Asthma
in the School Age Child

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Acknowledgements

– Martha Judson, RN MS
  • NHSNA Liaison

– Rescue Inhaler Work Group members
  • Marie Mulroy; Holly Meilcarz; Jessica Morton

– Asthma Collaborative
Learning Objectives

• Discuss emerging thinking on Asthma, its causes and symptoms.

• Identify latest treatment

• Identify components of Asthma care in school, the Asthma Action Plan and Emergency Plan.

• Understand the new Bronchodilator bill, its intent and implementation
Asthma:

- Accounts for 14 million lost school days annually
- Is the most common chronic disease causing absence from school
- Is the 3rd leading cause of hospitalizations among children under 15
- 1 in 13 school children have asthma
- 6.3 million children under 18 have asthma

1 Asthma Prevalence, Health Care Use, and Mortality, 2000-01, National Center for Health Statistics, CDC
2 Morbidity and Mortality Report, National Center for Health Statistics (NCHS), U.S. CDC, 2003
3 Surveillance for Asthma - United States, 1980-99, MMWR Surveillance Summaries, CDC, March 29, 2002
This means..

In a class of 30 children, you can expect 2 to 3 students WILL have asthma. This number varies depending on age and geographical location.
One in 12 people (about 26 million, or 8% of the U.S. population) had asthma in 2010, compared with 1 in 14 (about 20 million, or 7%) in 2001.
Among children aged 0-14, boys were more likely than girls to have asthma. Boys and girls aged 15-17 years had asthma at the same rate. Among adults women were more likely than men to have asthma.
In New Hampshire...

- 10.6% of NH children have current diagnosis of asthma
  - 28,000 children

- Asthma is more prevalent among older children
  - Increasing after age 6, greatest number ages 11-17

- Gender and household income not statistically significant
  - Boys slightly greater than girls

» NH DHHS February 2015
In New Hampshire (continued)

• 2/3 of children with asthma had well-controlled asthma

• Medical costs associated with asthma in children: $24 million

• Highest incidence: Merrimack, Coos Counties; cities of Nashua and Manchester

• Grafton, Sullivan, and Carroll has the least
School Age Children...

- Spend 180 days in school!
- Spend 6-12 hours per day
“School nurses are an important component of the health care system for children and play a critical role in identifying solutions to the health problems faced by today’s children and families”.

The Journal of School Nursing, June 2007, Vol.23, Num. 3
Impact Of Asthma On Students

School Performance:

- Poorly controlled asthma has a negative impact on school performance in both academic achievement and physical education.
Psychosocial:
- Poor self-esteem
- Anxiety about asthma
- Fear of becoming ill at school
- Anxiety about exercise at school
- Fear of being different
YOU Can Make A Difference!
What Is Asthma?

Asthma is a chronic disease that causes:

- Bronchoconstriction (obstruction that is reversible)
- Inflammation of the bronchioles (small airways)
- Hyper-responsive “twitchy” airways
- Excessive mucus production in the bronchioles
During an asthma attack, smooth muscles located in the bronchioles of the lung constrict and decrease the flow of air in the airways. Inflammation or excess mucus secretion can further decrease the amount of air flow.
Epithelial Injury in Asthma

Healthy Subject

Asthma Patient

A Lot Going On Beneath The Surface

- Airway inflammation
- Airflow obstruction
- Bronchial hyperresponsiveness
- Airway inflammation

Slide courtesy of ALAMN - PACE program 2004
The Asthma Cascade

- Allergen
- Antigen-Presenting Cell
- T Cell
- Cytokines
- IgE
- B-lymphocyte
- Plasma Cell
- Unbound IgE
- Mast Cell
- Release of Inflammatory Mediators

Genentech

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The End Results Of The Cascade

- Localized mucosal edema in the walls of the small bronchioles
- Secretion of thick mucus into the bronchiolar lumens (Clogs and narrows the airways)
- Spastic contraction of bronchiolar smooth muscle
Mediator Phases

- Early-phase reaction caused by mediator release, usually peaks within an hour after initial exposure to the allergen.
- Three to four hours after an acute asthma episode, a "late-phase reaction" may occur and may last up to 24 hours.
Child wheezing and short of breath
Causes – We Don’t Know...Yet! *

- Asthma has dramatically risen worldwide over the past decades, particularly in developed countries, and experts are puzzled over the cause of this increase.

- Not all people with allergies have asthma, and not all cases of asthma can be explained by allergic response.

- Asthma is most likely caused by a convergence of factors that can include genes (probably several) and various environmental and biologic triggers (e.g., infections, dietary patterns, hormonal changes in women, and allergens).
HE WAS RAISED BY WOLVES SO HIS SOCIAL SKILLS ARE A LITTLE WEAK. ON THE OTHER HAND HE'S FREE OF ALLERGIES OR ASTHMA.

