Updates in Asthma Management 2013

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Asthma and Immunology AAAAI
AAAAI Liaison to AAPA
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Disclaimer slide

Honoraria – CAPA

Consultant- Mylan, Merck, TEVA, Sunovion

Speakers Bureau- Aerocrine, Genentech, Mylan, Merck, ThermoFischer Diagnostics, TEVA, Sunovion
Objectives

1. Apply the NAEPP guideline measures of severity and control including current impairment and future risk to determine initial and appropriate therapy.
2. Identify the six steps of managing asthma for each of the 3 pediatric age groups of the NAEPP guidelines

Patients With AR Can Suffer From Many Comorbid Conditions

Most Patients with Asthma Have AR

- Approximately 80% of asthmatics have AR
- Most patients with allergic and non-allergic asthma have AR
- Many patients with AR have asthma
- AR is associated with and also constitutes a risk factor for asthma
- Many patients with AR have increased non-specific bronchial hyperreactivity


AR Can Increase Risk for Asthma ~3-Fold

Asthma Differential Diagnosis

• COPD
• GERD
• Anxiety
• Bronchitis (acute or chronic)
• Upper airway dysfunction – croup
  – excessive post nasal drip
  – vocal cord dysfunction
• Sinusitis
• Cystic fibrosis
• Bronchopulmonary aspergillosis
• Other infectious respiratory diseases including pertussis, TB
• Habit cough

Asthma Predictive Index

H/O ≥4 wheezing episodes in the past year (at least one must be provider diagnosed)

PLUS

One major criteria
• Parent with asthma
• Atopic dermatitis
• Aeroallergen sensitivity

Two minor criteria
• Food sensitivity
• Peripheral eosinophilia (4%)
• Wheezing not related to infection

or

If +, then 65% likelihood of developing persistent asthma
If -, then 95% likelihood of not developing persistent asthma

Variability of Untreated Asthma

Asthma: Pathophysiologic Features and Changes in Airway Morphology

Asthma Triggers

- Allergen exposure
- Respiratory infections
- Strong expressions of emotion (laughing, crying)
- Vigorous exercise
- Cold air
- Dust
- Air pollution
- Cigarette smoke
- Household products
- Drugs
- Pets

Cat Wash

- Rinsing cat weekly can reduce airborne levels
- Effect temporary and must be done at least twice/week
  - More recent data suggest washing every 2-3 days

Courtesy of Dr David Khan UT Southwestern Dallas
Shaving the Cat?

Courtesy of Dr David Kahn UT Southwestern Dallas

Courtesy of Dr David Kahn UT Southwestern Dallas
Which Asthma Patient Types Have Small Airway Dysfunction?

- Patients with nocturnal symptoms
  - Nocturnal symptoms are associated with small airway inflammation

- Those with recurrent exacerbations and hard-to-control disease
  - Air trapping in the small airways is associated with recurrent asthma exacerbations

- Patients exposed to small-particle aeroallergens (e.g., flowering grasses, pet or rodent secretions)

Common Aeroallergens


Childhood Asthma Control Test (C-ACT)

[Image of Childhood Asthma Control Test (C-ACT) diagram]
Childhood Asthma Control Test
Questions Completed by Child Age 4-11 Years

1. How is your asthma today?
   - Score

2. How much of a problem is your asthma when you run, exercise or play sports?
   - Score

3. Do you cough because of your asthma?
   - Score

4. Do you wake up during the night because of your asthma?
   - Score

Childhood Asthma Control Test
Questions Completed by Parent/Caregiver

5. During the last 4 weeks, on average, how many days per month did your child have any daytime asthma symptoms?

6. During the last 4 weeks, on average, how many days per month did your child wheeze during the day because of asthma?

7. During the last 4 weeks, on average, how many days per month did your child wake up during the night because of asthma?

TOTAL

SCORE
Scoring the ACT/C-ACT

- **19 or less**: Your asthma may not be under control.
  - Make an appointment to discuss your Asthma Control Test score.
- **20 or more**: Your asthma seems to be well controlled.

www.asthmacontrol.com
Current Impairment and Future Risk

- Both severity and control include the domains of current impairment and future risk

- **Impairment**
  - Frequency and intensity of symptoms and functional limitations the patient is currently experiencing or has recently experienced

- **Risk**
  - Likelihood of asthma exacerbations, progressive decline in lung function, or risk of adverse effects from medications

Spirometry Reference Values

- “Predicted” values
  - Obtained from studies of healthy people
  - Depend on:
    - Height (measure it accurately)
    - Age
    - Gender
    - Race or ethnicity
  - Weight is not a factor in predicted values
  - Extremes of weight can reduce lung function

- NHANES III reference equations are used on the Jones Medical Spirometer
Normal Lung Function Values

- FVC >80% of the predicted normal value
- FEV₁ >80% of the predicted normal value
- FEV₁/FVC
  - Greater than 80% in children
  - Greater than 70-75% in adults

Graphic Representation — Obstructive Lung Disease

The shape of both the volume vs time and flow vs volume tracings (blue curves) are clearly abnormal. In the volume vs time tracing, there is no sudden upsweep from the zero point; instead, the tracing rises gradually, never reaching a clear, sustained plateau. This is characteristic of classic, severe obstructive airways disease.

