ADAPTING YOUR PRACTICE

Treatment and Recommendations for People Experiencing Homelessness with Asthma

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June 22, 2017
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Acknowledgements

• Health Care for the Homeless Clinicians Network

• Bureau of Primary Health Care, Health Resources and Services Administration, U.S. Department of Health and Human Services

• NHLBI 2007 Asthma Guidelines
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Objectives

I. Case Study

II. Overview of Asthma Diagnosis & Treatment

III. Review Adult Asthma Guidelines

IV. Review Child Asthma Guidelines

V. Discussion/Q & A

VI. Peak Flow Meters, Asthma Action Plans & Spirometry
I. Case Study
II. Overview

Asthma
Asthma Prevalence-2015

• 18.4 million adults or 7.6% currently have asthma
• 6.2 million children or 8.4% currently have asthma
• It is the most prevalent chronic disease in the United States

• % Asthma in those experiencing homelessness?
Asthma

The *fundamental physiologic problem* with asthma is an exaggerated responsiveness of the airway to a variety of stimuli leading to:

- Increased smooth muscle contraction
- Inflammation
It’s a maladaptive response to ubiquitous environment factors in a genetically susceptible individual.

Major Feature is due to...

*Increase airway resistance* resulting in...

Airflow obstruction that is *reversible* - resolves either spontaneously or with treatment

Often, asthma is associated with increased production of IgE antibodies in response to external allergens/triggers
Asthma-Triggers

• Dust mites, cockroaches, rodents, and indoor molds are common asthma triggers found in most shelter housing
• External environment - pollution, humidity, cold
• Upper respiratory infections are a well-identified asthma trigger
• There is increasing evidence that psychosocial stress may also be an important asthma trigger
Asthma Airways

- The airways are both hyper-reactive leading to constriction of the airways as well as plugging from inflammation and swelling.
### Airway branching

<table>
<thead>
<tr>
<th>Conducting zone</th>
<th>Name of branches</th>
<th>Number of tubes in branch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trachea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronchi</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Bronchioles</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Terminal bronchioles</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Respiratory bronchioles</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Respiratory zone</td>
<td>Terminal bronchioles</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6 x 10⁴</td>
</tr>
<tr>
<td>Respiratory bronchioles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alveolar ducts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alveolar sacs</td>
<td></td>
<td>8 x 10⁶</td>
</tr>
</tbody>
</table>
Cross Section of Bronchioles

- Normal airway
- Asthmatic airway
- Asthmatic airway during attack

- Relaxed smooth muscles
- Wall inflamed and thickened
- Air trapped in alveoli
- Tightened smooth muscles
Diagnosis of Asthma

• **Clinical history**-persistent cough and/or wheeze

• **Physical examination**-Increased respirations, wheezing, lack of air exchange, retractions and/or other signs of respiratory distress

• **Demonstration** of *reversibility* of airway obstruction-response to a bronchodilator clinically or with Peak Flow Meter/Spirometry
Asthma Severity

• **Intermittent**
  – Wheezing/coughing 2 days a week or less

• **Mild Persistent**
  – More than twice a week but less than 7 days (< 1 week)
  – Lung function 80% of normal or greater without Rx.

• **Moderate Persistent**
  – Symptoms occur daily- for a week or greater
  – Lung function between 60% and 80% of normal without Rx

• **Severe Persistent**
  – Symptoms occur multiple times a day and greater than 1 week
  – Lung function is less than 60% of the normal without Rx
How do you decide?
Asthma Management Continuum
Children (6 years and over) and Adults

Regularly Reassess
- Control
- Spirometry or PEF
- Inhaler technique
- Adherence
- Triggers
- Comorbidities

Adjust Therapy to Achieve and Maintain Control

Inhaled Corticosteroid (ICS)*
*Second-line: Leukotriene Receptor Antagonist (LTRA)

Low Dose
- ≥12 yrs: ≤250 mcg/day
- 6-11 yrs: ≤200 mcg/day

Medium Dose
- 251 – 500 mcg/day
- 201 – 400 mcg/day

High Dose
- >500 mcg/day
- >400 mcg/day

Fast-acting Bronchodilator on Demand

Environmental Control, Education and Written Action Plan

Confirm Diagnosis

*HFA Beclomethasone or equivalent; *Second-line: LTRA; †Approved for 12 years and over.
Spacers & Nebulizers

