ASPNI Multi-Disciplinary Symposium
Lisa Summers, MD, RD
Carolinas Weight Management and Wellness
Weight management for Hypertensive Children
Disclosures:
I declare that I have no actual, potential, or perceived vested interests in relation to this program.
CWW Pediatric / Adolescent team members

Michael Slomba, RD, LDN
Lisa Summers, MD, RD
Stephanie Kinner, RD, LDN

Kathryn Randall, BS, MS, Exercise Specialist
John Tomcho, DO, RD
Erin Thompson, BA, MSW, LCSW
Preventable deaths in US

- High blood pressure is responsible for ½ million deaths in US
  - (1 in 5 deaths)
- Overweight–obesity is responsible for ¼ million deaths in US
  - (1 in 10 deaths)
- Physical inactivity is responsible for just under ¼ million deaths in US
  - (1 in 10 deaths)
- High dietary salt intake is responsible for 100,000 deaths in US
- Low dietary omega-3 fatty acids is responsible for 75,000 deaths in US

Updates in obesity

• The American Medical Association officially recognized obesity as a chronic disease

• Adult obesity rates in the United States
  • Leveled off in the past year
  • First time in 30 years

• 3 out of 4 of adults overweight
• 1 out of 3 are obese
Updates in pediatric obesity

19/40 states showed obesity rates down 1% in low-income preschoolers

1 in 8 preschoolers is obese
### Prevalence of obesity in US children and adolescents

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
<th>Children</th>
<th>Adolescents Ages 12-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight</td>
<td>BMI &gt; 85&lt;sup&gt;th&lt;/sup&gt; % ile</td>
<td>32 %</td>
<td>34 %</td>
</tr>
<tr>
<td>Obese</td>
<td>BMI &gt; 95&lt;sup&gt;th&lt;/sup&gt; % ile</td>
<td>17 %</td>
<td>18 %</td>
</tr>
<tr>
<td>Severe Obese</td>
<td>BMI &gt; 99&lt;sup&gt;th&lt;/sup&gt; % ile</td>
<td>4 %</td>
<td>4 %</td>
</tr>
</tbody>
</table>


Severely obese adolescents become obese adults

- 100% of adolescents with severe obesity (BMI > 99\textsuperscript{th} % ile) became obese adults (BMI > 30 kg/m\textsuperscript{2})

- 65% of adolescents with severe obesity (BMI > 99\textsuperscript{th} % ile) became severely obese adults (BMI > 40 kg/m\textsuperscript{2})

Adolescent obesity increases the risk of cardiovascular disease in young adulthood

- Prospective study of 37,674 healthy young men
  - Mean age 17 years (adolescence)
  - Mean age 30 years (adulthood)
- Followed for 650,000 person years
  - mean follow up 17.5 years

- Elevated BMI in adolescence was a substantial risk factor for coronary heart disease in young adulthood

Association of high BMI in adolescence and adulthood and coronary heart disease

- Coronary heart disease detected by angiography:
- 50% coronary stenosis
- in 1 or more artery

Association of high BMI in adolescence and adulthood and coronary heart disease

- Cohort of 227,000 adolescents (14–19 years in 1963–1975)
- Followed (8 million person-years):
  - mean follow up 35 years
- 9,650 deaths observed:
  - mean age death: 40 years in males, 43 years in females
  - # 1 cause of death was ischemic heart disease

- Relative risk of ischemic heart disease death for BMI > 95 th % ile compared to 25 - 74 th % ile (reference)
  - 2.9 (95 CI 2.3-3.6) for males
  - 3.7 (95 CI 2.3-5.7) for females

• A trend towards increasing stroke incidence at younger age
• Thought to be due to increasing rates of obesity, HTN, diabetes in youth

Adult mortality increases with increasing BMI > 25 kg/m$^2$

Deaths/yr Per 1,000

BMI 40–45 kg/m$^2$ median survival is reduced by 8–10 years

Prospective Studies Collaboration. BMI and cause-specific mortality in 900,000 adults: Lancet 2009; 373; 1083-96.
CV risk factor prevalence in obese adolescents

Prevalence of CVD risk factors among US adolescents, NHANES 1999–2008 (N = 3383). Based on the 2000 Centers for Disease Control gender-specific growth charts for the United States. Available at: www.cdc.gov/growthcharts. Overweight and obesity are defined as having a BMI within the 85th to <95th percentile or ≥95th percentile, respectively. Normal weight was defined as having an age- and gender-specific BMI >5th to <85th percentile.

