Obesity and Asthma
What is the Asthma Educators Role

Christine W. Wagner, RN, MSN, CPNP, FNP-BC, AE-C
Children’s Health Pediatric Group
Dallas, Texas
Disclosure Statement

- Advisory board for Thermo-Fisher Scientific
- There is no commercial bias in this presentation
Objectives

- Define obesity for adults and children
- Recognize the relationship between asthma and obesity
- Identify barriers to weight loss and potential opportunities for education
Growing Body of Literature Linking Asthma and Obesity

- Search on PubMed May, 2017
  - Over 2000 articles with search of Asthma and obesity
  - Articles on pediatrics, adolescents, adults
  - Of first 100 articles, 26 were relevant to this presentation
“Remember when we used to have to fatten the kids up first?”
What is Obesity?

- Obesity is defined as “very fat or overweight; corpulent”
- Corpulent = “large or bulky of body; portly; stout; fat”
- Fat = “having too much flabby tissue; corpulent; obese”
Clinical Clues

- Visual (waist circumference)
  - Not easy with pediatric patients!
- BMI
  - Must calculate %ile in peds
- Acanthosis nigrans
- Presence of co-morbid conditions
Definition of Adult Obesity

- Below 18.5: Underweight
- 18.5 - 24.9: Normal
- 25 - 29.9: Overweight
- 30 and above: Obese
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How to Calculate BMI

- \((\text{Weight in pounds}) / \text{height in inches} / \text{height in inches} \times 703 = \text{BMI}\)
- METRIC \(\text{Wt kg/ht cm/ht cm} \times 10,000 = \text{BMI}\)
- Example
  - Wt. 257 pounds
  - Ht 5 ft 10 inches (70 inches)
- \((257/70)/70 \times 703 = (257/4900) \times 703 = \)
- \(.052 \times 703 = 36.5 = \text{BMI}\)
BMI Calculations
Definition of Childhood Obesity

- A child who has a BMI at or above the 85th percentile and lower than the 95th percentile is considered overweight.
- A child who has a BMI at or above the 95th percentile for children of the same age and sex is considered obese.
How to Calculate Pediatric Percentage

- \((\text{Weight in pounds}) / \text{height in inches} / \text{height in inches} \times 703 = \text{BMI}\)

Example
- Wt 70 pounds
- Ht 46 inches
- Female, Age 6 6/12 years

- \(70/46/46 \times 703 = \text{BMI}\)
- \(1.52/46 \times 703 = .033 \times 703 = 23.2 \text{ BMI}\)
In Children-You Can’t Tell by Just Looking

- Acceptable BMI %iles change during growth
- For pediatrics you always have to determine the BMI then determine the current percentile to know how to classify
46 in
70 lb
23.2 BMI
BMI 23.2
Age 6 6/12 yrs
Acanthosis Nigricans
It’s not dirt
After 6 months and 20 lb weight loss
Asthma and Obesity

- Both asthma and obesity are on the rise
  - Weight gain can precede the development of asthma or poorly controlled asthma can lead to obesity
  - Increase of 1 point in BMI relates to 6% increase in prevalence of asthma
  - Weight loss can improve asthma control

Asthma and Obesity

- Altered respiratory physiology in obesity
  - NiOx was increased in asthmatics, obese non-asthmatics and obese asthmatics

- Increased inflammation due to obesity
  - P2 protein helps fat cells store fat molecules also inflames cells lining the surface of the airways *

- Adults with asthma has major reductions in asthma symptoms and need for asthma medications following weigh loss via lap band surgery

Association between obesity and asthma: NHANES III

7505 children aged 4-17

VonMutius Thorax 56;835,2001
The Theories

- Genetics: thrifty gene
- Weight set-point
- Low metabolism
- Food-rich environment
- Sedentary lifestyle
- Too busy to cook healthy
- Low income lack of access
- Lack of knowledge of how to make healthy choices
Possible Mechanisms for Association of Obesity and Asthma

Romieu et al Ped Pulmonol 2004;38:31
Risk Factors

- Mother’s pre-conception weight and weight gain during pregnancy
- Very high birth weight AND very low birth weight are associated with childhood obesity
- Maternal smoking during early pregnancy is associated with a 500% greater risk of obesity at age 5
Mediating Factors

