Obesity in Children and Adolescents:
Review of Recent Clinic Practice Recommendations and Introduction of the New SCMA Childhood Obesity Taskforce Toolkit

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South Carolina Chapter
American Academy of Pediatrics
2014 Annual Meeting, Myrtle Beach SC

Educational Objectives

• Review recent clinical practice recommendations for diagnosis, treatment and prevention of overweight and obesity in children and adolescents
• Develop a plan for use of the new SCMA toolkit in clinical practice

THE SPEAKERS HAVE NO CONFLICTS TO DISCLOSE
Obesity Trends* Among U.S. Adults
BRFSS, 2002
(*BMI ≥ 30, or ~ 30 lbs. overweight for 5’ 4” person)

No Data          <10%           10%–14%      15%–19%           20%–24%     25%

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BRFSS, 2006
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Obesity Trends* Among U.S. Adults
BRFSS, 2007
(*BMI ≥30, or ~30 lbs. overweight for 5’4” person)
BRFSS, 2008
(*BMI ≥30, or ~30 lbs. overweight for 5’4” person)

BRFSS, 2009
(*BMI ≥30, or ~30 lbs. overweight for 5’4” person)

BRFSS, 2010
(*BMI ≥30, or ~30 lbs. overweight for 5’4” person)
Prevalence of obesity (body mass index >95th percentile) among children and adolescents 2 to 19 years of age in the United States between 1971 to 1974 and 2009 to 2010 shows a recent plateau from 2003 to 2004 on.

Lakshman R et al. Circulation. 2012;126:1770-1779

Current rates of overweight and obesity in South Carolina

| AGE       | % OVERWEIGHT | % OBES
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>ADULT (≥ 18)</td>
<td>67</td>
<td>12</td>
</tr>
<tr>
<td>HIGH SCHOOL</td>
<td>28</td>
<td>13</td>
</tr>
<tr>
<td>2-5</td>
<td>28</td>
<td>13</td>
</tr>
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http://www.cdc.gov/obesity/data/overweight.html
Change in the distribution of weight among adults in SC
(During the past 40 years, obesity has gone from being rare
to the “normal” condition)

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Weight status cannot be determined
without assessing BMI

1966
BODY MASS INDEX (BMI):
What is it and how does it work?

“Body Mass Index (BMI) is a number calculated from a person's weight and height. BMI provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems.” CDC

CDC BMI Calculator:

- Quetelet Index initially created by Adolphe Quetelet (1796-1874)
- Dr. Ancel Keys (the Mediterranean Diet) proposed use of BMI in 1970's
- 1985 NIH Consensus Development Panel promoted use in practice

Caveats about BMI

- Assumes proportion of muscle, fat, bone, fluid so does not actually measure obesity = excess fat
- Cannot be used in children less than 2 years old
- Height and weight measurements must be accurate

BMI video located on the Lean Team website:
http://academicdepartments.musc.edu/lean_team/physicians/bmicheck.html

Definition of Overweight and Obesity in Children and Adolescents

- % Based on BMI distribution in 1970’s
- Risk categories based on adult morbidity
- Overweight = BMI > 85% - 94%
- Obese = BMI ≥ 95% or
- Obese = BMI ≥ 30

*Pediatrics 2007 120, (suppl 4)*
Body proportion changes during childhood and adolescence

1. Normal BMI for children varies by age and gender
2. BMI normative data not available for children < 2 years old
3. Adiposity rebound is important
4. BMI > 30.0 is obesity regardless of percentile

Adiposity rebound = age at which BMI first increases
Adiposity rebound <5 associated with >3 BMI units increase by age 18-21
Taylor et al. Current Opinion in Clinical Nutrition & Metabolic Care 2005
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Obesity Prevention / Treatment in Well Child Care

- Assessment of BMI at least annually
- Promotion of healthy lifestyle
- 5-2-1-0 Plan
- Stage I – IV Treatment Plan

Staying Healthy:
- Weight
- Fruit
- Vegetables
- Whole grain
- Calcium
- Physical activity
5-2-1-None

- ≥ 5 fruits/vegetables
- ≤ 2 hours of screen time
- ≥ 1 hour of physical activity
- No sugar sweetened drinks

http://www.choosemyplate.gov/

Additional Screening for an Obese Child

- Insulin Resistance – random/fasting insulin
- Diabetes – random / fasting BS, hgb a1c
- Hyperlipidemia – random / fasting cholesterol / lipid panel
- Hypertension - accurate blood pressure
- Obstructive sleep apnea - sleep study
- NAFLD – Liver function tests
- Hypothyroidism - only if short, sudden onset, or additional symptoms

Expert Committee Recommendations of the Assessment, Prevention and Treatment of Childhood and Adolescent Obesity 2007


STAGE 2: Diet plan limiting energy dense foods, structured meals and snacks, supervised active play 1 h/d and screen time ≤ 1 h/d. Goal of weight maintenance to decrease BMI or lose ≤ 1 lb/m.

