Asthma outpatient/Primary care considerations

Jeanne Conner APNP, AE-C
Pediatric Nursing Conference
October 30th, 2019
• I have no relevant financial relationships.
Objectives

- Describe the focus of outpatient asthma services
- Facilitate optimal use of medications by patients and families to prevent asthma exacerbations and promote optimal health and wellbeing
- Recognize what it means for a patient to be in good asthma control
• Milwaukee – 6th highest number of asthma related ED visits in the country
• State department of Health Services – 2017
  • 6,640 asthma related ED visits in Milwaukee
  • 2,575 visits for children
• Wisconsin
  • 400,000 adults with asthma
  • 100,000 children (1 in 4 in MPS)
Define Asthma

Asthma is...

...a serious chronic lung disease caused by continual airway inflammation punctuated by episodes or attacks of increased inflammation, often in response to specific triggers.

*Trends in Asthma Morbidity and Mortality, American Lung Association September 2012*
Asthma Severity
Asthma and Airway Inflammation

Genetic

Risk Factors
(for development of asthma)

Environmental

INFLAMMATION

Bronchial Hyperresponsiveness

Airflow Obstruction

Symptoms

Risk Factors
(for exacerbations)
Modified Asthma Predictive Index

Primary Criteria: 4 or more episodes of wheezing in a year

Secondary Criteria:

At least one major:  
- Parental physician-diagnosed asthma  
- Physician-diagnosed atopic dermatitis  
- Allergic sensitization to at least one aeroallergen

OR

At least 2 minor:  
- Wheezing unrelated to colds  
- 4 or more % eosinophils in circulation  
- Allergic sensitization to milk, egg, or peanuts

NAEPP Guidelines, Section 4, Managing Asthma Long Term in Children 0–4 Years of Age and 5–11 Years of Age, page 285, https://www.nhlbi.nih.gov/sites/default/files/media/docs/asthgdln_1.pdf last accessed 9/5/2018
NHLBI Asthma Guidelines

1991  Asthma is an inflammatory disease
1997  Early recognition and treatment
2002  Update on selected topics
2007  Asthma Guidelines Update
# Asthma Treatment—Stepwise

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<th>Persistent Asthma: Daily Medication</th>
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**Patient Education and Environmental Control at Each Step**
- Steps 2–4: Consider SQ allergen immunotherapy for pts with allergic asthma

**Quick-Relief Medication for All Patients**

Stepwise Approach to Therapy

- Stepwise approach recommended to gain/maintain control
  - **Severity** assessment to initiate controller therapy
  - **Control** assessment to adjust controller therapy
- Before stepping up:
  - Assess medication adherence, inhaler technique, environmental control measures, comorbid conditions
  - If alternative treatment is being used, discontinue, initiate preferred treatment instead
- Consider stepping down therapy:
  - Once control maintained for >3 months
  - Identify minimum medication necessary to maintain control

### Goals of asthma treatment

<table>
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<tr>
<th>Prevent</th>
<th>Prevent chronic and troublesome symptoms</th>
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<tr>
<td>Maintain</td>
<td>Maintain (near -) normal pulmonary function</td>
</tr>
<tr>
<td>Maintain</td>
<td>Maintain normal activity levels</td>
</tr>
<tr>
<td>Prevent</td>
<td>Prevent recurrent exacerbations of asthma</td>
</tr>
<tr>
<td>Provide</td>
<td>Provide optimal pharmacotherapy with minimal or no adverse effects</td>
</tr>
<tr>
<td>Meet</td>
<td>Meet patients’ and families’ expectations</td>
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Asthma Control

- No (or minimal) asthma symptoms
- No waking up at night due to asthma.
- No (or minimal) need to use “reliever” medication.
- The ability to do normal physical activity and exercise.
- Normal (or near-normal) lung function test results.
- No (or very infrequent) asthma attacks.
FIG 1. Algorithm for attaining optimal asthma control.
Nick

**Presented to the AAC at age 7, January 2010**

- URI – cough and wheeze, more problems in the fall, but some symptoms daily – both daytime and nighttime
- Triggers – URI, weather change, cold air, cats, activity.
- Uses albuterol with symptoms, up to several times per week

**Second visit late February 2010**

- Spirometry improved
- Allergy skin testing done

**Continued to do well through the summer**
### Classification of Asthma Severity (5–11 years of age)

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<td><strong>Nighttime awakenings</strong></td>
<td>≤2x/month</td>
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<tr>
<td><strong>Short-acting beta₂-agonist use</strong></td>
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<tr>
<td><strong>Interference with normal activity</strong></td>
<td>None</td>
<td>Minor limitation</td>
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<tr>
<td><strong>Lung function</strong></td>
<td>● Normal FEV₁ between exacerbations</td>
<td>● FEV₁ &gt;80% predicted</td>
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<tr>
<td></td>
<td>● FEV₁/FVC &gt;85%</td>
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### Impairment