Co-morbidities in severely obese adolescents

• 35 % chronic back pain
• 30 % gastroesophageal reflux disease
• **25 %** hypertension
• 25 % non alcoholic fatty liver disease
• 25 % obstructive sleep apnea
• 20 % orthopedic complications (Blount’s, SCFE, OA)
• 20 % asthma
• 15 % hyperlipidemia
• 15 % diabetes type 2
• **12 %** metabolic syndrome
• 10 % polycystic ovarian syndrome
• 10 % menstrual irregularities
• 8 % pseudotumor cerebri

Metabolic syndrome in adolescents

- Central (abdominal) obesity
  - High blood pressure
  - Associated atherogenic dyslipidemia (high TG, Low HDL)
  - Impaired fasting glucose
- Associated with insulin resistance and type 2 diabetes
- Associated with high ALT and fatty liver disease/fibrosis
- Pro-thrombotic and pro-inflammatory profile (high CRP)
- Leading to increased risk of cardiovascular disease and death

Our program goals

• Co-morbidity identification and treatment
• Tailor dietary recommendations to co-morbidity
• Promotion of individual lifestyle-behavioral changes
• Multidisciplinary team approach for BMI reduction
  • Physician
  • Dietitian
  • Exercise physiologist
  • Psychosocial
• Long term follow up and management
BMI reduction

- Total calorie deficit of 50 to 100 calories per day
- Leads to a 2 to 5 kg (5-11 lbs) weight loss over 1 year time
  - Decrease calorie dense foods (fats, sugars)
  - Decrease portion sizes
  - Eliminate sugar sweetened beverages
  - Decrease snacking
  - Increase fruits and veggies
  - Increase whole grains (fiber)
  - Choose lean (unprocessed) meats
  - Encourage activity (daily routines)
  - Focus on family activities that incorporate exercise
  - Gradually increase intensity, frequency, duration
- Long term follow up and management
Portion distortion

52 ounces
Sugared beverages
10% total calorie intake

Fry Inflation

1950-1970
Serving Size: 2 oz.
Calories: 200

1980s
Serving Size: 4 oz.
Calories: 400

2002
Serving Size: 6.1 oz.
Calories: 610

140 calories
350 calories

Snacking
25% of a child’s total calorie intake

Fast Food
10% of total calorie intake

2.8 oz
202 calories

4.3 oz
310 calories
# Reduction of Food Portion Sizes

## Portion Size by Age

<table>
<thead>
<tr>
<th>Food Group</th>
<th>6-9 years (1400-1600)</th>
<th>10-13 years (1800)</th>
<th>14-18 years (2000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grains</strong></td>
<td>1 serving per meal</td>
<td>1 serving per meal</td>
<td>1-2 servings per meal</td>
</tr>
<tr>
<td><strong>Vegetables</strong></td>
<td>1 cup cooked or 1/2 cup raw, limit starchy vegetables to 1 serving per day (1/2 cup)</td>
<td>2 servings per meal</td>
<td>2 servings per meal</td>
</tr>
<tr>
<td><strong>Fruits</strong></td>
<td>2 servings per day</td>
<td>2 servings per day</td>
<td>2-3 servings per day</td>
</tr>
<tr>
<td><strong>Dairy</strong></td>
<td>2 servings per day</td>
<td>2 servings per day</td>
<td>2-3 servings per day</td>
</tr>
<tr>
<td><strong>Protein</strong></td>
<td>15-20g Protein per meal</td>
<td>20g Protein per meal</td>
<td>20g Protein per meal</td>
</tr>
</tbody>
</table>

### The Secret to Serving Size is in Your Hand

- A fist or cupped hand = 1 cup
- 1 tennis ball = 1 serving of fruit
- 1 palm = 3 oz. of meat
- 1 thumb tip = 1 teaspoon

Healthy diets include 2-3 servings of fruit a day.

Chefs and nutrition experts recommend portion sizes as follows:

- A palm-sized portion of lean meat, beans, 
  or nuts equals 1 serving.
- A cupped hand-sized portion of vegetables 
  or fruit equals 1 serving.
- A thumb-sized portion of a snack food 
  equals 1 serving.
- A teaspoon-sized portion of a food 
  equals 1 serving.
Elimination of sugar sweetened beverages

**Rethink Your Drink**

**Did You Know?**
If you consumed 192 extra calories per day than you expend, you would gain 20 pounds in 1 year. Conversely, if you cut out 192 calories or eat 192 calories less than you expend, you would lose 20 pounds in 1 year.

<table>
<thead>
<tr>
<th>12 ounce serving</th>
<th>Exercise Required to Burn those Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit Punch</td>
<td>Walking 3.5 Miles per hour</td>
</tr>
<tr>
<td>192 calories</td>
<td>150 lbs = 45 minutes</td>
</tr>
<tr>
<td></td>
<td>200 lbs = 33 minutes</td>
</tr>
<tr>
<td></td>
<td>250 lbs = 27 minutes</td>
</tr>
<tr>
<td>Sweet Tea</td>
<td>Playing Soccer</td>
</tr>
<tr>
<td>135 calories</td>
<td>150 lbs = 16 minutes</td>
</tr>
<tr>
<td></td>
<td>200 lbs = 12 minutes</td>
</tr>
<tr>
<td></td>
<td>250 lbs = 10 minutes</td>
</tr>
</tbody>
</table>
There is a direct relation between salt intake and CV risk
Reduced salt intake is associated with a reduction in CV mortality

<table>
<thead>
<tr>
<th>Age</th>
<th>Na recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-8 years</td>
<td>1,200 mg daily</td>
</tr>
<tr>
<td>8-17 years</td>
<td>1,500 mg daily</td>
</tr>
<tr>
<td>Adults</td>
<td>2,400 mg daily</td>
</tr>
</tbody>
</table>
Nutrition specific recommendations for metabolic syndrome