- Breastfeeding reduces the risk of obesity
  - 4% decrease for every month of breastfeeding
  - Plateaus at 9 months

- Strongest effects of obesity reducing benefits of breastfeeding are seen in adolescents

- Early introduction of solids (before 6 months) increases risk of obesity in childhood
Other Issues Related to Asthma

- Reduced physical activity due to poorly controlled asthma resulting in
- Increased screen time
- Effects of asthma medications on weight – effects of oral and inhaled corticosteroids
The Problem

- About half of parents with an overweight or obese child do not think their kids are too heavy
- About 14% of parents see their normal weight children as underweight
- Parents of children ages 2-5 are more likely to underestimate their child's weight
- Parents are less accurate in judging the size of their sons
Obesity: Why Now?

- Genetics
- Lifestyle changes:
  - Increased calorie intake poor expenditure
  - Costs and quality of food
  - Portion size - Energy Dense Foods more plentiful
- Diet in school
  - In past, 70% of Dallas schools with over 1000 students have multiple vending machines
  - 75% of beverages and 85% of snacks sold in US middle and high school are of poor nutritional value
  - In Feb 2011, Healthy, Hunger-Free Kids Act increases access to healthy foods for low income children and allows FDA to regulate vending machines
  - It is estimated that 26-39,000 vending machines operate in Texas schools
  - Visit www.nutri-cafe.com
- Fast food
Implications as a Nation

- In 2010, 12 states have obesity rates over 30%
  - 20 years ago, no state had an obesity rate above 15%
- Obesity is the #2 cause of preventable death in the US
- Obesity contributes to 300,000 deaths per year
- Obesity related health costs exceed $100 billion annually
- 35% of children are overweight (BMI>85%); 11% with BMI > 95%……..an increase of 30% in past 10 years
- Childhood obesity is leading nutritional disorder in children
- Childhood obesity predicts adult obesity
Changes over 20 years

- 333 calories
- 590 calories
- 140 calories
- 330 calories
- 210 calories
- 610 calories

http://hin.nhlbi.nih.gov/portion/portion.cgi?action=question&number=1
Sugar Intake 1970 vs 2007

http://www.thecooksden.com/calories/, retrieved February 20th, 2013  statistics are from Economic Research Services-USDA
Diet Trends

- 1955: 10 oz, 13 lb/yr
- 1915: 6.5 oz, 8 lb/yr
- 1988: 44 oz, 57 lb/yr
- 1960: 12 oz, 16 lb/yr
- 1992: 20 oz, 26 lb/yr
Screen Time

- Children 8—18 years of age spend an average of 7.5 hours a day using entertainment media, including TV, computers, video games, cell phones, and movies.
- 4.5 of those hours are contributed to TV viewing
Potential Co-morbid Conditions

- Type II Diabetes
- Cardiovascular diseases
  - Hypertension
  - Heart disease
  - Stroke
- Joint problems
- Cancer
- Asthma
He’s Just Big Boned
Vitamin D and Obesity

- In 118 obese adults, Vitamin D insufficiency was found in 90% of the population.
- Serum 25-(OH)D3 levels were significantly lower in the obesity group of children compared to the normal weight control group.
Vitamin D and Obesity

- Obesity-associated vitamin D insufficiency is likely due to the decreased bioavailability of vitamin D3 from cutaneous and dietary sources because of its deposition in body fat compartments.

Vitamin D and Asthma

- Vitamin D levels reduced in many asthmatics
- Vitamin D appears to have suppressing effect on inflammation
- Low Vitamin D might increase inflammatory response in asthmatics
- Vitamin D also seems to reduce asthma exacerbation and increase the response to glucocorticoids
Vitamin D and Asthma

- Increased IgE can cause increased asthma symptoms and inflammation
- Vitamin D blocks the formation of $\epsilon$ (epsilon) germline transcript
  - $\epsilon$ germline transcript is required for production of immunoglobulin E (IgE)
- Low vitamin D might enhance the amount of IgE produced by allergic individuals
What should you measure for Vitamin D?

