

RACHEL K. LESCHER, MD PEDIATRIC ENDOCRINOLOGY ALASKA NATIVE MEDICAL CENTER

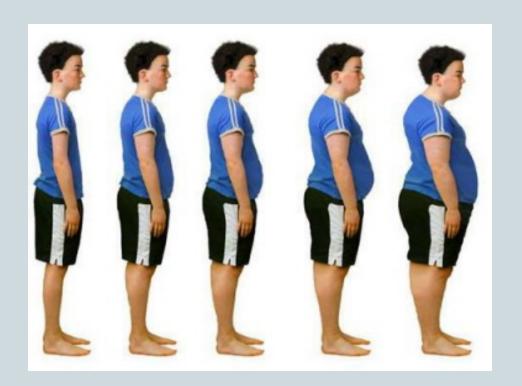
APRIL 28, 2015

Objectives

- Know the definitions of overweight and obese in children
- Recognize the prevalence of childhood obesity
- Understand the risk factors and causes of childhood obesity
- Review the American Academy of Pediatrics Expert Committee recommendations for the overweight/ obese patient
- Develop an appropriate evaluation for an overweight/obese child
- Discuss how to diagnose and treat common comorbidities of obesity.

Definitions

- Descriptions of weight
 - Underweight
 - Normal weight
 - Overweight
 - Obese
 - Severely obese



Body Mass Index (BMI)

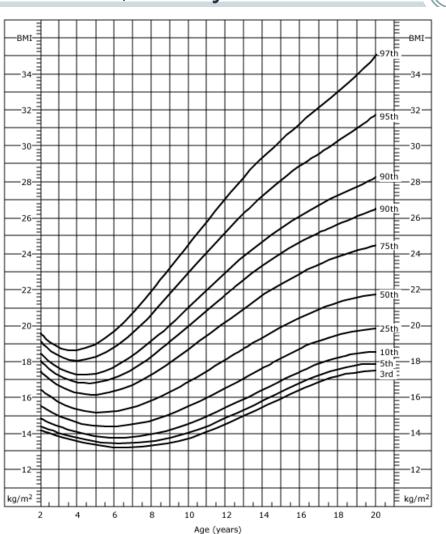
- Guideline for weight compared to height in each age group from 2-20 years old
- Although it is not a precise measure of body fat or health risk, BMI is the initial screen to serve as the starting point for classification of health risk
- To Calculate Body Mass Index
 - {Wt (kg) / [Ht (cm) x Ht (cm)]} x 10,000
 - {Wt (lb) / [Ht (in) x Ht (in)]} x 703
 - Online BMI calculator: nccd.cdc.gov/dnpabmi/Calculator.aspx
 - Your trusty Electronic Medical Record

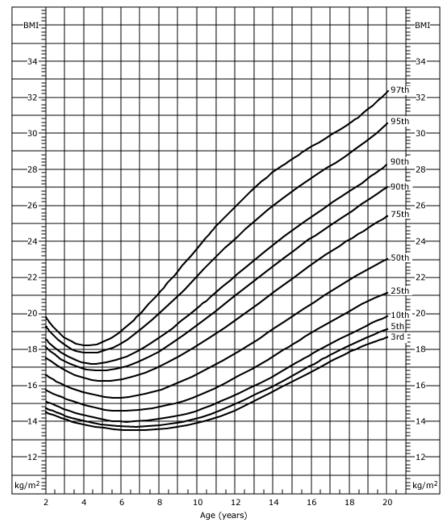
Body Mass Index (BMI)

Girls, 2-20 years old



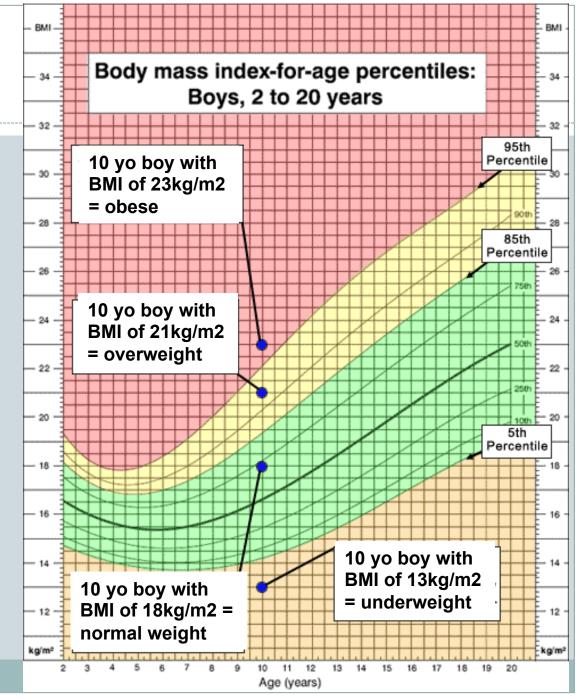
Boys, 2-20 years old





How is BMI used?