NEWS ITEM——STUDY FINDS GROWING UP WITH PETS BUILDS IMMUNITY...
Causes

- Gene-by-environment interactions are important to the expression of asthma.

- Atopy, the genetic predisposition for the development of an immunoglobulin E (IgE)-mediated response to common aeroallergens, is the strongest identifiable predisposing factor for developing asthma.

- Viral respiratory infections are one of the most important causes of asthma exacerbation and may also contribute to the development of asthma.
The critical role of inflammation is validated - there is considerable variability in the pattern of inflammation indicating phenotypic differences that may influence treatment responses. *(in other words – genetics)*

Gene-by-environmental interactions are affect the development of asthma. Of the environmental factors, allergic reactions are important. Viral respiratory infections are key and have an expanding role in these processes.

The onset of asthma for most patients begins early in life with the pattern of disease persistence determined by early, recognizable risk factors including atopic disease, recurrent wheezing, and a parental history of asthma.

Current asthma treatment with anti-inflammatory therapy does not appear to prevent progression of the underlying disease severity.
Why are the numbers increasing?

- Hygiene theory
- Increase in antibiotic use
- Increase use of acetaminophen
- Increase in obesity
- Vitamin D deficiency
- Varying Air Quality
Common Symptoms Of Asthma

✓ Frequent cough, especially at night
✓ Shortness of breath or rapid breathing
✓ Chest tightness
✓ Chest pain
✓ Wheezing
✓ Fatigue
Early Signs Of An Asthma “Episode”

- Mild cough
- Drop in Peak Flow reading
- Itchy, watery or glassy eyes
- Itchy, scratchy or sore throat
- Runny nose

- Stomachache
- Headache
- Sneezing
- Congestion
- Restlessness
- Dark circles under eyes
- Irritability
Group Straw Exercise

1. Stand up
2. Place the straw in your mouth
3. Try to breathe!

This is what it may feel like when a child is having a severe asthma episode
Questions to Ask our School Age Children

- Do School Children *Have* Asthma Action Plans?
- Do School Children if they had a written asthma action plan?
- Do students with asthma have medication at school?
- Do students with asthma know how to use their rescue inhalers?
- Do students with asthma know when to use their rescue inhalers?
- Do students with asthma have access to their rescue inhalers and school staff trained to help them?
The 4 Components Of Asthma Management

- **Component 1**: Measures of Asthma Assessment and Monitoring
- **Component 2**: Education for a Partnership in Asthma Care
- **Component 3**: Control of Environmental Factors and Comorbid Conditions That Affect Asthma
- **Component 4**: Medications
Measures of Asthma Assessment & Monitoring
Assessment and monitoring are closely linked to the concepts of severity, control, and responsiveness to treatment:

- **Severity** - intensity of the disease process. Severity is measured most easily and directly in a patient not receiving long-term-control therapy.
- **Control** - degree to which asthma (symptoms, functional impairments, and risks of untoward events) are minimized and the goals of therapy are met.
- **Responsiveness** - the ease with which asthma control is achieved by therapy.
Severity & Control Are Assessed Based On 2 Domains

- **Impairment** (Present):
  - Frequency and intensity of symptoms
  - Functional limitations (quality of life)

- **Risk** (Future):
  - Likelihood of asthma exacerbations or
  - Progressive loss of lung function (reduced lung growth)
  - Risk of adverse effects from medication
Severity & Control are used as follows for managing asthma:

- If the patient is not currently on a long-term controller at the first visit:
  - Assess asthma severity to determine the appropriate medication & treatment plan.
- Once therapy is initiated, the emphasis is changed to the assessment of **asthma control**.
  - The level of asthma control will guide decisions either to maintain or adjust therapy.
Peak Flow Monitoring

Long-term daily PF monitoring can be helpful to:

Detect early changes in asthma control that require adjustments in treatment:
  – Evaluate responses to changes in treatment
  – Provide a quantitative measure of impairment

NAEPP 2007 guidelines Sec. 3, P.54
Peak Flow Meters (PFM)
Assessment of Asthma Severity

2007 Guidelines

• Impairment
  – Frequency of daytime /nighttime symptoms
  – Quality of life assessments
  – Frequency of SABA use
  – Interference with normal activity
  – Lung function (FEV$_1$/FVC)

• Risk
  – Exacerbations (frequency and severity)
Classifying Severity AFTER Control is Achieved – All Ages

### Classification of Asthma Severity

<table>
<thead>
<tr>
<th>Lowest level of treatment required to maintain control</th>
<th>Intermittent</th>
<th>Persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild</td>
<td>Moderate</td>
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<tr>
<td></td>
<td>Severe</td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>Step 2</td>
<td></td>
</tr>
<tr>
<td>Step 2 or 4</td>
<td>Step 3 or 4</td>
<td></td>
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<tr>
<td>Step 5 or 6</td>
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</tbody>
</table>

(already on controller)
Assessment of asthma control includes the two domains of impairment and risk.