In the flow vs volume graph, the effects of both moderate and severe obstruction are demonstrated. Notice how the moderate obstruction tracing takes on a concave or “scooped out” shape after reaching its peak. Eventually, as airways obstruction worsens, the peak will drop and the curve will fall off dramatically in the shape of a “rat’s tail.”
Pre and Post Bronchodilator Test Tracings

These results are from a patient with asthma.

Goal of Asthma Therapy: Achieve Control

**Reduce Impairment**
- Prevent chronic and troublesome symptoms
- Require infrequent use of inhaled SABA (≤2 days/week)
- Maintain (near) “normal” pulmonary function
- Maintain normal activity levels
- Meet patients’ expectations of, and satisfaction with, asthma care

**Reduce Risk**
- Prevent recurrent exacerbations
- Minimize need for emergency department visits or hospitalizations
- Prevent progressive loss of lung function
- Provide optimal pharmacotherapy, with minimal or no adverse effects

Severity, Control and Responsiveness

- **Severity**
  - Intrinsic intensity of the disease process
  - Severity is most easily and directly measured in patients not receiving long-term therapy

- **Control**
  - Degree to which asthma-related symptoms, functional impairment, and risk of untoward events are minimized and the goals of therapy are met

- **Responsiveness**
  - Ease with which asthma control is achieved by therapy
  - Responsiveness to asthma treatment is highly variable

Classifying Asthma Severity and Assessing Asthma Control

- In patients not on controller medications
  - Severity based upon domains of impairment and risk
  - Level of severity based upon most severe category in which any feature appears

- In patients on controller medication
  - Severity based upon lowest step required to maintain clinical control
  - Control of asthma based upon domains of impairment and risk
    - Level of control based upon most severe impairment or risk category
    - Validated questionnaires may be used in patients aged ≥12 years

## Classifying Asthma Severity and Initiating Treatment in Children 0 to 4 Years of Age

<table>
<thead>
<tr>
<th>Components of Severity</th>
<th>Intermittent</th>
<th>Persistent</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impairment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>≤2 days/week</td>
<td>&gt;2 days/week but not daily</td>
<td>Daily</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>0</td>
<td>1-2×/month</td>
<td>5-6×/month</td>
<td>&gt;1×/week</td>
</tr>
<tr>
<td>SABA use for symptom control (not prevention of EIB)</td>
<td>≤2 days/week</td>
<td>&gt;2 days/week but not daily</td>
<td>Daily</td>
<td>Several times per day</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
<td>Minor limitation</td>
<td>Some limitation</td>
<td>Extremely limited</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exacerbations requiring oral systemic corticosteroids</td>
<td>0-1/year</td>
<td>5-12 exacerbations in 6 months requiring oral systemic corticosteroids, or &gt;4 wheeze episodes/1 year lasting &gt;2 days AND risk factors for persistent asthma</td>
<td>Consider severity and interval between exacerbation Frequency and severity may fluctuate over time Exacerbations of any severity may occur in asthma in any severity category</td>
<td></td>
</tr>
<tr>
<td><strong>Recommended Step for Initiating Treatment</strong></td>
<td>Step 1</td>
<td>Step 2</td>
<td>Step 3 and consider short course of oral systemic corticosteroids</td>
<td></td>
</tr>
<tr>
<td>In 2 to 6 weeks, depending on severity, evaluate level of asthma control that is achieved. If no clear benefit is observed in 4 to 6 weeks, consider adjusting therapy or alternative diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


## Assessing Asthma Control and Adjusting Therapy in Children 0 to 4 Years of Age

<table>
<thead>
<tr>
<th>Components of 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/week</td>
<td>&gt;2 days/week</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>1×/month</td>
<td>&gt;1×/month</td>
<td>&gt;1×/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 for symptom control (not prevention of EIB)</td>
<td>≤2 days/week</td>
<td>&gt;2 days/week</td>
<td>Several times per day</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exacerbations requiring oral systemic corticosteroids</td>
<td>0-1/year</td>
<td>2-3×/year</td>
<td>&gt;3×/year</td>
</tr>
</tbody>
</table>

**Treatment-related adverse effects:** Medication side effects can vary in intensity from none 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.