- BMI ≥ 99th percentile: consideration in the future for another weight classification "severely obese"
- □ BMI ≥ 95th percentile: obese
- □ BMI between ≥ 85th and 95th percentiles: overweight
- □ BMI 5th to 85th percentiles: normal weight
- □ BMĬ <5th percentile: underweight



Childhood Obesity Statistics



The Tragic Stats

2011-2012:

- 8.1% of children <2 yo obese
- 8.4% of children 2-5 yo obese
- 17.7% of children 6-11 yo obese
- 20.5% of children 12-19yo obese

Weight status of youth in AK

Figure 1: Prevalence of Overweight and Obesity Among Children Enrolled in the Women, Infants and Children Program (WIC)¹⁶; Resource Patient Management System (RPMS)¹⁷; and Anchorage School District (ASD)⁷ (Alaska, 2000-2005)

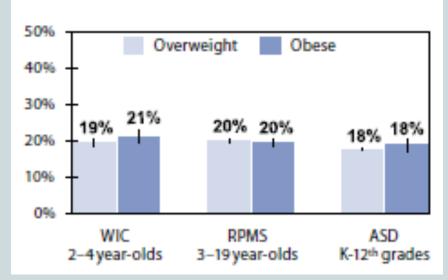
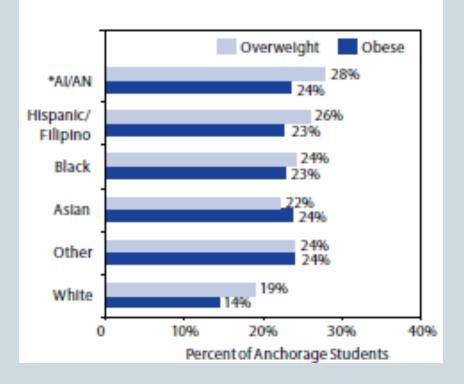
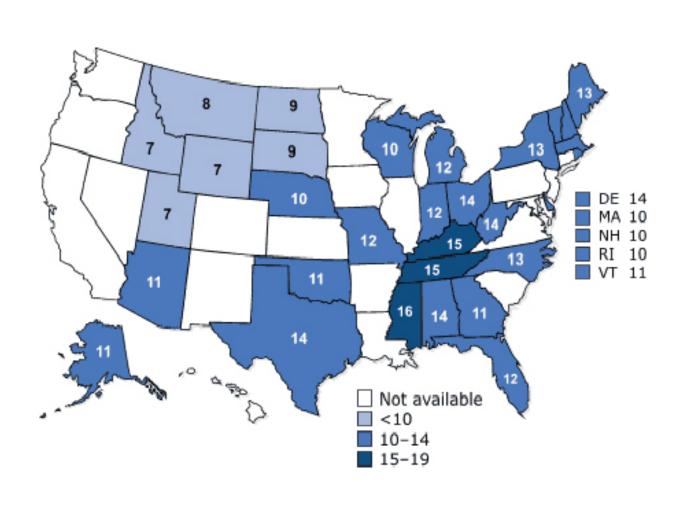


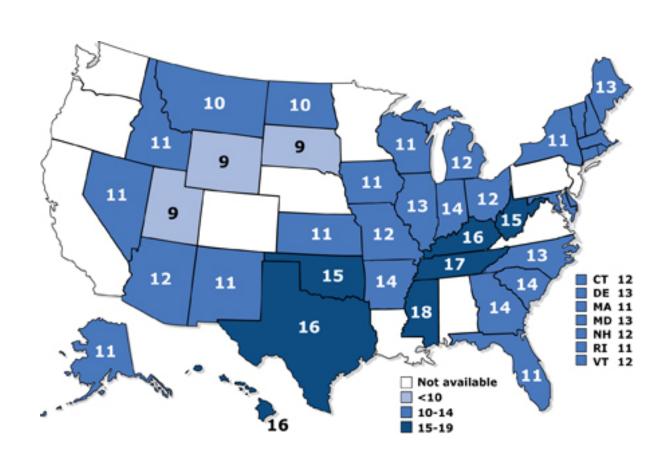
Figure 5: Prevalence of Overweight and Obesity Among Anchorage School District Students, by Race/Ethnicity, (2005-2006 School Year)⁷



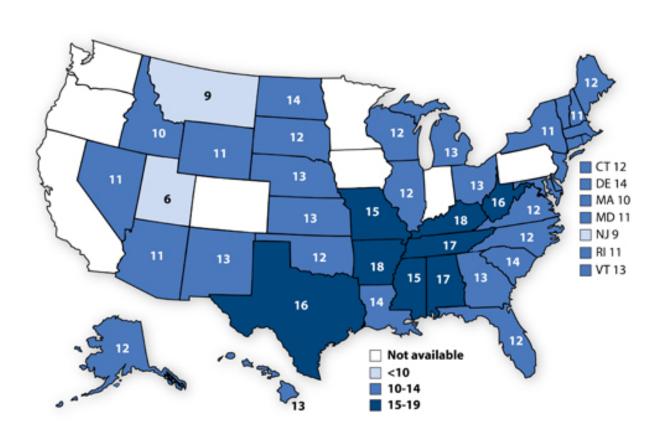
% HS students who were obese YRBS, 2003



% HS students who were obese YRBS, 2007

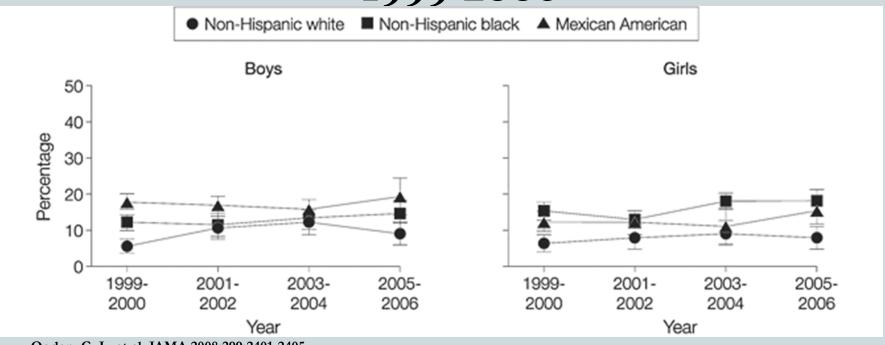


% HS students who were obese YRBS, 2013



The Good News

Body Mass Index for Age at or Above the 97th Percentile by Race/Ethnicity in 1999-2006