Peak flow monitoring:
- Assessing diurnal variation was deleted.
- Patients are most likely to benefit from routine peak flow monitoring.
- Evidence suggests equal benefits to either peak flow or symptom-based monitoring; the important issue continues to be having a monitoring plan in place.

Parameters for lung function, specifically FEV1/FVC, were added as measures of asthma control for children.
For patients w/persistent asthma, evaluate the role of allergens.

All patients w/ asthma should:
- Reduce, if possible, exposure to allergens they are sensitized and exposed to.
- Understand effective allergen avoidance is multifaceted and individual steps alone are ineffective.
- Avoid exertion outdoors when levels of air pollution are high.
- Avoid use of nonselective beta-blockers.
- Avoid sulfite-containing and other foods they are sensitive to.
- Consider allergen immunotherapy.
Evaluate a patient for other chronic comorbid conditions when asthma cannot be well controlled.

Consider inactivated influenza vaccination for patients w/ asthma.

Use of humidifiers are not generally recommended.

Employed asthmatics should be asked about possible occupational exposures, particularly those who have new-onset disease. (work related asthma)

There is insufficient evidence to recommend any specific environmental strategies to prevent the development of asthma.
Reducing exposure to inhalant indoor allergens can improve asthma control, a multifaceted approach is required; single steps to reduce exposure are generally ineffective.

Formaldehyde and volatile organic compounds (VOCs) are potential risk factors for asthma.

Influenza vaccine does not appear to reduce the frequency or severity of asthma exacerbations during the influenza season.

Discussion is included on ABPA, obesity, OSA, and stress as chronic comorbid conditions, in addition to rhinitis, sinusitis, and gastroesophageal reflux, that may interfere with asthma management.
Medications
Both control and rescue medications come in MDI (metered dose inhalers) and nebulized forms.

Control medications are also available in dry powder discs, breath actuated inhalers and pill form.
Most MDIs (metered dose inhalers) should be used with a spacer or holding chamber

- This device attaches to the MDI and allows the user to breathe in more medication effectively
- The clinician must write an order for a chamber when prescribing your MDI medication
- Both controller and reliever medications are in MDI dispensers
- Dry powder inhalers do NOT require spacers
Typical Spacers/Holding Chambers
2 general classes:
- Long-term control medications
- Quick-Relief medications

Controller medications:
- Corticosteroids
- Long Acting Beta Agonists (LABA’s)
- Leukotriene modifiers (LTRA)
- Cromolyn & Nedocromil
- Methylxanthines: (Sustained-release theophylline)
Quick-relief medications

- Short acting bronchodilators (SABA’s)
- Systemic corticosteroids
- Anticholinergics
Safety of Short Acting Beta2 Agonists

- SABAs are the most effective medication for relieving acute bronchospasm
- Increasing use of SABA treatment or using SABA >2 days a week for symptom relief (not prevention of EIB) indicates inadequate control of asthma.
- Regularly scheduled, daily, chronic use of SABA is not recommended.
Safety of Inhaled CorticoSteroids

- ICS’s are the most effective long-term therapy available, are well tolerated & safe at recommended doses.
- The potential but small risk of adverse events from the use of ICS treatment is well balanced by their efficacy.
- The dose-response curve for ICS treatment begins to flatten at low to medium doses.
- Most benefit is achieved with relatively low doses, whereas the risk of adverse effects increases with dose.
Epithelial Injury in Asthma

Healthy Subject

Asthma Patient

Inhaled Corticosteroid (ICS) Therapy: Reduces Inflammation

E = Epithelium
BM = Basement Membrane

Before 3-Month Treatment With an ICS b.i.d.
After 3-Month Treatment With an ICS b.i.d.

Reducing Potential Adverse Effects

- Spacers or valved holding chambers (VHCs) used with non-breath-activated MDIs reduce local side effects.
  - But there is no data on use of spacers with ultra fine particle hydrofluoroalkane (HFA) MDIs.
- Advise patients to rinse their mouths (rinse and spit) after (ICS) inhalation.
- Use the lowest dose of ICS that maintains asthma control:
  - Evaluate patient adherence and inhaler technique as well as environmental factors that may contribute to asthma severity before increasing the dose of ICS.
- To achieve or maintain control of asthma, add a LABA to a low or medium dose of ICS rather than using a higher dose of ICS.
- Monitor linear growth in children.
Adding a LABA to the tx of patients whose asthma is not well controlled on low- or medium-dose ICS improves lung function, decreases symptoms, and reduces exacerbations and use of SABA for quick relief in most patients.

The FDA determined that a Black Box warning was warranted on all preparations containing a LABA.