Optichamber
The Reality for Homeless Persons
27% of homelessness adults indicated the presence of **asthma**/bronchitis/emphysema in a 2002 TN Study
Medical History

- Not only Symptoms, but...
- History of GERD
- Nutrition
- TB exposure
- HIV status
- Medications
- OTC, herbal, folk remedies

- Living Conditions
- Working Conditions
- Functional Impairment
- Inhaled Substances
- Incarceration
- Health Insurance
- Providers, Acute Care/ER, Hospitalizations/ICU
- Literacy

What are others issues to consider?
Physical Examination

• Vital Signs
• Upper Airway & Nasal Findings
• Lung auscultation with forced expiration on exam
• Other pulmonary diseases (COPD)
• Mental Health Status
Diagnostic Tests

• Chest X-ray
• Peak Flow (Diagnosis and Management)
• Spirometry-finding is a reduced FEV1/FVC
• TST or T-Spot (often required prior to admission to shelter)
• HIV testing
• Sputum Cultures with chronic cough-
  Histoplasmosis in Midwest and Coccidiomycosis in Southwest

What do you choose-if any?
Optimum Peak Flow in Adults
Spirometry
### Spirometry criteria for diagnosis of Asthma

<table>
<thead>
<tr>
<th>Spirometry (showing reversible airway obstruction)</th>
<th>Criteria for children (ages ≥ 6 years)</th>
<th>Adult criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced FEV₁/FVC</td>
<td>Less than lower limit of normal based on age, sex, height, and ethnicity AND ≥12%</td>
<td>Less than lower limit of normal based on age, sex, height and ethnicity AND ≥12% (and minimum ≥200mL)</td>
</tr>
<tr>
<td>AND Increase in FEV₁ after a bronchodilator or course of controller therapy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Typical Asthma Spirometry Printout

C.

<table>
<thead>
<tr>
<th>Spirometry measure</th>
<th>Predicted</th>
<th>Before bronchodilator</th>
<th>After bronchodilator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Best</td>
<td>% of predicted</td>
</tr>
<tr>
<td>FVC, L</td>
<td>3.70</td>
<td>3.30</td>
<td>89</td>
</tr>
<tr>
<td>FEV₁, L</td>
<td>2.94</td>
<td>1.80</td>
<td>61</td>
</tr>
<tr>
<td>Ratio FEV₁/FVC, %</td>
<td>80</td>
<td>55</td>
<td>NA</td>
</tr>
</tbody>
</table>

Note: FEV₁ = forced expiratory volume in 1 second, FVC = forced vital capacity, NA = not applicable.
Medication

• Short Acting Beta Agonists (SABA)
• Corticosteroids (inhaled and orally)
• Long Acting Beta Agonists (LABA)
• Leukotriene Receptor Agonists (LTRA)

Concerns...

• Medication storage
• Medication reconciliation
• Medication refill plan

Other concerns?
Plan and Management

• Asthma Action Plan
• Inhaler use/Spacers
• Nebulizers-Use and cleaning
• Smoking history and exposure
• Exercise
• Patient goals for asthma
• Inquire if individual has questions

What do you use or not use?
Managing Asthma:  
Asthma Action Plan

• Develop with a provider

• Tailor to meet individual needs

• Educate patients and families about all aspects of plan
  – Recognizing symptoms
  – Medication benefits and side effects
  – Proper use of inhalers and Peak Expiratory Flow (PEF) meters

Is it reasonable in a HCH setting?
Managing Asthma:
Sample Asthma Action Plan

Describes medicines to use and actions to take
eAAP
Associated Problems/Complications

- Lost or stolen medications & supplies
- Uncoordinated care & financial barriers
- Availability of transportation
- Functional impairment
- Literacy/language barriers
- COPD, GERD, Sinusitis, Inhalation, etc..