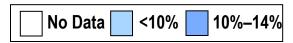




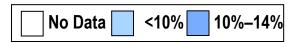
What's the big deal? Persistence of Obesity into Adulthood

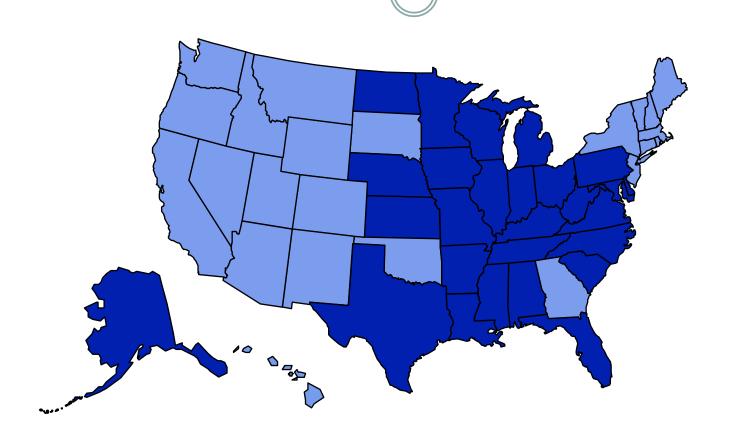
- Children who are obese are at increased risk of being obese adults compared to normal weight children
 - A child who is obese at 6-9 yo is 8.8 times more likely than a normal weight 6-9 yo child to be obese at 20-29 yo
 - Predictors of adult obesity are related to age of obese child, parental obesity, and the severity of obesity in the child
- Risk of obesity persisting into adulthood increases with age
 - 25% preschool aged children, 50% school aged children and
 75% of teenagers who are obese become obese adults

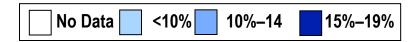


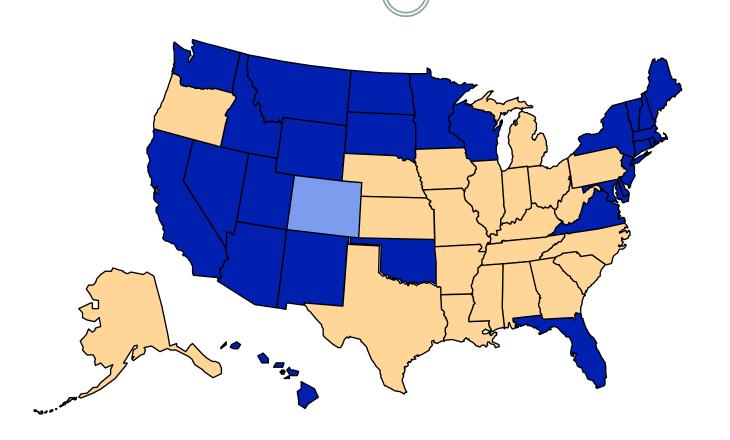


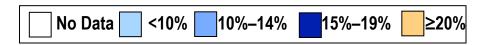


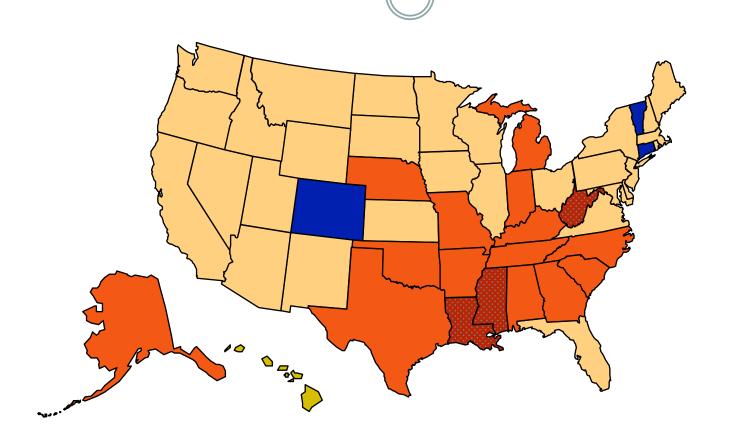


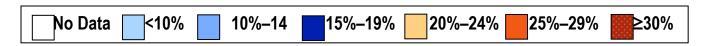


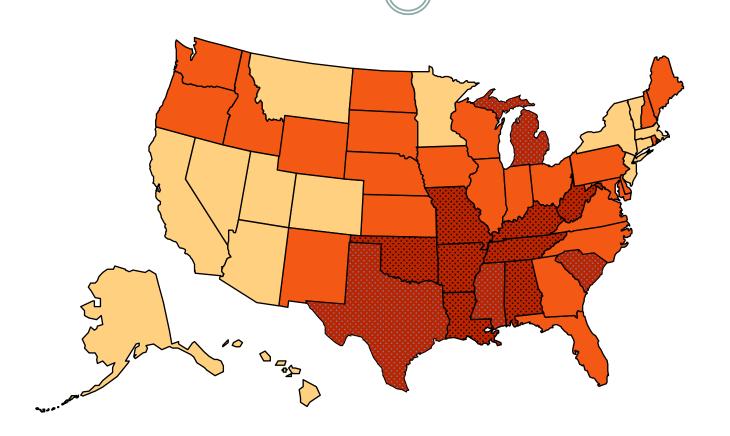


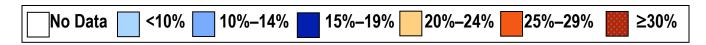












Adult Obesity

- Obese adults have increased risk of
 - Type 2 diabetes
 - Stroke
 - Heart disease
 - Osteoarthritis
 - Cancer (eg. breast, colon, endometrium, esophagus, kidney, pancreas, gallbladder, thyroid, ovary, cervix, prostate, multiple myeloma, Hodgkin's lymphoma)