For patients who have asthma not sufficiently controlled with ICS alone, the option to increase the ICS dose should be given equal weight to the option of the addition of a LABA to ICS.

It is not currently recommended that LABA be used for treatment of acute symptoms or exacerbations.

LABAs are not to be used as monotherapy for long-term control.
# ASSESSING ASTHMA CONTROL AND ADJUSTING THERAPY IN CHILDREN 5 - 11 YEARS OF AGE

## Components of Control

<table>
<thead>
<tr>
<th>Classification of Asthma Control</th>
<th>Well Controlled</th>
<th>Not Well Controlled</th>
<th>Very Poorly Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impairment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>≤ 2 days/wk, ≤1/day</td>
<td>&gt;2 days/wk or multiple times on ≤2 days/wk</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤ 1/month</td>
<td>&gt; 2 x/month</td>
<td>&gt;2x/week</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>none</td>
<td>Some limitation</td>
<td>Extremely limited</td>
</tr>
<tr>
<td>SABA use</td>
<td>≤ 2 days/week</td>
<td>&gt; 2 days/week</td>
<td>Several times/day</td>
</tr>
<tr>
<td>FEV₁ or peak flow</td>
<td>&gt; 80% predicted/ personal best</td>
<td>60-80% predicted/ personal best</td>
<td>&lt;60% predicted/ personal best</td>
</tr>
<tr>
<td>FEV₁/FVC</td>
<td>&gt; 80% predicted</td>
<td>75-80% predicted</td>
<td>&lt;75% predicted</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exacerbations</td>
<td>0-1/ year</td>
<td>≥ 2 / year (Consider severity and interval)</td>
<td>Evaluation requires long-term follow up care</td>
</tr>
<tr>
<td>Lung growth</td>
<td></td>
<td></td>
<td>Medication-related sides effects can vary from none to to very troublesome and worrisome. The level of intensity does not correlate to specific levels of control but should be considered in the overall assessment of risk.</td>
</tr>
<tr>
<td>Treatment-related adverse effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Recommended Action For Treatment</strong></td>
<td>Maintain current step</td>
<td>Step up 1 step</td>
<td>Consider oral steroids</td>
</tr>
<tr>
<td></td>
<td>Consider step down if well controlled at least 3 months</td>
<td>Reevaluate in 2 - 6 weeks</td>
<td>Step up 1-2 steps</td>
</tr>
<tr>
<td></td>
<td>Step up 1 step</td>
<td>Reevaluate in 2 wk</td>
<td>Reevaluate in 2 wk</td>
</tr>
</tbody>
</table>
STEPWISE APPROACH FOR MANAGING ASTHMA
IN CHILDREN 5-11 YEARS OF AGE

Persistent Asthma: Daily Medication
Consult with asthma specialist if step 4 or higher care is required
Consider consultation at step 3

Intermittent Asthma

Quick-Relief Medication for All Patients
SABA as needed for symptoms. Intensity of treatment
depends on severity of symptoms: up to 3 treatments
at 20-minute intervals as needed. Short course of
systemic oral corticosteroids may be needed.
• Use of beta₂-agonist >2 days a week for symptom
control (not prevention of EIB) indicates inadequate
control and the need to step up treatment.

Step 1
Preferred: SABA prn
Alternative: LTRA, Cromolyn, Theophylline
OR Medium-dose ICS

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

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

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

Step 5
Preferred: Medium-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

Assess Control
Step up if needed (check adherence, environmental control and comorbidities)
Step down if possible (asthma well controlled for 3 months)

Patient Education and Environmental Control at Each Step

Quick-Relief Medication for All Patients
SABA as needed for symptoms. Intensity of treatment
depends on severity of symptoms: up to 3 treatments
at 20-minute intervals as needed. Short course of
systemic oral corticosteroids may be needed.
• Use of beta₂-agonist >2 days a week for symptom
control (not prevention of EIB) indicates inadequate
control and the need to step up treatment.
# Classifying Asthma Severity and Initiating Treatment in Children > 12 Years and Adults

<table>
<thead>
<tr>
<th>Components of Severity</th>
<th>Classification of Asthma Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intermittent</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
</tr>
<tr>
<td>Impairment</td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>&lt;2 days/week</td>
</tr>
<tr>
<td>Nighttime Awakenings</td>
<td>≤2x/month</td>
</tr>
<tr>
<td>SABA use for symptoms</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>none</td>
</tr>
<tr>
<td>Lung Function</td>
<td>• Normal FEV₁ between exacerbations</td>
</tr>
<tr>
<td></td>
<td>• FEV₁ &gt; 80%</td>
</tr>
<tr>
<td>Risk</td>
<td>0-1/year</td>
</tr>
<tr>
<td>Exacerbations requiring oral systemic corticosteroids</td>
<td></td>
</tr>
<tr>
<td>Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for any patient in any severity category.</td>
<td></td>
</tr>
<tr>
<td>Relative annual risk of exacerbations may be related to FEV₁</td>
<td></td>
</tr>
<tr>
<td>Recommended Step for Initiating Treatment</td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td>Step 2</td>
</tr>
<tr>
<td>Re-evaluate asthma control in 2-6 weeks and adjust therapy accordingly</td>
<td></td>
</tr>
</tbody>
</table>
# Intermittent Asthma