- **Interference with normal activity**
  - None
  - Minor limitation
  - Some limitation
  - Extremely limited

### Lung function

- Normal FEV₁ between exacerbations
- FEV₁ >80% predicted
- FEV₁/FVC >85%
- FEV₁/FVC >80%
- FEV₁/FVC = 75–80%
- FEV₁/FVC <75%

### Risk

- **Exacerbations**
  - 0–1/year
  - ≥2 in 1 year
  - Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category.

Relative annual risk of exacerbations may be related to FEV₁.
Intermittent Asthma

Persistent Asthma: Daily Medication—Ages 5-11 yrs
Consult with asthma specialist if step 4 care or higher is required.
Consider consultation at step 3.

**Step 1**
Preferred: Low-dose ICS
Alternative: Cromolyn, LTRA, Nedocromil, or Theophylline

**Step 2**
Preferred: Low-dose ICS + either LABA, LTRA, or Theophylline
Alternative: Medium-dose ICS

**Step 3**
Preferred: Medium-dose ICS + LABA
Alternative: Medium-dose ICS + either LTRA or Theophylline

**Step 4**
Preferred: High-dose ICS + LABA
Alternative: High-dose ICS + either LTRA or Theophylline

**Step 5**
Preferred: High-dose ICS + LABA + oral corticosteroid
Alternative: High-dose ICS + either LTRA or Theophylline + oral corticosteroid

**Step 6**
Preferred: High-dose ICS + LABA + oral corticosteroid
Alternative: High-dose ICS + either LTRA or Theophylline + oral corticosteroid

Step up if needed
(first, check adherence and environmental control and comorbid conditions)
Assess control
Step down if possible
(and asthma is well controlled at least 3 months)

http://www.nhlbi.nih.gov/guidelines/asthma/epr3/
Nick

- November 2011
  - Fall allergies worse than ever
  - Asthma also affected
- March 2012
  - Symptoms improved with Montelukast
  - Spirometry – borderline small airway flows
- July 2012
  - Repeated allergy skin testing in preparation for allergy immunotherapy
  - Off Zyrtec – sneezing, itchy nose, watery eyes
  - Started allergy immunotherapy 7/12/2012
Allergen Immunotherapy
High dose, SQ, specific

- Small injections of relevant allergens, increasing concentrations over 3-6 months of build up, maintenance of monthly injections for 3-5 years.
- Benefit occur over months, not immediate
- Prevent the development of new sensitivities, asthma
- Decrease in symptoms by 80%, medications
- Long term relief, but not a cure
- Time consuming, risk of reaction, expensive
- Indications – multi-season allergies, allergic asthma, medication reliance or adverse reactions
Nick

• December 2012
  • Good fall, colds didn’t linger
  • Albuterol with sports
  • Continued montelukast and fluticasone
  • Fall – injections caused a lot of arm swelling
  • Pt and mother felt shots were helping – better fall

• August 2013
  • Reached maintenance 3/14/13
  • Stopped Montelukast in May
• 2014
  • Fall 2013 – rough, montelukast helpful, missing fluticasone a lot at night, albuterol with sports
  • Cat passed away in Feb, spirometry better in spring, decreased Fluticasone had changed to QVAR – decreased to 2 puff daily, did well, goo spring
• 2015
  • Did well
• 2016
  • Back to QVAR twice daily, stopped cetirizine and montelukast
Nick

• June 2017
  • No problems with stopping montelukast
  • No asthma symptoms – borderline small airway flows
• December 2017
  • Not much albuterol even with sports
  • Spirometry – small airways improved
  • QVAR decreased to 2 puff daily
• Completed 5 years of allergy injections 5/3/2018
February 2019
- Rare albuterol use, still plays soccer (varsity)
- Stopped fluticasone nasal spray
- Family got 2 new kittens in December
- Spirometry normal
- Cetirizine as needed

How is Nick doing now?
• Good example of stepping up and stepping down using the recommended guidelines based on his asthma control
• Controlling or eliminating an asthma trigger = better asthma control
• Assessing adherence can also help in decision making
• His case supports current literature
  • Allergy injections can help to stop the progression of asthma
  • By controlling the upper airway, the lower airway improves

What did Nick teach us?
Starting seeing AAC when he was 2 yo
Came to clinic after a reaction to peanut
  - Allergy skin testing done – positive for peanut and tree nuts
Did well until spring 2014 when he developed more seasonal allergy symptoms
  - Runny nose and congestion
  - Allergy skin testing + for tree pollen and mold
### Components of Severity

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<td>Interference with normal activity</td>
<td>None</td>
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<td>Lung function</td>
<td>Normal FEV(_1) between exacerbations</td>
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<td>Risk</td>
<td>Exacerbations (consider frequency and severity)</td>
<td>0–1/year</td>
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Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category.