Risk Factors of Childhood Obesity

- Genetic
- Environmental
- Epigenetic



Genetic Risk Factors

- BMIs of adopted children more similar to those of biological parents rather than adoptive parents
- Conclusions from twin studies:
 - Heritability of obesity between 40 70% (maybe???)
- Gene mutations that are associated with obesity
 - Leptin, leptin receptor, neuropeptide Y, proopiomelanocortin receptor, prohormone convertase-1, melanocortin receptor MC4R
- Loci on chromosomes 2, 5, 10, 11, 20

Environmental Risk Factors

Calories Consumed

- Sodas, sports drinks,
 Juices
- Portion sizes
- Prepackaged foods
- Fast food
- Vending machine food
- Fruits
- Vegetables
- Whole grains
- Fish
- Lean meats

Calories Used

- TV, videogames, computers
- Phones, tablets
- Cars
- Elevators
- Dishwashers
- Robotic vacuums
- Basketball
- Physical education
- Winter sports
- Walking, running

Not quite so simple an equation, however...

Epigenetic Factors

- Heritable changes that affect gene function without modifying the DNA sequence
- When epigenetic influences are introduced early in development (prenatally, even possibly preconception), they can permanently affect metabolism
 - What a mother eats during pregnancy and maybe even prior to conception can have an impact on the metabolism of the fetus and subsequent infant/child/teenager/adult

Causes of Obesity



Differential Diagnosis

- Endogenous Obesity most common especially if normal growth velocity
- Increased risk with:
 - Increased Age
 - Pubertal stages—those who are at a higher sexual maturity stage have more body fat
 - Sex—girls have more body fat than boys at the same BMI
 - Waist-to-hip ratio—individuals with higher waist-to-hip ratio with the same BMI have more body fat
 - Race—Highest percentages of obesity were Mexican-American boys and Non-hispanic black girls

Differential Diagnosis

• Endocrinologic:

- Cushing's Disease
- Hypothyroidism
- Growth Hormone Deficiencies
- Pseudohypoparathyroidism/ Albright Hereditary Osteodystrophy
- ROHHAD/ROHHADNet syndrome

CNS disorders

- Hypothalamic tumor
- Trauma
- Inflammation

Genetic syndromes

- Prader-Willi
- Albright Hereditary Osteodystrophy
- Bardet-Biedel syndrome
- Cohen syndrome
- Single gene mutations

Miscellaneous

- Drug induced (Risperdone, TCAs, Lithium)
- Binge eating disorder
- Bulimia nervosa

AAP EC Recommendations (2007)

Expert Committee Recommendations Regarding the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report

Sarah E. Barlow, MD, MPH and the Expert Committee

Division of Pediatric Gastroenterology, Nutrition, and Hepatology, Department of Pediatrics, Baylor College of Medicine, Texas Children's Hospital, Houston, Texas

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Prevention



- Obesity prevention should be a public health focus
- Primary vs. Secondary vs. Tertiary prevention
 - Primary prevention—prevention of disease before it occurs and reducing its incidence
 - Secondary prevention—early disease detection to provide opportunities to prevent disease progression and symptoms
 - Tertiary prevention—reduce impact of an already established disease by restoring function and reducing complications

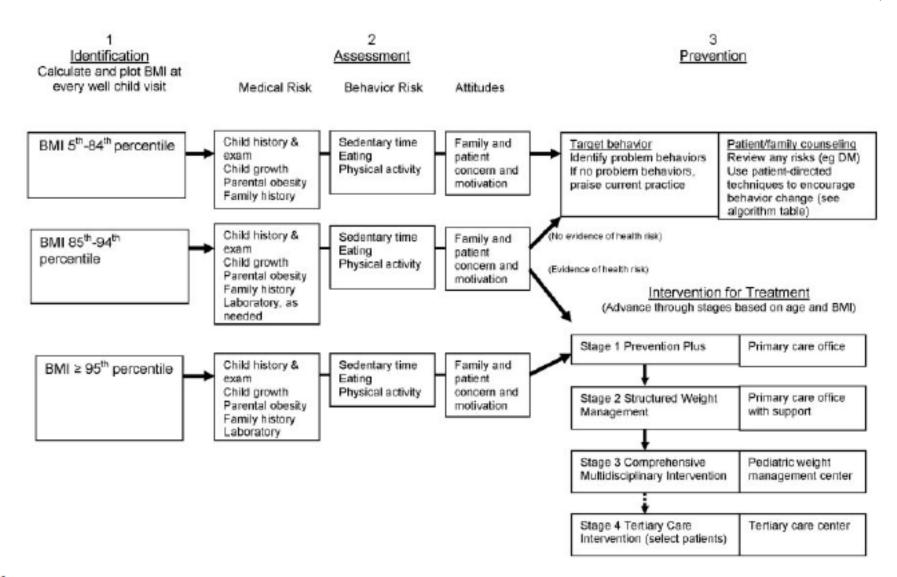


FIGURE 1
Universal assessment of obesity risk and steps to prevention and treatment. DM indicates diabetes mellitus.