- Serum 25(OH)D is the barometer for vitamin D status
- Serum 1,25(OH)₂D provides no information about vitamin D status and is often normal or even elevated due to secondary hyperparathyroidism associated with vitamin D deficiency
- Most experts agree that 25(OH)D of < 20 ng/ml is considered to be vitamin D deficiency, 21-29 ng/ml is considered to be insufficient
- The goal should be to maintain both children and adults at a level > 30 ng/ml to take full advantage of all the health benefits that vitamin D provides

Labs

- HgA1c and fasting blood sugar
- Insulin level
- Total cholesterol, HDL, LDL, triglycerides
- TSH
- ALT and AST
- BUN
- Creatinine
- Vit D 25 hydroxy
Where do you start?

- Is the child/family concerned about the child’s weight?
- Readiness to change critical
- Even if not ready to change, the issue needs to be addressed
- Should be discussed at every encounter
- Opens the door for the child
Who, what, where, when and how?

- Who purchases the food, prepares the food, eats with the child, etc
- What do they eat and HOW MUCH
- Where are meals eaten
- When are meals served
- How does eating affect them, what motivates them to eat
Be Specific

- How much juice, sugared drinks, sports drinks
- What type of milk is used
- What is the perception of health, healthy eating
- Where is the nearest grocery store, fast food restaurant
- Is the neighborhood safe
Energy Balance

In

Out
Recommendations

- Define portion size
- How to read labels
- Importance of fiber
- Family effort
- Reduce screen time - goal is one hour per day but we settle for 2
- Increase activity - goal is 1 hour per day
## Current Label

**Nutrition Facts**

- **Serving Size**: 2/3 cup (55g)
- **Servings Per Container**: About 8

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount Per Serving</th>
<th>% Daily Value*</th>
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<tbody>
<tr>
<td><strong>Calories</strong></td>
<td>230</td>
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<tr>
<td><strong>Total Fat</strong></td>
<td>8g</td>
<td>12%</td>
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<tr>
<td>Saturated Fat</td>
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<td><strong>Sodium</strong></td>
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<tr>
<td><strong>Total Carbohydrate</strong></td>
<td>37g</td>
<td>12%</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>4g</td>
<td>16%</td>
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<tr>
<td>Sugars</td>
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<td><strong>Protein</strong></td>
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*Percent Daily Values are based on a 2,000 calorie diet. Your daily value may be higher or lower depending on your calorie needs.*

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### Additional Information

- **Vitamin A**: 10%
- **Vitamin C**: 8%
- **Calcium**: 20%
- **Iron**: 45%

### Footnote

*Footnote on Daily Values (DV) and calories reference to be inserted here.*

## Proposed New Label

**Nutrition Facts**

- **Serving size**: 2/3 cup (55g)
- **8 servings per container**

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- **Vitamin A**: 10%
- **Vitamin C**: 8%
- **Calcium**: 20%
- **Iron**: 45%
- **Potassium**: 235mg

*Footnote on Daily Values (DV) and calories reference to be inserted here.*
FOOD SERVING SIZES GET A REALITY CHECK

Serving Size Changes

Serving sizes are often much larger than those intended for personal use. This has led to increased calorie intake and weight gain. To address this, serving sizes are being adjusted to better reflect the actual portion sizes people eat.

CURRENT SERVING SIZE

Packaging Affects Servings

Package size affects how much people eat and drink. For example, a 2-litre bottle of soda may contain 20 servings, while a 1-litre bottle may only contain 12 servings. People are often more likely to finish a larger bottle in one sitting.

1 SERVING PER BOTTLE
PER SITTING BOTTLE SIZE
Barriers to Weight Loss

- Eating healthy is more expensive
- Unsafe environments for outside activities
- Reduced parental supervision
- No exercise partners
- Lack of motivation
- Irregular schedules
- No encouragement
Home Gym

- Milk jugs, canned foods
- Resistance bands
- Zumba or other dancing
- Heavyweight yoga
- Exercise during commercials
RECOMMENDATIONS

- Motivate adults to be good role models
- Offer suggestions on how to buy healthier options
- Instill structure regarding meal times/food choices/TV
- Encourage positive/healthy eating for family unit
- Use TV/video games as a reward to exercise/physical activity
- Eliminate eating when bored
Summary