Other problems you have encountered?
Follow-up

- Contact Information
- Frequency of follow-up
- Medication control
- Coordinate with other providers
- Case Management
- Referral for other services i.e., mental health
- Community outreach
IV. Child Asthma Guidelines
Childhood Asthma

Medical History

• Undiagnosed Asthma
• Extent and type of Housing Instability
• Primary provider and availability of Medical home
• Acute visits/ER/hospitalization/ICU
• Environment triggers & allergies
• Viral URIs
• Overall growth and nutrition
Additional History

- Prenatal-Low birthweight (LBW)/preterm
- Family stress/adversity/domestic violence
- Food insecurity/chronic hunger
- Entitlements
- School Attendance
- Developmental status and special needs
- The child’s literacy level
Diagnostic Tests

- Chest X-ray
- Peak Flow and/or Spirometry
- PPD or T-Spot
- Consider referral for allergy testing
Child Peak Flow Guidelines

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Height (ft)</th>
<th>Predicted EU PEFR (L/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.85</td>
<td>2'9&quot;</td>
<td>87</td>
</tr>
<tr>
<td>0.90</td>
<td>2'11&quot;</td>
<td>95</td>
</tr>
<tr>
<td>0.95</td>
<td>3'1&quot;</td>
<td>104</td>
</tr>
<tr>
<td>1.00</td>
<td>3'3&quot;</td>
<td>115</td>
</tr>
<tr>
<td>1.05</td>
<td>3'5&quot;</td>
<td>127</td>
</tr>
<tr>
<td>1.10</td>
<td>3'7&quot;</td>
<td>141</td>
</tr>
<tr>
<td>1.15</td>
<td>3'9&quot;</td>
<td>157</td>
</tr>
<tr>
<td>1.20</td>
<td>3'11&quot;</td>
<td>174</td>
</tr>
<tr>
<td>1.25</td>
<td>4'1&quot;</td>
<td>192</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Height (m)</th>
<th>Height (ft)</th>
<th>Predicted EU PEFR (L/min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.30</td>
<td>4'3&quot;</td>
<td>212</td>
</tr>
<tr>
<td>1.35</td>
<td>4'5&quot;</td>
<td>233</td>
</tr>
<tr>
<td>1.40</td>
<td>4'7&quot;</td>
<td>254</td>
</tr>
<tr>
<td>1.45</td>
<td>4'9&quot;</td>
<td>276</td>
</tr>
<tr>
<td>1.50</td>
<td>4'11&quot;</td>
<td>299</td>
</tr>
<tr>
<td>1.55</td>
<td>5'1&quot;</td>
<td>323</td>
</tr>
<tr>
<td>1.60</td>
<td>5'3&quot;</td>
<td>346</td>
</tr>
<tr>
<td>1.65</td>
<td>5'5&quot;</td>
<td>370</td>
</tr>
<tr>
<td>1.70</td>
<td>5'7&quot;</td>
<td>393</td>
</tr>
</tbody>
</table>

Normal PEF values in children correlate best with height; with increasing age, larger differences between the sexes. These predicted values are based on the formulae given in Lung Function in Health and Disease by LT Cotes (Fourth Edition), adapted for EU scale Mini-Wright peak flow meters by Cler. Date of preparation – 7th October 2004
Treatment Plan and Management

- Medications/Spacers/Nebulizers/Storage
- Medication response and refills
- Proper equipment use
- Immunizations
- Allergen Avoidance
- Asthma Action Plans
- Environmental tobacco exposure
- Other illicit drug exposures
School Involvement

- School Education Administration Forms
- School-based Asthma Controller Management
- Education Special Needs-IEP
- Exercise
- School Attendance
- Advocacy
Access to and Use of School-Based Health Centers

2015

<table>
<thead>
<tr>
<th></th>
<th>Housed</th>
<th>All Homeless</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have Access</td>
<td>84%</td>
<td>60%</td>
</tr>
<tr>
<td>Use Centers</td>
<td>36%</td>
<td>51%</td>
</tr>
</tbody>
</table>

N=4,955         N=682         N=4,182         N=409

Note: Based on YRBS survey question 124.
Source: Centers for Disease Control and Prevention, 2015 New York City Youth Risk Behavior Survey.
Associated Problems to Consider

- Use of Antibiotics - Appropriate & Inappropriate
- Uncoordinated Care
- Difficulty in follow-up
- Financial and social support barriers
- Family Stress

*Other issues for families with children?*
Follow-up

• Frequency
• Coordination with Primary Care Provider
• Availability of Medical Home
• Referrals to other specialists
• Community outreach
• Advocacy
Take Away

• Providing care to persons experiencing homelessness (with asthma) is really hard but rewarding

• **Asthma Control** is more important than severity

• Control is optimized if multi-faceted and coordinated across systems
V. Hands On

• Finish Case Study
• Calculate Your Peak Flow
• Spirometry station

• Pick-up a Peak Flow Meter or Optichamber

THANK YOU