All Pediatric Patients

- Measure and plot height, weight, BMI on ALL patients at EACH well-child check
- Assess medical risk for obesity
 - Ask patient history, family history including parental obesity
 - +/- laboratory testing depending on BMI percentile
- Assess behavior risk for development of obesity
 - Ask about sedentary time, eating habits, and physical activity in all patients
- Assess attitudes about obesity prevention
 - Ask about patient and family concern and motivation

EC Recommendations - Assess Medical Risk

Patient history

- Medications that may affect weight gain
- Risk of future or persistent obesity
- Risk of future obesity-related medical conditions
- Identification of current obesity-related medical conditions
 - Snoring/sleep disturbances, daytime somnolence
 - x Abdominal pain
 - Menstrual irregularities, acne, hirsutism
 - x Hip, knee, or leg pain, walking pain, foot pain
 - × Polyuria, polydipsia, nocturia
 - Depression, anxiety, school avoidance, bullying
 - ▼ Shortness of breath, exercise intolerance
 - ▼ Severe/recurrent headaches, vision problems

EC Recommendations - Assess Medical Risk

- Focused family history for obesity and its comorbidities
 - Early stroke/heart attack
 - o type 2 diabetes
 - h/o gastric bypass surgery
 - Hyperlipidemia
 - Hypertension
 - o infertility/polycystic ovary syndrome

EC Recommendations - Assess Medical Risk

Physical exam should include

- Pulse and blood pressure
- If overweight or obese, signs associated with comorbidities or causes of obesity
 - General appearance—distribution of fat, presence of syndromic features
 - × Fundoscopic exam (blurred optic disk margins a/w pseudotumor cerebri)
 - × Neck—goiter
 - Sexual maturity rating (Tanner staging)—abnormal genitalia
 - Skin—Acanthosis nigricans or violaceous striae, facial plethora, buffalo hump, acne, hirsutism
 - Extremities—tibial bowing (Blount disease), small hands/feet

 - Neuro—slowed DTRs, decreased proximal muscle strength

NHBLI Blood Pressure Table

SYSTOLIC BP (mmHq)

Percentile of Height

Blood Pressure Levels by Age and Height Percentile

BOYS

DIASTOLIC BP (mmHg)

Percentile of Height

50th

75th

90th 95th

10th

25th

5th

95th

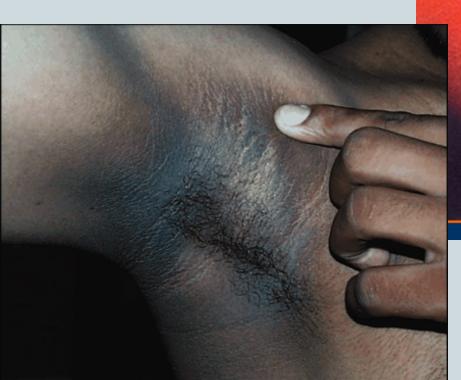
										5th	10th	25th	50th	75th	90th
TABLE II Die d D						1		50th		80	81	83	85	87	88
	TABLE II-Blood Pr						9	90th		94	95	97	99	100	102
Age	BP	Systo						95th		98	99	101	103	104	106
(yr)	percentile	He					9	99th		105	106	108	110	112	113
		5 th	10 th	25 ⁴		2		50th		84	85	87	88	90	92
1	50 th	50 th 83 84 85			90th			97	99	100	102	104	105		
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	95 th	100	101	102				99th		109	110	111	113	115	117
	99 th	108	108	109		3	50th			86	87	89	91	93	94
2	50 th	85	85	87				90th		100	101	103	105	107	108
	90 th	98	99	100				95th		104	105	107	109	110	112
	95 th	102	103	104				99th		111	112	114	116	118	119
	99 th	109	110	111	112	114	115	116	69	69	70	70	71	72	72
3	50 th	86	87	88	89	91	92	93	47	48	48	49	50	50	51
	90 th	100	100	102	103	104	106	106	61	62	62	63	64	64	65
	95 th	104	104	105	107	108	109	110	65	66	66	67	68	68	69
	99 th	111	111	113	114	115	116	117	73	73	74	74	75	76	76
4	50 th	88	88	90	91	92	94	94	50	50	51	52	52	53	54
	90 th	101	102	103	104	106	107	108	64	64	65	66	67	67	68
	95 th	105	106	107	108	110	111	112	68	68	69	70	71	71	72
	99 th	112	113	114	115	117	118	119	76	76	76	77	78	79	79

BP

Percentile

Age (Year)

Acanthosis Nigricans





www.medscape.com

EC Recommendations - Assess Behavior Risk

- Dietary assessment should be done for ALL patients
 If no problem behaviors, praise current practice

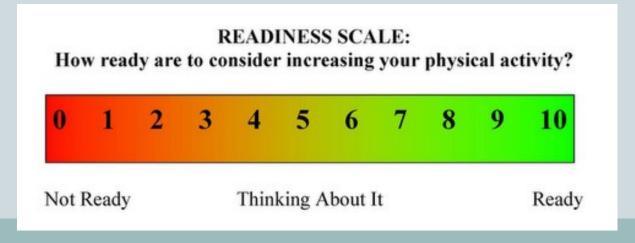
 - Targets for change
 - 1. fast food/restaurant eating
 - 2. sugar-sweetened beverage consumption
 - 3. excessive portion size
 - Other dietary assessment
 - 1. Fruit juice consumption
 - 2. Skipping breakfast
 - 3. Excessive high energy density foods
 - 4. Low consumption of fruits and vegetables
 - 5. Meal frequency and snacking patterns

EC Recommendations – Assess Behavior Risk

- Physical activity assessment on ALL patients
 - o If no problem behaviors, praise current practice
 - Targets for change
 - 1. Environment, social support, barriers
 - 2. Meeting 60 min/day rec of exercise
 - 3. Sedentary behavior assessment

EC Recommendations – Assess Attitudes

- "What concerns, if any, do you have about your child's weight?"
- Reflect, probe on patient's or parent's concerns
- Address self-efficacy and readiness for change, motivation and barriers to change, confidence
- Motivational interviewing techniques