**Persistent Asthma: Daily Medication**  
Consult with asthma specialist if step 4 or higher care is required  
Consider consultation at step 3

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## Patient Education and Environmental Control at Each Step

### Step 1
- **Preferred:** SABA prn
- **Alternative:** LTRA, Cromolyn, Theophylline

### Step 2
- **Preferred:** Low-dose ICS  
  OR  
  Medium-dose ICS+ either LABA, LTRA, Theophylline  
  Or Zileutin
- **Alternative:** LTRA

### Step 3
- **Preferred:** Low-dose ICS  
  OR  
  Medium-dose ICS+ either LABA, LTRA, Theophylline  
  Or Zileutin
- **Alternative:** Medium-dose ICS+ either LABA, LTRA, Theophylline  
  Or Zileutin

### Step 4
- **Preferred:** High dose ICS + LABA  
  AND  
  Consider Omalizumab for patients with allergies
- **Alternative:** Medium dose ICS+ either LABA, LTRA, Theophylline  
  Or Zileutin

### Step 5
- **Preferred:** High-dose ICS + LABA  
  AND  
  Consider Omalizumab for patients with allergies
- **Alternative:** Medium-dose ICS+ either LABA, LTRA, Theophylline  
  Or Zileutin

### Step 6
- **Preferred:** High-dose ICS + LABA + oral Corticosteroid  
  AND  
  Consider Omalizumab for patients with allergies

---

**Quick-Relief Medication for All Patients**  
SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. Short course of systemic oral corticosteroids may be needed.  
- Use of beta₂-agonist >2 days a week for symptom control (not prevention of EIB) indicates inadequate control and the need to step up treatment.

---

**Assess Control**  
Step up if needed (check adherence, environmental control and comorbidities)  
Step down if possible (asthma well controlled for 3 months)
**Actions to consider:**

- Assess whether the medications are being taken as prescribed.

- Assess whether the medications are being inhaled with correct technique.

- Assess lung function with spirometry and compare to previous measurement.

- Adjust medications, as needed; either step up if control is inadequate or step down if control is maximized, to achieve the best control with the lowest dose of medication.

Adapted from *Global Initiative for Asthma: Pocket Guide for Asthma Management & Prevention.* 1995
Managing Exacerbations of Asthma
Exacerbations Defined

- Are acute or subacute episodes of progressively worsening shortness of breath, cough, wheezing, and chest tightness—or some combination of these symptoms.

- Are characterized by decreases in expiratory airflow that can be documented and quantified by spirometry or Peak expiratory flow.
  - These objective measures more reliably indicate the severity of an exacerbation than does the severity of symptoms.
Early treatment of asthma exacerbations is the best strategy for management.

- Patient education includes a written asthma action plan to guide patient self-management of exacerbations.
  - especially for patients who have moderate or severe persistent asthma and any patient who has a history of severe exacerbations.
- A peak-flow-based plan for patients who have difficulty perceiving airflow obstruction and worsening asthma.
Exacerbation

- Recognition of early signs of worsening asthma & taking prompt action.
- Appropriate intensification of therapy, often including a short course of oral corticosteroids.
- Removal of the environmental factors contributing to the exacerbation.
- Prompt communication between patient and clinician about any serious deterioration in symptoms or peak flow, decreased responsiveness to SABAs, or decreased duration of effect.
## Classifying Severity of Asthma Exacerbations in the UC or ER Setting

<table>
<thead>
<tr>
<th>Severity</th>
<th>Symptoms &amp; Signs</th>
<th>Initial PEF (or FEV₁)</th>
<th>Clinical Course</th>
</tr>
</thead>
</table>
| Mild           | Dyspnea only with activity (assess tachypnea in young children) | PEF ≥70 percent predicted or personal best | - Usually cared for at home  
- Prompt relief with inhaled SABA  
- Possible short course of oral systemic corticosteroids |
| Moderate       | Dyspnea interferes with or limits usual activity           | PEF 40–69 percent predicted or personal best | - Usually requires office or ED visit  
- Relief from freq. inhaled SABA  
- Oral systemic corticosteroids; some symptoms last 1–2 days after treatment is begun |
| Severe         | Dyspnea at rest; interferes with conversation              | PEF <40 percent predicted or personal best | - Usually requires ED visit and likely hospitalization  
- Partial relief from frequent inhaled SABA  
- PO systemic corticosteroids; some symptoms last >3 days after treatment is begun  
- Adjunctive therapies are helpful |
| Subset: Life threatening | Too dyspneic to speak; perspiring                  | PEF <25 percent predicted or personal best | - Requires ED/hospitalization; possible ICU  
- Minimal or no relief w/ frequent inhaled SABA  
- Intravenous corticosteroids  
- Adjunctive therapies are helpful |
The EPR -3
Does **NOT** Recommend...

