Are initiating or changing their diabetes treatment regimen
   c. Have not met treatment goals
   d. Have intercurrent illnesses

Type II Diabetes Mellitus

5. Committee suggests that clinicians incorporate the Academy of Nutrition and Dietetics’ Pediatric Weight Management Evidence-Based Nutrition Practice Guidelines
6. Clinicians should encourage children and adolescents with T2DM to engage in moderate-to-vigorous exercise for at least 60 min daily and limit ‘screen time’ to < 2 hours/day

Acanthosis Nigricans

Who gets it?
- Obese or overweight.
- Of Native American, African, Caribbean, or Hispanic descent.
- From a family with a history of AN.

Acanthosis Nigricans

Acanthosis nigricans: A skin condition characterized by dark thickened velvety patches, especially in the folds of skin in the axilla (armpit), groin and back of the neck. The condition is complex. It can occur with endocrine diseases such as Cushing disease, tumors of the pituitary, and diabetes mellitus. It is common in people who have insulin resistance -- whose body is not responding correctly to the insulin that they make in their pancreas. Acanthosis nigricans also occurs with underlying malignancies (especially carcinomas of the visceral), administration of certain drugs, and as a genetic disorder inherited in an autosomal dominant manner.

Acanthosis Nigricans

What is it a sign of?
- Pre-diabetes or diabetes: If you have pre-diabetes, making some lifestyle changes can help prevent diabetes. If you have diabetes, it is important to find out so that you can treat it.
- A reaction to a medicine: Birth control pills, strong corticosteroids like prednisone, and niacin can cause AN.
- Hormonal disease: This skin condition can be a sign of polycystic ovarian syndrome (PCOS), thyroid disease, or a problem with the adrenal glands.
- Cancer: When AN develops quickly, it can be a sign of a cancer, especially a cancer in the stomach, colon, or liver.
Acanthosis Nigricans: Pathophysiology

- Insulin and insulin-like growth factor-1, and their receptors on keratinocytes are obviously involved in the complex regulations leading to the peculiar epidermal hyperplasia.
- This condition is unrelated to other types of acanthosis nigricans, including the congenital and the paraneoplastic types.
- Control of obesity contributes largely to reverse the whole process, essentially by reducing both insulin resistance and compensatory hyperinsulinemia.
- Several drugs including metformin, octreotide, retinoids and topical colecalciferol (vitamin D(3)) analogs are also beneficial in clearing acanthosis nigricans.