Relative annual risk of exacerbations may be related to FEV\(_1\).
Persistent Asthma: Daily Medication—Ages 5-11 yrs
Consult with asthma specialist if step 4 care or higher is required.
Consider consultation at step 3.

**Step 1**
*Preferred:*
Low-dose ICS

*Alternative:*
SABA PRN

**Step 2**
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Cromolyn, LTRA, Nedocromil, or Theophylline

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(first, check adherence and environmental control and comorbid conditions)
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Step down if possible
(and asthma is well controlled at least 3 months)

Patient Education and Environmental Control at Each Step

http://www.nhlbi.nih.gov/guidelines/asthma/epr3/
Billy

• Returned to clinic June 2017 - cough for 3 months, day and night
  • Albuterol with activity, helpful
  • Peak flow 250
  • What could be helpful for Billy?
• August 2017 – cough resolved
• December 2017 – fluticasone daily, plan – if doing well in 6 months, stop
  • Continue albuterol for soccer
Billy

• 6 months later – continues fluticasone daily
• Illness – increases fluticasone to 4 puffs twice daily
• Soccer – albuterol before games, 2 puffs during games, energy low
• Stop fluticasone for the summer?
• December
  • URI for a week, YZ plan, saw PCP – steroids, only slightly better, fatigue and cough
  • 2-3 illnesses since school started, no albuterol before gym – trouble walking
  • What would you do now?
Step up asthma management

Prompt recognition of symptoms and signs of acute loss of control

Acute loss of control

RED ZONE = Systemic Steroids

Asthma Control

Non-allergic

Infectious / Virus

Allergic

Irritants
Yellow zone plan

Reliever (rescue medication) every 4 hours

- Albuterol or levalbuterol (Xopenex) 4 puffs
- Albuterol or levalbuterol (Xopenex) 1 vial via nebulizer

Current treatment with low – medium dose ICS

- Consider increasing total ICS dose per 24 hours
- Mild to moderate asthma – consider recommending symptom driven use of ICS with concomitant albuterol for control of asthma sx
Yellow zone plan

- Pt specific based on previous asthma exacerbations
- Ideal intervention – provide quick symptom relief, prevent progression to the red zone
- Be safe and easy to do at home
- Convenient and practical for self-administration
- Portable so it can always be available
- Cost effective
Yellow zone plan

Scheduled dosing
- Increase total CS dose per 24 hours
- Fluticasone 4 puffs 2-4 times per day

Dynamic dosing
- Use ICS along with reliever medication
- Concomitant dose of ICS with each reliever dose

Adjustable maintenance dosing
- ICS – formoterol – AMD therapy (symptoms driven therapy)
Adjustable maintenance dosing

- Poor asthma control and asthma deaths can be related to widespread use and overuse of SABA
- Frequent SABA use
  - Increased risk of future exacerbations
  - Hospital admission
  - Increased airway inflammation
  - Used instead of ICS and in place of increased ICS when control deteriorates
- Symptom relief but does nothing to suppress increased inflammation
March 2019

- Several illnesses requiring nebulizer treatments, YZ plan of care, decadron as well as prednisone courses, antibiotics at least once
- Has tree allergy – started fluticasone nasal spray 3/1, cetirizine started
- Fluticasone MDI daily increased to 110, 2 puffs twice daily

June 2019

- Good for 2 months
- Ended up in his YZ twice early in month
Visit 6/19/19

• Mom very concerned – Billy is going to Boy Scout camp in Upper Michigan for 1 week, leaving in 3 days
• Spirometry is decreased
• Over the last week has needed nebulizer treatments and albuterol frequently

What to do for Billy?
How did Billy do at camp

No trouble at camp

Home for 2 days – some cough and wheeze, gave nebulizer treatment, no further problems

Walked in July 4th parade without problems, albuterol before

August visit

- Doing well!
- Spirometry back to his norm
- Albuterol before activity and on poor air quality days
- Continue Dulera 100/5, Singulair, Zyrtec as needed, albuterol before activity, fluticasone
What did Billy teach us?