- Drinking large volumes of liquids or breathing warm, moist air (e.g., the mist from a hot shower).

- Using over-the-counter products such as antihistamines or cold remedies.

- Although pursed-lip and other forms of controlled breathing may help to maintain calm during respiratory distress, these methods do *not* bring about improvement in lung function.
Acute Asthma Episodes
Common Symptoms Of Asthma

- Frequent cough, especially at night
- Shortness of breath or rapid breathing
- Chest tightness
- Chest pain
- Wheezing
- Fatigue
### Early Signs Of An Asthma “Episode”

<table>
<thead>
<tr>
<th>Symptom</th>
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<tbody>
<tr>
<td>Mild cough</td>
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<tr>
<td>Drop in Peak Flow reading</td>
</tr>
<tr>
<td>Itchy, watery or glassy eyes</td>
</tr>
<tr>
<td>Itchy, scratchy or sore throat</td>
</tr>
<tr>
<td>Runny nose</td>
</tr>
<tr>
<td>Stomachache</td>
</tr>
<tr>
<td>Headache</td>
</tr>
<tr>
<td>Sneezing</td>
</tr>
<tr>
<td>Congestion</td>
</tr>
<tr>
<td>Restlessness</td>
</tr>
<tr>
<td>Dark circles under eyes</td>
</tr>
<tr>
<td>Irritability</td>
</tr>
</tbody>
</table>
An asthma episode occurs when a child is exposed to a trigger or irritant and their asthma symptoms start to appear. This can occur suddenly without a lot of warning, or brew for days before the symptoms emerge. Episodes are preventable by avoiding exposure to triggers and taking daily controller medications (if prescribed).
Handling Acute Asthma Episodes At School

- Remain calm and reassure the child; stop activity.
- Have the child sit up and breathe slowly-in through the nose slowly, out through pursed lips very slowly.
- Have the child sip water / fluids.
- Check peak flow (*with severe symptoms: skip PF & give quick-relief or reliever medication immediately*).
- Child should not be left alone.
Give asthma reliever (bronchodilator) per the child's Asthma Action Plan / medication orders
Assess response to medication
After ~5-10 minutes recheck peak flow
Call parent/guardian/health care provider prn
Call 911 if escalating symptoms or no improvement
Call 911 if..

- Cyanosis of lips or nail beds
- Child has difficulty talking, walking or drinking
- Quick relief or “rescue” meds (albuterol) is ineffective or not available
- Neck, throat, or chest retractions are visible
- Nasal flaring occurs when inhaling
- Obvious distress; anxious
- Altered level of consciousness/confusion
- Rapidly deteriorating condition
“There should not be any delay once a child notifies school staff of a possible problem or developing asthma episode”
Common Allergens (Triggers)

- Seasonal Pollens
- Animal dander
- saliva/urine
- Dust Mites
- Cockroaches/Mice/Rat droppings and urine
- Mold
- Some medications
- Some Foods
Common Irritants (Triggers)

- Exercise
- Cold Air
- Chalk Dust
- Viral/upper respiratory infections
- Air pollution
- Tobacco smoke or secondhand smoke

- Chemical irritants and strong smells
- Strong emotional feelings
- Diesel fumes
- Cleaning supplies
Dust Mites

Live in pillows and mattresses, carpet, fabric-covered furniture, curtains, stuffed toys -

- Avoid buying fabric covered furniture
- Remove carpeting
- Wash fabrics in hot water (130°)
- Vacuum often when people with asthma/allergies are not in the area (HEPA filter vacuum cleaners)
- Wet dust book cases and furniture frequently
- Keep room humidity < 50% if possible
Droppings or body parts from cockroach can trigger asthma symptoms.