**Recommended Action for Treatment**
- Maintain current treatment
- Regular follow-up every 1 to 6 months
- Consider step down if well controlled for at least 3 months
- Step up (1 step) and reevaluate in 2 to 6 weeks
- If no clear benefit in 4 to 6 weeks, consider alternative diagnoses or adjusting therapy
- For side effects, consider alternative treatment options
- Consider short course of oral systemic corticosteroids
- Step up (1-2 steps) and reevaluate in 2 weeks
- If no clear benefit in 4 to 6 weeks, consider alternative diagnoses or adjusting therapy
- For side effects, consider alternative treatment options

Stepwise Approach for Managing Asthma in Children Aged 0 to 4 Years

**Interruption Asthma**

**Persistent Asthma: Daily Medication**

- Consult with asthma specialist if Step 3 care or higher is required.
- Consider consultation at Step 2.

**Step 1**

- **Preferred:** Low-dose ICS (A)
- **Alternative:** Cromolyn (B) or Montelukast (A)

**Step 2**

- **Preferred:** Medium-dose ICS (D)

**Step 3**

- **Preferred:** High-dose ICS + either LABA (D) or Montelukast (D)

**Step 4**

- **Preferred:** Oral Systemic Corticosteroids (D)

**Step 5**

- **Preferred:** High-dose ICS + either LABA or Montelukast

**Step 6**

- **Preferred:** Montelukast

**Step Up If Needed**

- (first, check adherence, inhaler technique, and environmental control)

**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
- With viral respiratory infection: SABA q 4
- FEV<sub>1</sub> ≤ 80%
- Normal FEV<sub>1</sub>

**Components of Severity**

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Intermittent</th>
<th>Persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild</td>
<td>Moderate</td>
</tr>
<tr>
<td><strong>Symptoms</strong></td>
<td>≤2 days/week</td>
<td>&gt;2 days/week but not daily</td>
</tr>
<tr>
<td><strong>Nighttime awakenings</strong></td>
<td>≤2 days/week</td>
<td>≤1 day/month</td>
</tr>
<tr>
<td><strong>SABA use for symptom control (not prevention of EIB)</strong></td>
<td>≤2 days/week</td>
<td>&gt;2 days/week but not daily</td>
</tr>
<tr>
<td><strong>Interference with normal activity</strong></td>
<td>None</td>
<td>Minor limitation</td>
</tr>
<tr>
<td><strong>Lung Function</strong></td>
<td>- Normal FEV&lt;sub&gt;1&lt;/sub&gt;, between exacerbations</td>
<td>- FEV&lt;sub&gt;1&lt;/sub&gt;, &gt;80% predicted</td>
</tr>
</tbody>
</table>

**Classifying Asthma Severity and Initiating Treatment in Children 5 to 11 Years of Age**

**Recommended Step for Initiating Treatment**

- **Step 1**
- **Step 2**
- **Step 3**, medium-dose ICS option, and consider short course of oral systemic corticosteroids

**Risk**

- Exacerbations requiring oral systemic corticosteroids

**Relativist annual risk of exacerbations may be related to FEV<sub>1</sub>.**

Assessing Asthma Control and Adjusting Therapy in Children 5 to 11 Years of Age

<table>
<thead>
<tr>
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<th>Well Controlled</th>
<th>Not Well Controlled</th>
<th>Very Poorly Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impairment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>≤2 days/week but not more than once on each day</td>
<td>&gt;2 days/week or multiple times on ≥2 days/week</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤1x/month</td>
<td>≥2x/month</td>
<td>≥2x/month</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 for symptom control (not prevention of EIB)</td>
<td>≤4x/week</td>
<td>≥2 days/week</td>
<td>Several times per day</td>
</tr>
<tr>
<td>Lung function</td>
<td></td>
<td></td>
<td></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/ personal best</td>
<td>75%-80%</td>
<td>&lt;75%</td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exacerbations requiring oral systemic corticosteroids</td>
<td>0-2/year</td>
<td>≥2/year</td>
<td>Consider severity and interval since last exacerbation</td>
</tr>
<tr>
<td>Reduction in lung growth</td>
<td></td>
<td>Evaluation requires long-term follow-up</td>
<td></td>
</tr>
<tr>
<td>Treatment-related adverse effects</td>
<td>Medication side effects can vary in intensity from none 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>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Recommended Action for Treatment

- Maintain current step
- Regular follow-up every 1 to 6 months
- Consider step down if well controlled for at least 3 months
- Step up at least 1 step and reevaluate in 2 to 6 weeks
- For side effects, consider alternative treatment options
- Consider short course of oral systemic corticosteroids
- Step up 1 or 2 steps, and reevaluate in 2 weeks
- For side effects, consider alternative treatment options


Stepwise Approach for Managing Asthma in Children Aged 5 to 11 Years

Intermittent Asthma

- Consult with asthma specialist if Step 4 care or higher is required. Consider consultation at Step 3.