STAGE 3: Multidisciplinary team with structured behavioral modification program about food and activity. Goal weight loss 1 lb/month age 2-5y or up to 2 lb/week > 5 years

STAGE 4: Referral to pediatric tertiary weight management center (MUSC Heart Health) Referral to next stage if no improvement in 3-6 months.
Consequences of obesity in children and adolescents

- 9X risk of hypertension
- Early onset puberty in girls
- 25% impaired glucose tolerance
- 4% type 2 diabetes mellitus
- 80% adult obesity, 1/4 of whom will have metabolic syndrome

** NEJM 346(11):802, 2002
*** JAMA 287(3):356, 2002

METABOLIC SYNDROME IN CHILDREN AND ADOLESCENTS

Of the following:

- Elevated fasting triglycerides
- Low HDL cholesterol
- Elevated fasting glucose
- Increased waist circumference
- Elevated systolic BP

Among 1960 children ≥ 12 years old in NHANES:
2/3 had one finding of metabolic syndrome
1/10 had metabolic syndrome (1/3 of those with BMI > 85%)  
(Circulation 2004;110:2494-2497)

* No standard definition of pediatric metabolic syndrome

<table>
<thead>
<tr>
<th>Endothelial function</th>
<th>Developmental pattern in children</th>
<th>Change with age in adulthood</th>
<th>Effect of obesity</th>
<th>Effect of type 2 diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>No change or reduced; limited age and developmental stage-related norms</td>
<td>Reduced, preserved in exercisers</td>
<td>Reduced in children and adults</td>
<td>Reduced in adults, no data in children</td>
<td></td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Arterial compliance</th>
<th>Developmental pattern in children</th>
<th>Change with age in adulthood</th>
<th>Effect of obesity</th>
<th>Effect of type 2 diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased; limited age and developmental stage-related norms</td>
<td>Reduced, preserved in exercisers</td>
<td>Reduced in most studies of children and adults; recent conflicting data in children</td>
<td>Reduced in adults, no change in children</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Intima-media thickness</th>
<th>Developmental pattern in children</th>
<th>Change with age in adulthood</th>
<th>Effect of obesity</th>
<th>Effect of type 2 diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td>No change or increased slightly</td>
<td>Increased</td>
<td>Increased in most studies (both children and adults)</td>
<td>Increased in adults and adolescents</td>
<td></td>
</tr>
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SCMA TASK FORCE ON CHILDHOOD OBESITY

- Created as a committee of SCMA in 2011
  - Established following presentation about childhood obesity at SCMA Board of Trustees retreat Fall 2011
  - Vince Degenhart, MD former Chair
  - Janice Key, MD and Mike Finch, MD Co-Chairs
  - Invitations extended to leaders from relevant state agencies and experts in children’s health, obesity, nutrition, health care delivery
Pediatric Obesity Toolkit

5-2-1-NONE RECOMMENDATIONS

- Developed in collaboration with SCMA, Dr. James Simmons, ESMMSC, MUSC Boeing Center, BCBSSC, DHEC
- Pilot testing completed
- Contents include:
  - 5-2-1-0 age-appropriate questionnaires
  - 5-2-1-0 Handouts
  - Prescription pads for nutrition and exercise

Physician behavior rarely (?) never) changes with CME or journal articles or clinical practice guidelines
Academic detailing improves communication of BMI assessment in pediatric practices*

<table>
<thead>
<tr>
<th>Group</th>
<th>Baseline</th>
<th>After 1st AD visit</th>
<th>Final</th>
</tr>
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<tbody>
<tr>
<td>Control</td>
<td>3%</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Toolkit only</td>
<td>11%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Academic Detailing</td>
<td>4%</td>
<td>63%</td>
<td>45%</td>
</tr>
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</table>

6 pediatric practices (2 in each condition)
Data from 1269 well child patient visits
547 baseline, 182 after AD visit, 535 final
3-17 years old; 49% female; 52% white, 37% AA
49% Medicaid, 48% private insurance

Focus groups found only AD implemented systemic changes
* Funded by Select Health

Fruits and vegetables
Meal habits
Screen time
Physical activity
Beverages
Change talk

Motivational Interviewing
- Defined in 1983 by Miller & Rollnick in treatment of adults with substance abuse
- Patient-centered, only the patient can make a change
- Starts with patient’s Stage of Change (Prochaska and DiClemente), moving from Pre-contemplation to action and maintenance

www.motivationalinterview.org
Underlying Principles of Motivational Interviewing

1. **Express empathy**
   - Acceptance facilitates change
   - Skillful reflective listening is fundamental
   - Ambivalence is normal

2. **Develop discrepancy**
   - The patient should present the argument for change
   - Change motivated by a perceived discrepancy between current behavior and goals

3. **Roll with resistance**
   - Avoid arguing!!!!
   - Do not directly oppose resistance
   - New perspectives invited but not imposed
   - Patient is the primary source of answers and solutions

4. **Support self-efficacy**
   - Patient's belief in possibility of change is important
   - Patient, not the doctor, is responsible for carrying out change

Primary Techniques of Motivational Interviewing

- Open-ended questions vs close-ended
- Reflective listening
- Affirmations
- Summary statements
- Evocation of change talk vs importance and ability rulers

Using the Toolkit Questionnaire:

- Have patients/parents fill it out during triage/while waiting
- Use for all patients not only those who are overweight/obese
- Review during interview
- Base MI on “change talk” selected by patient
- Focus on only one thing at a time
- Use handout for that one item
- FU in 1 month
- Celebrate success
Example:
“Based on your answers, is there ONE thing you would like to help your child change now?”