- Causal link between asthma and obesity not definite but there is a growing body of literature to support the link
- Strong association cannot be ignored
- Difficult to control asthma can be influenced by obesity
- Other co-morbid conditions to both diseases should be considered
- As Certified Asthma Educators we should promote good health
CURRICULUM VITAE

Christine Waldman Wagner RN, MSN, CPNP-PC, FNP-BC, AE-C
1310 Concho Trail
Mansfield, Texas 76063
Cwagnerr1029@gmail.com

PROFILE

Experienced nurse practitioner board certified in pediatrics (CPNP) by the Pediatric Nursing Certification Board and in family practice (FNP-BC) by the American Nurse’s Credentialing Center. Also board certified as an Asthma Educator (AE-C) by the National Asthma Educator Certification Board.

Extensive clinical experience working with children and adults with acute and chronic problems.

Developed and presented numerous programs for allied health professionals on multiple topics including patient education, health literacy, diagnosis and treatment of allergies, asthma and other nursing issues. Trained facilitator for Problem Based Learning.

Faculty Associate - Texas Woman’s University

EDUCATION

Post Master of Science in Nursing
Houston Baptist University Family Nurse Practitioner Program

Master of Science in Nursing
University of Texas School of Nursing, Houston, Texas Health Science Center Pediatric Nurse Practitioner Program
Thesis: Nurse’s Perceptions of their Role as a Patient Educator.

Bachelor of Science in Nursing
University of Texas School of Nursing, Houston, Texas Health Science Center

WORK EXPERIENCE

August, 2014 to present
Asthma Educator and Program Development
My Children’s Pediatric Practices
Dallas, TX

March, 2007 to June, 2014
Department of Pulmonary Medicine
Nurse Practitioner and Asthma Educator
Children’s Medical Center of Dallas
1935 Medical District Drive
Dallas, TX 75235

March, 2010 to present
Faculty Associate/Clinical Instructor
Texas Woman’s University
College of Nursing
Dallas, Texas
August, 2006 to Dec 2006 Adjunct Professor
Texas Woman’s University
College of Nursing
Houston, Texas

July, 2002 to March, 2007 Nurse Practitioner Associate, Asthma Educator
Allergy and Asthma Associates
1140 Business Center Drive, #402
Houston, TX 77043 (Previous practice purchased)

February, 1999 to July, 2002 Nurse Practitioner Associate, Asthma Educator
Allergy, Sinus and Asthma Professionals
Linda J. Gorin, MD
920 Frostwood, Suite 790
Houston, Texas 77024

Additional work history available upon request

MEMBERSHIPS
American Academy of Allergy, Asthma and Immunology
American College of Allergy, Asthma and Immunology
Association of Asthma Educators
Texas Asthma Coalition-former board member
North Texas Asthma Consortium-former board member
Founding member and first president of the Association of Asthma Educators
Past board member and vice chairperson of the National Asthma Educator Certification Board

AWARDS
American Academy of Allergy, Asthma and Immunology Allied Health Professionals Recognition Award 2011
Great 100 Nurses Dallas-Ft Worth 2009
Association of Asthma Educator’s Asthma Educator of the Year 2003

PUBLICATIONS


PRESENTATIONS

"Health Literacy-what is it and how do I measure it?”

"Inhaler Transition: New Changes for Patient Education”

"New NAEPP Asthma Guidelines Update”

"Utilization of Allied Health Professionals in the Administration of Anti-IgE Therapy”

"Improving Patient-Provider Communication”

"Physical Assessment of the Patient with Asthma and Allergies”

"Patient Education for the Patient with Asthma”

"Diagnosis and Management of Asthma by the Pediatric Nurse Practitioner”

"Asthma-Practical Approaches for Allied Health Professionals”

"Anaphylaxis: Optimizing Management and Prevention”

RESEARCH

The Gap between Knowledge and Action in Healthy Eating, poster presentation at National Association of Pediatric Nurse Practitioners, 2012

Does the presence of a scale in the home influence weight in pediatric asthma patients? Unpublished; study completed in 2013.

LISCENSURE AND CERTIFICATIONS
Texas RN/ ANP Lisc. #449805
Licensed as ARNP with prescribing privileges

Pediatric Nurse Practitioner Cert. #95397.
Family Nurse Practitioner Cert. #03377359-22.
Asthma Educator Cert. #0005