Step 1 Preferred: SABA PRN

Step 2 Preferred: Low-dose ICS (A)

Step 3 Preferred: EITHER

Alternative: Medium-dose ICS + LABA (B)

Alternative: High-dose ICS + LABA (B)

Alternative: High-dose ICS + either LTRA (B) or Theophylline (B)

Alternative: High-dose ICS + either LTRA (B) or Theophylline (B)

Step 4 Preferred: Medium-dose ICS + LABA (B)

Alternative: Medium-dose ICS + either LTRA (B) or Theophylline (B)

Alternative: High-dose ICS + either LTRA (B) or Theophylline (B)

Step 5 Preferred: High-dose ICS + LABA + Oral Systemic Corticosteroid (D)

Alternative: High-dose ICS + either LTRA (B) or Theophylline (B) and Oral Systemic Corticosteroid (D)

Step 6 Preferred: High-dose ICS + LABA + Oral Systemic Corticosteroid (D)

Step Up If Needed

- First, check adherence, inhaler technique, environmental control, and comorbid conditionals

Assess Control

Step Down If Possible

- (and asthma is well-controlled at least 3 months)

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 oral systemic corticosteroids may be needed.
- Caution: Increasing of use of SABA or use ≥2 days a week for symptom relief (not prevention of EIB) indicates inadequate control and the need to step up treatment

### Estimated Comparative Daily Dosages for ICS in Children Aged 5 to 11 Years

<table>
<thead>
<tr>
<th>Drug</th>
<th>Low Daily Dose</th>
<th>Medium Daily Dose</th>
<th>High Daily Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beclomethasone HFA 40 or 80 µg/puff</td>
<td>80-160 µg</td>
<td>&gt;160-320 µg</td>
<td>&gt;320 µg</td>
</tr>
<tr>
<td>Budesonide DPI 50, 100, or 200 µg/inhalation</td>
<td>180-400 µg</td>
<td>&gt;400-800 µg</td>
<td>&gt;800 µg</td>
</tr>
<tr>
<td>Budesonide inhalation suspension 0.5 mg for nebulization (child dose)</td>
<td>1.0 mg</td>
<td>2.0 mg</td>
<td></td>
</tr>
<tr>
<td>Flunisolide 250 µg/puff</td>
<td>500-750 µg</td>
<td>1000-1250 µg</td>
<td>&gt;1250 µg</td>
</tr>
<tr>
<td>Flunisolide HFA 80 µg/puff</td>
<td>160 µg</td>
<td>320 µg</td>
<td>≥640 µg</td>
</tr>
<tr>
<td>Fluticasone HFA MDI 44, 110, or 220 µg/puff</td>
<td>88-176 µg</td>
<td>&gt;176-352 µg</td>
<td>&gt;352 µg</td>
</tr>
<tr>
<td>Fluticasone DPI 50, 100, or 250 µg/inhalation</td>
<td>100-200 µg</td>
<td>&gt;200-400 µg</td>
<td>&gt;400 µg</td>
</tr>
<tr>
<td>Mometasone DPI 200 µg/inhalation</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Triamcinolone acetonide 75 µg/puff</td>
<td>300-600 µg</td>
<td>&gt;600-900 µg</td>
<td>&gt;900 µg</td>
</tr>
</tbody>
</table>