Use integrated pest management (IPM) methods:

- Don’t leave food, water or garbage exposed
- Vacuum or sweep areas prone to cockroach every 2-3 days
- Seal entry points for pests
- Use pesticides only as needed; try roach traps or gels
Fury and feathery pets can cause asthma symptoms

Fur is not the trigger; the animals dander, saliva and urine are the culprits –

- Keep pets outside
- Keeps pets off the furniture
- Bath pets weekly
- Vacuum frequently or damp mop hard floor surfaces at least weekly
Tobacco and secondhand smoke

Is an irritant triggering asthma in children and adults

- State law prohibits tobacco use in K-12 public schools
- Maintain a clean indoor air environment – smoke residue can stay on clothes
- Health care providers can provide a referral to a quit smoking program, or call the US Network of Quitlines: 800-QUIT-NOW (800-784-8669)
Respiratory Infections

- Viruses cause asthma exacerbations in children
- RVs cause ~60% of virus-induced exacerbations of asthma
- RVs directly infect the bronchial airways
- The response to viral infection is shaped by the host’s antiviral response
Outdoor Air

High seasonal pollen counts aggravate allergies
Ozone and fine particles are biggest concern caused by industrial emissions and car exhaust

- Sign up for Air Quality Index e-mail notices
  - Pollution Control Agency sends e-mail alerts when they expect poor air quality (regional)
- Avoid being outside at high pollen count times, especially if allergic to particular seasonal pollens
- Keep windows closed during pollen season
School Environment – Indoor

- Animals
  - Urine, dander, saliva; can remain for months
  - Remove, or keep caged away from ventilation source
- Dust Mites
  - Live on skin flakes; pillows, carpets, stuffed toys, upholstery
- Mold
  - Moisture dependent; check pipes, ceilings, carpeting
- Pests
  - Attracted by food, water, garbage; integrative pest management
- Second hand smoke
  - Aware of tobacco smoke on clothes
Exercise Induced Asthma
What Is Exercise Induced Asthma (EIA)?

- Tightening of the muscles around the airways (bronchospasm)
- Distinct from allergic asthma in that it does NOT cause swelling and mucus production in the airways
- Can be avoided by taking pre-exercise medications and by warming up/cooling down
EIA - What Happens?

- Symptoms include coughing, wheezing, chest tightness and shortness of breath

- Symptoms may begin during exercise and can be worse 5 to 10 minutes after exercise

- EIA can spontaneously resolve 20 to 30 minutes after starting

- Can be avoided by doing the following:
Preventing Exercise Induced Asthma (EIA)

- Become familiar with Asthma Action Plans
- Use reliever (Albuterol) 15 - 30 minutes before activity
- Do warm-up/cool-down exercises before and after activities
- Check outdoor ozone/air quality levels

www.aqi.pca.state.mn.us/hourly/
Exercise can be a trigger for those who have “chronic” asthma.

Their pre-exercise treatment is the same but -

These children will have the underlying inflammation and require daily controller medication.
Assess Need For Pre-Medication

- Take note of medication order wording
  “As needed” vs. “prior to exercise”
- Evaluate if activity level requires pre-medication
- Pre-medicate for strenuous activity only
- Contact parent/ HCP if questioning need for pre-exercise medication
Coach’s Asthma Clipboard Program
“Winning With Asthma”

- 100% online education for:
  - Coaches
  - Referee’s
  - Physical Education Teachers
- Coaches will receive:
  - Coach’s asthma clipboard
  - Special Coach’s asthma education booklet
  - Certificate of completion
  - The satisfaction of knowing what to do during an asthma episode!

www.WinningWithAsthma.org
So the doctor tells me it's Asthma. But I ask you, I'm 27 why would I get Asthma now?
<table>
<thead>
<tr>
<th>Myth</th>
<th>Truth</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use “reactive airway disease” instead of “asthma” for a diagnosis – that way the insurance company will never know</td>
<td>• Reactive airway disease’s code is the same code used for asthma!</td>
</tr>
<tr>
<td></td>
<td>• Any order for albuterol (or other rescue inhaler) flags the insurance company</td>
</tr>
</tbody>
</table>
Treatment Myths

- Gecko liquid tonic
- Herbal supplements
- Acupuncture/pressure, chiropractic adj.
- Cockroach tea
- Asthma diets
- Pranic healing with mantras
- Owning a Chihuahua
"I stopped to smell the flowers. Where's my inhaler?"
Every Child Is Unique!

- Wheezing and coughing are the most common symptoms - *but* -
- No two children will have the exact same symptoms or the same trigger
- Every child who has a diagnosis of asthma should have access to a rescue inhaler!
- Every child with persistent asthma should have an asthma action plan at school (AAP)
Self management education is essential and should be integrated into all aspects of care & requires repetition and reinforcement.

Provide all patients with a written asthma action plan that includes 2 aspects:
- Daily management
- How to recognize & handle worsening asthma symptoms

Regular review of the status of patients asthma control.
- Teach & reinforce at every opportunity

Develop an active partnership with the patient and family.
Asthma Action Plans

Student Education

~Aware of written AAP:

1) Know daily management
2) How to recognize & handle worsening symptoms including adjustment of medication dose.
3) Identify school staff available to provide help
4) Know where medications are

~Cultural and ethnic factors & health literacy that affect education must be considered
Together- We Can Make A Difference!
The creation of a Circle of Support amongst the families, clinicians, and school nurses centered around the child with asthma.