EC Recommendations - Assess Medical Risk

Laboratory evaluation should include

- Normal weight: Universal Lipid Screening ages 9-11 yo and 17-21 yo
- Overwieight + no risk factors: fasting lipid panel
- Overweight + 1 or more risk factors: ALT, AST, fasting glucose, +/-HbA1c
 - **x** Risk factors:
 - FH of obesity-related diseases, s/a HTN, early cardiovascular deaths, strokes
 - Elevated blood pressure, hyperlipidemia
 - Tobacco use
- Obese: Fasting lipid profile, fasting glucose and/or HbA1c, ALT, AST
- Severely obese: Fasting lipid profile, fasting glucose and/or HbA1c, ALT, AST

Laboratory Reference Values

	Normal	Impaired	Diabetes
Fasting glucose	<100 mg/dl	100-125 mg/dl	≥126 mg/dl
OGTT 2hr PPG	<140 mg/dl	140-199 mg/dl	≥200 mg/dl
Random glucose			≥200+ symptoms
HbA1c	<5.7%	5.7% - 6.4%	≥6.5%

	Total Chol	LDL	HDL	Triglycerides	
				0-9 yo	10-19 yo
Acceptable	<170	<110	>45	<75	<90
Borderline	170-199	110-129	40-45	75-99	90-129
Abnormal	≥ 200	≥130	<40	≥100	≥130

What's Not Included in those Labs?

- TSH, Free T4
- Fasting Insulin level
- 25-hydroxyvitamin D
- Testosterone
- Growth hormone level or IGF1 level
- Cortisol

Stages of Obesity Treatment



Stage 1 – Prevention Plus

Overweight + health risk (based on personal hx, FH, physical exam, labs) or Obese/Severely Obese

Primary Care Provider:

- Goal: weight maintenance with growth → BMI decreases
- Follow-up: monthly
- If after 3-6 months, no improvement in BMI, advance to stage 2

Stage 1 – Prevention Plus

Address dietary habits, physical activity, & behavior change



Also:









Start the day with breakfast 7 days a week.



Eat 5 servings of fruits and vegetables a day.



Keep screen time under 2 hours a day.











- Limit meals outside the home
- Family meals 5-6 times a week
- Allow self-regulation at meals
- Tailor behavior to cultural values
- Involve whole family in lifestyle changes

Stage 2—Structured Weight Management

Primary Care Provider with Appropriate Training, plus clinic dietician, if available

- Goal: weight maintenance with growth → BMI decreases; weight loss not to exceed 1 lb/mo in children 2-11 yo, or average of 2lb/wk in children 12+
- Follow-up: monthly
- If no improvement in BMI/weight after 3-6 months, advance to stage 3

Stage 2—Structured Weight Management

Dietary habits and physical activity

- Balanced macronutrient diet with few energy-dense foods
- Increase structured mealtimes and snacks
- Supervised daily activity at least 60 min/day
- Decrease screen time to <1 hour
- Increase monitoring by family/caretaker of screen time, physical activity, dietary intake, eating out

Stage 3—Comprehensive Multidisciplinary

Weight management clinic with multidisciplinary team (exercise specialist, dietician, behavioral counselor)

- Goal: weight maintenance or gradual weight loss as in stage 2, until BMI <85th percentile
- If no improvement, may need to advance to stage 4, depending on other factors

Stage 3—Comprehensive Multidisciplinary

- Eating and activity goals are the same as stage 2
 - Balanced macronutrient diet with few energy-dense foods
 - Increase structured mealtimes and snacks
 - Supervised daily activity at least 60 min/day
 - Decrease screen time to <1 hour
 - Increase monitoring by family/caretaker of screen time, physical activity, dietary intake, eating out
- Activities also include
 - Structured behavioral modification program
 - Involvement of family/caregivers for behavioral modification of kids <12 y/o and training of families for all kids

Stage 4—Tertiary Care

- Recommended for those children who have significant comorbidities and are >95th percentile or who are >99th percentile and have not been successful in stages 1-3.
- Multidisciplinary team with expertise in childhood obesity operating under a designated protocol
- Continued diet and activity counseling
- May include things such as very low calorie diet, meal replacement, medication, and surgery.

Not available in Alaska

Medical Complications



Complications

- Respiratory
 - Sleep apnea, snoring, asthma, Pickwickian sy.
- Orthopedic
 - Blount disease, Slipped capital femoral epiphysis
- Gastrointestinal
 - Gallbladder disease, steatohepatitis
- Cardiovascular
 - Dyslipidemias, hypertension
- Endocrinologic
 - Insulin resistance, impaired glucose tolerance, Type 2 Diabetes, Polycystic ovarian syndrome, Menstrual irregularity
- Psychological
 - Depression, eating disorders, social isolation

Hyperlipidemia

- Predicts increased risk for CVD in adulthood
- Screen ages 2-10 for risk factors or if risk factors are unknown.
- Total cholesterol normal--<170 borderline--170-199 elevated-->200
- LDL normal--<110 borderline--110-129 elevated if >130

- For high trigs, LDL
 110-190, or HDL <40,
 diet and exercise
 therapy
- If over 8 years of age and LDL > 190, consider pharmacology
- Agents: Bile acidbinding resins, Niacin, Statins, fibrates, cholesterol-absorption inhibitors?(ezetimibe)

Hypertension

- Tables are made for age, gender and height adjusted norms
- Must be measured with the appropriate cuff on two separate visits
- Attempt lifestyle intervention first for patients with blood pressure between the 90-95th percentile systolic
- Lifestyle plus first line therapy for >95th percentile or if lifestyle mod fails for borderline
- First line therapies: ACE inhibitors/ARBs, CCBs diuretics, beta blockers

Insulin Resistance, impaired glucose tolerance, type 2 DM

Diagnosis

Prediabetes

- Fasting glucose 101-125 (IFG)
- HbA1c 5.7-6.4%
- Random glucose 140-199 (IGT)