• Lower total fat and saturated fat intake
• Increase intake of PUFA (DHA and EPA)
• Lower sugar intake in the diet

• Monitor vitals and biochemical improvements
  • waist circumference
  • systolic and diastolic blood pressure
  • plasma triglycerides
  • low-density lipoprotein cholesterol

Exercise in obese hypertensive adolescents

- Children and adolescents encouraged to participate in regular, non-competitive aerobic physical activity
- Goal is 60 minutes active play a day
  - Reduces both systolic and diastolic pressures
  - Reduction of 5-12 mm Hg
- Temporary restriction of athletes with Stage 2 HTN
  - SBP >99th %ile for age + 5 mmHg based on sex, age, Ht
  - Until a normal BP is achieved
  - Concern for reports of CVA during maximal exercise
    - Significant increase in SBP and DBP
  - Strenuous dynamic exercise not recommended
    - Increase in SBP, decrease in DBP

Substances to avoid in hypertensive adolescents

- Alcohol
- Tobacco
- Drugs of abuse (cocaine, amphetamines)
- Stimulants (ephedra)
- Caffeine (coffee, cola, teas)
- Energy drinks (Monster energy, Red Bull)
- Exogenous androgens
- Growth hormone
- Other medications that may increase BP

Pediatric obesity decreases quality of life

- Obese youth report lower QOL
  - social functioning
- Parents of obese youth report lower QOL
  - social QOL
- Compared with other chronic conditions
  - CF, Type 1 DM, epilepsy, IBD, sickle cell disease (P < .001)

## Psychosocial concerns in obese adolescents

- 10% psychosocial impairment
- 50% anxiety symptoms
- 30% depression
- 9% alcohol usage
- 5% tobacco usage

Eating from internal cues
Boredom Eating

What is boredom eating?
- Boredom eating occurs when someone eats in response to feelings of boredom.

Call your pediatrician and/or a psychologist if your child:
- Eats when feeling bored.
- Does not know the difference between physical hunger and boredom hunger.
- Habit of eating at certain times (times of boredom or low activity).

Methods to help your child reduce boredom eating include:
- Be more aware of boredom.
- Use a hunger scale to identify appropriate times to eat.

0 Stomach feels very empty.
1
2
3 Stomach feels hungry.
4
5
6
7 Stomach feels satisfied.
8
9
10 Stomach feels uncomfortably full.

- Help your child understand the difference between boredom and hunger.
- Ask your child if he/she is hungry or bored when he/she eats for a snack.
- Identify activities that frequently lead to boredom.
- Break bad habits of eating at times of low activity.
- Help your child develop a list of fun, fun activities and post it on the refrigerator and/or cabinet.
- Remind your child to engage in a fun activity when bored.
- Encourage your child to engage in a social or physical activity with friends and/or family members when bored.
- Eliminate foods that you know your child likes to snack on when bored.
- Remind your child to take a 20-minute break before eating so that the body knows that it is full.

For more information regarding these handouts contact:
Wendy L. Ward, Ph.D.
Associate Professor
Department of Pediatrics
UAMS College of Medicine
Arkansas Children’s Hospital
1 Children’s Way, Slot 512-21
Little Rock, AR 72202-3591
Ph: 501-364-1021
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Summary

• Childhood - adolescent obesity is a chronic disease
• Associated with cardiovascular morbidity
• Leading to early adulthood mortality
• Associated with a decreased quality of life and psychosocial comorbidities
• A multi-disciplinary behavioral-lifestyle program is recommended
• Disease specific recommendations and interventions should be incorporated into weight loss management goals
Thank you

lisa.summers@carolinas.org
Carolinas HealthCare System

Carolinas Weight Management & Wellness
2608 East 7th St.
Charlotte, NC 28204
704-355-9484
Bariatric procedures

Laparoscopic Roux-en-Y Gastric Bypass (RYGB)
Laparoscopic Adjustable Gastric Banding (LAGB)
Laparoscopic Sleeve Gastrectomy (LSG)
Long term weight loss in adults: Lifestyle versus surgery

**FIGURE 1. Relative effectiveness of obesity treatments**

1 year outcomes in adolescents undergoing bariatric surgery (BOLD database)

- 890 adolescents at baseline, 259 at 1 year follow up (30 %)
- Age 11-19 years (ave 18.5 yrs)
- 75 % F/25 % M
- 68 % white, 14 % Hispanic, 11 % black, 6 % other
- 51 % RYGB
  - Mean BMI 50.7 kg/m$^2$ $\downarrow$ to 33 kg/m$^2$ (-35 % BMI reduction)
  - Mean weight loss = 48 kg (- 33 % weight reduction)
  - Better improvement in co-morbidities at 1 year
  - Higher rate of readmissions with RYGB over band
- 49 % Lap Band
  - Mean BMI 46 kg/m$^2$ $\downarrow$ to 39 kg/m$^2$ (-14 % BMI reduction)
  - Mean weight loss = 20 kg (- 15 % weight reduction)

Short term outcomes post roux-en-Y gastric bypass (RYGB) in adolescents