The creation and transmission of Asthma Management Plans to schools. This includes an Asthma Emergency Treatment Plan for emergency management of asthma symptoms and an individualized Asthma Action Plan (AAP) for each child with asthma. A standardized AAP is available.

A comprehensive Asthma Education Plan for school personnel.

A comprehensive Environmental Asthma Plan to assess and remediate asthma triggers at home and in school.
What Schools Need to Do

- Establish management and support systems for asthma-friendly schools.
- Provide appropriate school health and mental health services for students with asthma.
- Provide asthma education and awareness programs for students and school staff.
- Provide a safe and healthy school environment to reduce asthma triggers.
- Provide opportunities for safe, enjoyable physical activity.
- Coordinate school, family and community efforts to better manage asthma symptoms and reduce school absences among students with asthma.
Asthma Management Plan

- Asthma Emergency Treatment Plan
  - Assess severity
  - Provide initial treatment
  - Act according to initial treatment

- Asthma Action Plan
  - Individualized treatment plan for the chronic and acute management of asthma
    - At home
    - At school.
Checklist for School Nurses

• Pre-planning prior to school entry
  – Diagnosis, AAP, meet student, parent, school staff

• Assign Level of care
  – Health Care Plan, 504 Plan

• Self Administration of Medication
  – Self carrying, asthma action plan, demonstration of knowledge

• Promoting Independence
  – Appropriate use of medication, attendance, school performance
## Getting the AAP to School

<table>
<thead>
<tr>
<th>Transmission</th>
<th>Advantages</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual</td>
<td>• Universally available</td>
<td>• Unreliable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No direct communication from the provider to the RN</td>
</tr>
<tr>
<td>Telephone or Electronic Fax</td>
<td>• Available to most schools and clinics</td>
<td>• Need correct contact information</td>
</tr>
<tr>
<td></td>
<td>• EHR integration feasible</td>
<td>• May require manual faxing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Concerns for patient confidentiality and readability</td>
</tr>
<tr>
<td>Direct electronic messaging</td>
<td>• Direct, secure transmission</td>
<td>• Schools must have access to web portal and/or EHR</td>
</tr>
<tr>
<td>and/or web portals</td>
<td>• May offer bi-directional messaging</td>
<td>• Not widely available</td>
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<tr>
<td></td>
<td>• Automatic uploads of documents</td>
<td>• Requires IT support</td>
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Toolkit

- https://www.hipxchange.org/SAMPRO
Senate Bill 322: Rescue Inhalers in Schools

An act relative to the provision and administration of bronchodilators, spacers and nebulizers in schools
An overview of the Bill

- Adds an amendment to RSA 200 to include the use of bronchodilators, spacers, and nebulizers in schools
- Allows school districts to keep a supply of emergency inhalers at school, for student use during an asthma emergency
- After completion of an asthma training program school personnel (unlicensed assistive personnel, UAP) can help administer a rescue inhaler
- Students must have an asthma action plan and parental permission on file.
Prescribing Authority

- The School Board authorizes the school nurse to maintain the medication supply

- A health care practitioner can prescribe the rescue medications to the school district
Student Eligibility

- The student must have an asthma action plan on file and updated annually.
- The student’s health care provider must have signed an order form with the dosage information, and permission to use the school stock in an emergency.
- The student must have written permission from the parent.
• School must produce an annual report summarizing use of medication and equipment

• If the emergency school stock was used for a student, schools must notify the parents as soon as possible.
To administer a rescue inhaler, a school employee must be designated by the school nurse and must have completed an asthma training program conducted by the school nurse.

The school nurse will maintain a list of those who have completed the asthma training program.
Asthma Training Program

- An initial training and an annual refresher course based on training programs by the NH School Nurses Association, The National Association of School Nurses, and the American Lung Association.

- Recognition of the signs and symptoms of severe respiratory distress

- Procedures for the storage of medication

- Understanding of the administration of the bronchodilator with spacer or nebulizer
Guidance from the Department of Education

- The NH School Nurses Association, the American Lung Association and the NH Department of Education will provide guidelines for this. These guidelines will include trainings for unlicensed school personnel.

- Immunity against liability is built into this legislation provided that any damages are not caused by the willful disregard for the requirement.
Let’s Get Started!

• Brief SurveyMonkey will appear on the List Serv

• Training slides will be posted on AsthmaNow and the Office of Student Wellness websites

• Pilot schools

• Feedback from School Nurses
Thanks to the following agencies and individuals:

- This bill would not have been possible without the support of: the NH School Nurses Association, the American Lung Association, the NH Public Health Association, Sen. Sanborn, Sen. Avard, Sen. Boutin, Sen. Kelly, Sen. Reagan, Sen. Watters, and Sen. Woodburn
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