Diabetes

- Fasting glucose >126
- HbA1c of >6.4%
- Random glucose >199

Management

- Prediabetes—
 Lifestyle, consider
 metformin
- DM—Metformin, May need insulin
- If second agent is needed, sulfonylurea depending on age of patient and/or insulin

Hepatosteatosis—NAFLD

- Usually noticed by elevated liver transaminases prompting an ultrasound or sometimes noted on liver biopsy done for other reasons
- Treatment is conservative—no medications approved (consideration of metformin, vitamin E)
- Lifestyle modifications and avoidance of hepatotoxins
- If worsening of steatosis continues, fibrosis and cirrhosis can develop

Obstructive Sleep Apnea

- Ask about snoring, in particular, breath holding, exam
- Diagnosis is made by sleep study
- Tonsillectomy and adenoidectomy
- If persistent, then CPAP at night
- Lifestyle modification very important
- Affects the central nervous system, the cardiovascular and metabolic systems, and somatic growth, ultimately leading to reduced quality of life

Polycystic Ovary Syndrome

- Signs may be observed in girls before menarche
 - Premature adrenarche, obesity, impaired glucose tolerance
- Hirsutism
 - Other signs of androgen excess: acne, alopecia
- Menstrual irregularities
- Obesity
- Signs of insulin resistance

PCOS diagnostic criteria

Table 1 Criteria for the diagnosis of polycystic ovary syndrome

1990 NIH Criteria [3]: all of the following:

Hyperandrogenism and/or hyperandrogenemia

Oligo-ovulation

Exclusion of other disorders of hyperandrogenism

2003 Rotterdam Criteria [4]: at least two of the following:

Oligo-ovulation and/or anovulation

Clinical and/or biochemical signs of hyperandrogenism

Polycystic ovarian morphology

2006 Androgen Excess Society [5°°]: all of the following:

Hyperandrogenism: hirsutism and/or hyperandrogenemia

Ovarian dysfunction: oligo-anovulation and/or polycystic ovaries

Exclusion of other androgen excess or related disorders

PCOS Diagnosis

- Clinical presentation
- Labs
 - Free testosterone
 - o FSH, LH
 - 17-OHP
 - O DHEA-S
 - Thyroid studies
 - Prolactin
 - OGTT
 - Fasting lipid panel
- +/- Pelvic ultrasound



Modified Ferriman Galleway Scale

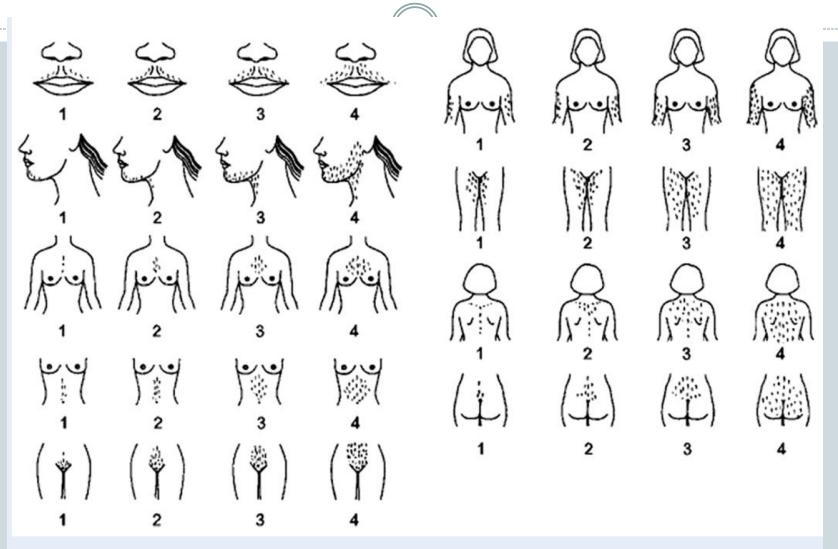


Figure 2 Modified FG scoring system.

Treatment

- Lifestyle modification
- Pharmacologic Therapy
 - OCPs
 - Metformin
 - Antiandrogens (Spironolactone)
 - Statins
- Cosmetic Treatment
 - Laser treatment
 - Waxing
 - Vaniqa

Tertiary Care Treatment Options

- Weight loss medications
- Bariatric surgery



Sibutramine

- Serotonin and norepinephrine reuptake inhibitor
- Weight loss mechanism unknown, thought to increase satiety and resting energy expenditure
- Responders lose 4 pounds in the first 4 weeks of therapy
- In some, produces long term weight loss even after d/c
- Continued for a second year, weight loss was sustained
- Produces improvement in triglyceride levels, HDL levels, total cholesterol levels
- Side effects--hypertension and increase in heart rate
- Other side effects--anxiety, depression, dry mouth, constipation (only one statistically significantly different from patients receiving placebo)
- Approved for weight loss in patients aged 16 and up

Sibutramine

 2006, Berkowitz et al. performed a double-blind, placebocontrolled, randomized trial in obese adolescents.

498 adoléscent patients aged 12-16 years with BMI 2 points higher than the

95 percentile

• Excluded--BMI's >43, cardiovascular disease, diabetes, psychiatric illness, pregnancy, systolic blood pressure >130 or diastolic blood pressure >85, pulse rate >95, cigarette smoking, medication contraindications, use of anorexiants or weight-reduction treatments during the three months prior to randomization

BM plus placebo or BM plus 10 mg sibutramine for 6

months at a 3:1 ratio

• After 6 months, medication uptitrated to 15 mg/d if patient had not lost more than 10% of initial BMI (47.9% of group) to 12 months

76% of sibutramine patients and 62% of the placebo patients completed

Sibutramine

Effectiveness:

Sibutramine--decreased BMI by 3.1 points and weight by 6.5 kg Placebo--decreased their BMI by 0.3 points but increased weight by 1.9

In sibutramine group, 33.1% no longer met BMI study criterion, 16.7% no longer had BMI >95th%, compared to 7.6 % and 3.8% in placebo

Side Effects:

Tachycardia significantly increased in the sibutramine group (12.5% vs.