- The atopic march does exist
- Individualized Yellow zone plans work if patients use them
- Sometimes a patient’s medications just need to increase
- Okay to give a short course of oral steroids
Anna

- Viral induced bronchospasm
  - Slammer – gets a cold and goes down very quickly but is fine between illnesses
  - Gets a cold – asthma flares and coughs linger, fine between illnesses

OR

- Persistent asthma
  - Intermittent cough day and night
  - Symptoms worse with illness
  - Activity symptoms
## CHHS Definition of Asthma

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<th>Under 2 Years of Age “Transient Wheeze”</th>
<th>2 years &amp; Above “Asthma”</th>
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<tr>
<td>• Avoid use of “Reactive Airway Disease” (RAD)</td>
<td>• Cough / wheeze or shortness of breath (SOB) more than once at least 4 or more weeks after a documented URI OR</td>
</tr>
<tr>
<td>• Transient Wheezers are difficult to identify while they are symptomatic</td>
<td>• More than 3 episodes of cough / wheeze / SOB within 4-6 weeks (including viral induced)</td>
</tr>
<tr>
<td>• Diagnosis options:</td>
<td>• Absence of other diagnoses (BPD, etc)</td>
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<td>• Choose the appropriate symptom the patient presents with:</td>
<td></td>
</tr>
<tr>
<td>• Wheezing</td>
<td></td>
</tr>
<tr>
<td>• Cough</td>
<td></td>
</tr>
<tr>
<td>• Dyspnea</td>
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• This will “over treat” some patients – refer if needed. Over diagnosed patients will be identified at the specialist visit.
# EPR3: Classifying Asthma Severity in 0-4 years

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<td>Nighttime Awakenings</td>
<td>0</td>
<td>1-2x/ month</td>
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<tr>
<td>SABA for symptom control</td>
<td>≤ 2 days/wk</td>
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<td>Interference with normal activity</td>
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<td><strong>Risk</strong></td>
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<tr>
<td>Exacerbation Frequency &amp; Severity</td>
<td>0-1/yr</td>
<td>&gt; 2 exacerbations in 6 months requiring steroids OR &gt; 4 wheezing episodes/1 yr lasting &gt;1 day AND risk factors for persistent asthma</td>
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Freq and severity may fluctuate over time

Persistent Asthma: Daily Medication
0-4 years EPR-3

ICS = inhaled corticosteroid; (A-D) = Evidence A-D; LABA = long-acting $\beta_2$-agonist.
http://www.nhlbi.nih.gov/guidelines/asthma/epr3/
Anna

• Intermittent asthma
  • Rescue medication with symptoms
  • No daily medication
  • Intermittent ICS therapy for increased asthma symptoms
    • It is possible to treat mild persistent asthma with short, intermittent courses of ICS, taken when symptoms worsen?
    • Answer is not in the guidelines
  • Asthma management plan
Anna

- Persistent asthma
  - Symptoms between illnesses
  - Frequent illnesses
  - Frequent visits to the PCP office
  - ER visits, hospitalizations, frequent steroid courses
- > 2 exacerbations in 6 months requiring steroids OR > 4 wheezing episodes/1 yr lasting >1 day AND risk factors for persistent asthma
Anna – How to treat persistent asthma

- Refer to the Guidelines
  - Options to treat
  - See in 4-8 weeks for follow up then every 3-4 months
  - At follow up visits – consider:
    - When and if to decrease medication
    - If not controlled, how to increase medication
- Treat if “yes” to any of the “Rule of 2’s” (According to the ALA)
  - Daytime cough/wheeze/SOB 2 or more times per week
  - Night waking or cough in sleep 2 or more times per month
  - Refilling the rescue inhaler more than 2 times per year
• 2004 – meta-analysis done comparing the efficacy of SABA with spacer with nebulizer in children < 5 years of age with acute exacerbation or asthma in the ER

• 1996-2003 – randomized controlled trials, outcome measured – hospital admission

• Results – pts receiving SABA with MDI and spacer showed significant decrease in admission rate compared with nebulizer

• Conclusion – MDI and spacer more effective in terms of decreasing hospitalization and improving clinical score than use of nebulizer in child < 5 with moderate to severe acute exacerbations of wheezing or asthma

Study supporting the practice of increasing ICS therapy in worsening asthma in children (1-14) already on daily ICS

Several randomized trial have not supported this practice

Evidence does not support increasing the dose of ICS in children with mild to moderate asthma to treat exacerbations

For adults – some benefit in using 4 times the ICS dose in worsening asthma
Concise messages for putting asthma guidelines into practice

• Use ICS
• Use written Asthma action plan
• Assess asthma severity
• Assess and monitor asthma control
• Schedule follow-up visits
• Control environmental exposures
Thank you ..... Questions
References

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