Eat more fruits and vegetables  
Preparation stage of change

MI: Good choice! You can do it!
Fruits & vegetables are …
Have you tried:
The 3 bite rule
Low fat salad dressing dip
Fruit smoothie
Don’t give up; it takes 7 to 10 times to get a kid to like a new food

Example:
Nothing checked

MI: What do you think about this new questionnaire?

Have you ever thought about making any of these changes to keep your child healthy?

I know you are concerned about the diabetes that runs in your family.

Getting a healthy dinner together every night can be really hard; I have trouble with it myself.

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OBESITY IS A RECENT HUMAN PHENOMENON; TODAY, NORMAL HUMAN BEHAVIOR RESULTS IN UNHEALTHY WEIGHT GAIN

THEREFORE EFFECTIVE INTERVENTION MUST ADDRESS THE OBESOGENIC ENVIRONMENT

“The solution is simple. With more than half of Americans living with at least one chronic disease, we should be investing more in community-based prevention.”
Risa Lavizzo-Mourey, Robert Wood Johnson Foundation.
“We must focus on prevention if we want our nation to thrive” The Atlantic, June-2012

“Strengthen schools as the heart of health.”
Institute of Medicine; Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation May 2012

THEN vs NOW

1950s

NOW
20 year change in average caloric intake
Children 11-18 eat fast food 2X/week*
Fast food meal 187 cal > home meal**
Fast food restaurants more common in low SES predominantly AA neighborhoods***

*Paeratakul J Am Diet Assoc 2003;103:1330
**Bowman Pediatrics 2004;113(1):112
***Block Am J Preventative Med 2004;27:211
THEN vs NOW

1950s vs NOW

Television

- 5 h / day = 5X Higher risk obesity
- 25% of children watch ≥ 4 h / day
- TV in bedroom associated with obesity
- Limiting “Media Time” lowered BMI*

*Robinson JAMA 1999; 282:1561
Decreased Physical Education and Physical Activity in Schools

• Increased emphasis on academic achievement and testing
• PE & PA enhances learning, academic achievement, and positive behaviors*

*Shepard Pediatric Exercise Science 1997;9:113
Calas Pediatric Exercise Science 1994;6:406
Dwyer Pediatric Exercise Science 2001;13:225

THEN vs NOW

1950s       NOW

HIGH FRUCTOSE CORN SYRUP

Although they have the same chemical composition, fructose has a more open structure than glucose and therefore causes more glycosylation of proteins than does glucose.

Glycation (non-enzymic glycosylation) inactivates glutathione reductase.

Blakytny & Harding, Biochem J 1992 288 303-307

Glycation = Non-enzymatic binding of sugars to protein

“...intragastic fructose, but not dextrose, elicits considerable intestinal inflammation...”

Mattioli L F et al. JPEN J Parenter Enteral Nutr 2011;35:223-228

Representative images of a mesenteric venule from 1 animal for each experiment.

Public Health Approach for Obesity Prevention.
IOM Accelerating Progress in Obesity Prevention 2012
Examples of Policy and Environmental Changes

<table>
<thead>
<tr>
<th>Category</th>
<th>Example Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition</td>
<td></td>
</tr>
</tbody>
</table>
- Food Service Worker and School 
- Nutritional Water Analysis 
- Smoke Development / 
  Implementation 
- Removal of Deep Frying 
- Recipes for Healthy Meals 
- Local School Farms 
- Lower Sodium Content 
- High Whole Grain Offerings |
| Physical Activity | 
- Physical Education Training 
- Physical Education Standards and 
  Physical Education Standards 
- After-School Activity Groups 
- Dancing School - Promotions and 
  Dance |
| Physical Health | 
- Physical Education Standards and 
  Physical Education Standards 
- After-School Activity Groups 
- Dancing School - Promotions and 
  Dance |
| Health Services | 
- Health Services 
- Employee Assistance Plans 
- Employee Assistance Plans 
- Employee Assistance Plans |
| Behavior | 
- Increase Referrals 
- Meditation Groups 
- Meditation Groups 
- Meditation Groups |
| Student Services | 
- Student Services 
- Student Services 
- Student Services |

Docs-Adopt School Wellness Initiative Preliminary Outcomes

- Increased score over time (p<0.022)
- Reduction in variance in Title 1 schools (p<0.039)
- Increased scores with physician adoption (p<0.05)
- Increased scores associated with healthier BMI (p<0.05)
- Increased student attendance (p<0.0005)
- Decreased office referrals (p<0.0006)
Thank you

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