Therapy dc'd or close monitoring for systolics, diastolics, and pulse rates that increased in one visit to >150 or >20 above baseline, to >95 or >15 above baseline, or >110 or >20 above baseline until acceptable values returned (not defined).

23 of 368 sibutramine patients, 7 of 130 placebo patients withdrawn for

Placebo and sibutramine withdrawn in similar number for tachycardia, hypertension led to withdrawal in 5 of the sibutramine patients and none of the placebo patients.

Orlistat

- Gastrointestinal lipase inhibitor, reduces dietary fat absorption by 30%.
- 120 mg 3x/day, less weight regain in year after treatment
- Treatment continued for 2 years, weight regain further lessened but initial 1-year weight loss not sustained.
- After 2 year treatment with orlistat, LDL cholesterol, total cholesterol, HbA1c, and insulin levels improve.
- Side effects mostly related to the GI system
- Recommend fat-soluble vitamin supplement be used with orlistat
- Orlistat has been approved for adults and adolescents aged 12-16 years.

Orlistat

- 2005, Chanonine et al. double-blind, randomized trial on orlistat in obese adolescents
 - 539 adolescents with BMI 2 points higher than the 95 percentile were randomized to either BM plus placebo or BM plus 120 mg orlistat tid for 1 year at a 2:1 ratio.
 - Excluded--BMI's greater than or equal to 44, body weight ≥ 130 kg or ≤ 55 kg, diabetes, genetic obesity, psychiatric illness, use of dexamphetamine or methylphenidate, active GI disorders, bulimia or laxative abuse, and/or use of anorexiants or weight-reduction treatments three months prior to randomization
- 65% orlistat patients and 64% placebo patients completed

Orlistat

Results:

At week 12, both groups lost weight.
After week 12, orlistat group maintained the weight loss previously achieved, but the placebo group gained weight beyond baseline levels.
At the end of the study the orlistat group decreased BMI by 0.55 points, placebo group had increased BMI by

0.31 points

Orlistat group 26.5% had a 5% or greater decrease in their BMI and 13.3% had a 10% or greater decrease in their BMI, placebo group 15.7% and 4.5%.

Side effects:

Only SAE thought to be attributable to the drug was symptomatic cholelithiasis leading to cholecystectomy
 Common AEs reported were of GI disorders

Criteria for Bariatric Surgery in the Adolescent Patient

- Consider if all conditions below are met:
 - Failure of at least 6 months or organized effort at weight loss
 - Near maturity (Tanner IV or bone age)
 - o BMI ≥ 40 with severe comorbidity or BMI ≥ 50 with less severe comorbidity
 - Commitment to comprehensive evaluation before and after surgery
 - Avoidance for pregnancy for 1 year post op
 - Capable and willing to adhere to nutritional guidelines postop
 - Must be able to make informed decisions
 - Committed family or other support

Criteria for Bariatric Surgery in the Adolescent Patient

- And none of the following are present
 - A medically correctable cause of obesity
 - A substance abuse problem within 1 year
 - An inability to adhere to all therapy
 - Current or planned pregnancy or breastfeeding
 - Inability of the patient or family to understand the procedure or its medical consequences

Adjustable gastric band (AGB)

- Purely restrictive procedure
- Adjustable band placed just below GE junction around the cardia of the stomach creating a functional pouch.
- Port placed under skin where saline is injected to change the size of the band
- Creates early satiety and limits the quantity that can be ingested
- Restriction of intake may lead to malnutrition secondary to a reduction in the quantity and quality of nutrient intake.
- Device is easily removed and it does not alter gut physiology.
- The AGB is only approved for individuals over the age of 18 in the US

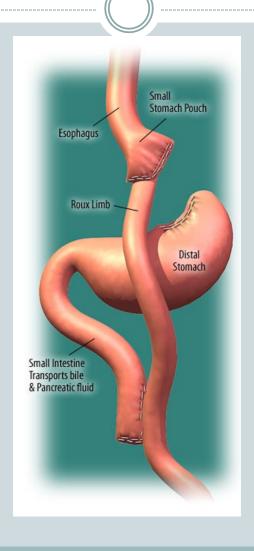
Adjustable gastric band (AGB)



Roux-en-Y gastric bypass (RYGB)

- Combined restrictive/malabsorptive procedure
- Creates a 15-30 ml gastric pouch yielding early satiety
- Pouch is anastomosed to a Roux limb of proximal jejunum
- Bypasses distal stomach and duodenum which is later anatomosed to a more distal segment of jejunum.
- Length of bypass can be varied yielding more or less malabsorption.

Roux-en-Y gastric bypass (RYGB)



Key Points

- Prevalence of overweight and obesity in children and adolescents is increasing
- Behavioral, environmental, genetic, and epigenetic contributions play a role in development of childhood obesity
- Many medical and societal complications arise from childhood obesity
- Obese children become obese adults
- Prevention is the key

Resources for physicians

- www.cdc.gov
- www.hhs.gov
- www.aap.gov
 - Books: Pediatric Obesity: Prevention, Intervention, and Treatment Strategies for Primary Care by Sandra Hassink, MD FAAP
 - o http://www.pep.aap.org/
- Expert Committee Recommendations on the assessment, prevention, and treatment of child and adolescent overweight and obesity. June 6, 2007.

www.ama-assn.org/ama/pub/category/11759.html

Resources for Parents

www.kidshealth.org

A Parents Guide to Childhood Obesity: A roadmap

to health. By the AAP.

Walk with a doc

http://www.letsmove.gov/



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Questions?