**Note:**
- NA = not approved and no data available for children less than 12 years of age.

### Classifying Asthma Severity and Initiating Treatment in Youths ≥12 Years of Age and Adults

#### Components of Severity

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Intermittent</th>
<th>Persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>1-2 days/week/month</td>
<td>Mild</td>
</tr>
<tr>
<td>Moderate</td>
<td>3-4 days/week/month</td>
<td>Moderate</td>
</tr>
<tr>
<td>Severe</td>
<td>5-7 days/week/month</td>
<td>Severe</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>1-2 nights/week/day</td>
<td>Mild</td>
</tr>
<tr>
<td>Moderate</td>
<td>3-4 nights/week/day</td>
<td>Moderate</td>
</tr>
<tr>
<td>Severe</td>
<td>5-7 nights/week/day</td>
<td>Severe</td>
</tr>
<tr>
<td>SABA use for symptom control (not prevention of EIB)</td>
<td>1-2 days/week/day</td>
<td>Mild</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>1-2 nights/week/day</td>
<td>Mild</td>
</tr>
<tr>
<td>Moderate</td>
<td>3-4 nights/week/day</td>
<td>Moderate</td>
</tr>
<tr>
<td>Severe</td>
<td>5-7 nights/week/day</td>
<td>Severe</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>1-2 days/week/month</td>
<td>Mild</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light</td>
<td>1-2 nights/week/day</td>
<td>Mild</td>
</tr>
<tr>
<td>Moderate</td>
<td>3-4 nights/week/day</td>
<td>Moderate</td>
</tr>
<tr>
<td>Severe</td>
<td>5-7 nights/week/day</td>
<td>Severe</td>
</tr>
<tr>
<td>Lung Function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal FEV&lt;sub&gt;1&lt;/sub&gt; between exacerbations</td>
<td>FEV&lt;sub&gt;1&lt;/sub&gt; &lt;80% predicted</td>
<td>Mild</td>
</tr>
<tr>
<td>FEV&lt;sub&gt;1&lt;/sub&gt;/FVC normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEV&lt;sub&gt;1&lt;/sub&gt;,&lt;sub&gt;P&lt;/sub&gt; reduced 5%</td>
<td>FEV&lt;sub&gt;1&lt;/sub&gt;,&lt;sub&gt;P&lt;/sub&gt; reduced &gt;5%</td>
<td>Severe</td>
</tr>
<tr>
<td>FEV&lt;sub&gt;1&lt;/sub&gt;,&lt;sub&gt;P&lt;/sub&gt; reduced 10%</td>
<td>FEV&lt;sub&gt;1&lt;/sub&gt;,&lt;sub&gt;P&lt;/sub&gt; reduced &gt;10%</td>
<td>Extremely limited</td>
</tr>
<tr>
<td>Risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exacerbations requiring oral systemic corticosteroids</td>
<td>0-1/year</td>
<td>Step 1: In 2 to 6 weeks, evaluate level of asthma control that is achieved and adjust therapy accordingly</td>
</tr>
</tbody>
</table>

**Notes:**
- EIB = exercise-induced bronchospasm; FEV<sub>1</sub> = forced expiratory volume in one second; FVC = forced vital capacity.
### Assessing Asthma Control and Adjusting Therapy in Youths ≥12 Years of Age and Adults

<table>
<thead>
<tr>
<th>Components of 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>&lt;2 days/week</td>
<td>&gt;2 days/week</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>&lt;2x/month</td>
<td>1-3x/week</td>
<td></td>
</tr>
<tr>
<td>Intolerance with normal activity</td>
<td>None</td>
<td>Some limitation</td>
<td>Extremely limited</td>
</tr>
<tr>
<td>SABA use for symptom control (not prevention of EIB)</td>
<td>&lt;2 days/week</td>
<td>&gt;2 days/week</td>
<td>Several times per 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>Validated questionnaires</td>
<td>ATAAQ 0 ≤0.75 1.2 ≤1.5 3-4</td>
<td>ACT 20 30 40</td>
<td></td>
</tr>
</tbody>
</table>

**Risk**

- Exacerbations requiring oral systemic corticosteroids
- Consider severity and interval since last exacerbation
- Progressive loss of lung function
- Evaluation requires long-term follow-up
- Treatment-related adverse effects
- Medication side effects can vary in intensity from none to very troublesome and worrisome

**Recommended Action for Treatment**

- **Well Controlled**
  - Maintain current step
  - Regular follow-ups every 1-6 months to maintain control
  - Consider step down if well controlled for at least 3 months
- **Not Well Controlled**
  - Step up 1 step and
  - Reevaluate in 2 to 6 weeks
  - For side effects, consider alternative treatment options
- **Very Poorly Controlled**
  - Consider short course of oral systemic corticosteroids
  - Step up 1-2 steps, and
  - Reevaluate in 2 weeks
  - For side effects, consider alternative treatment options


### Stepwise Approach for Managing Asthma in Patients Aged ≥12 Years

#### Intermittent Asthma
- Consult with asthma specialist if Step 4 care or higher is required.
- Consider consultation at Step 3.

#### Persistent Asthma: Daily Medication
- Consider step down if personal best is not maintained for at least 3 months.

#### Step 1
- **Preferred:** SABA PRN
- **Alternative:** Cromolyn (A), LTRA (A), Nedocromil (A), or Theophylline (B)

#### Step 2
- **Preferred:** Low-dose ICS + LABA (A) or Medium-dose ICS (A)
- **Alternative:** Low-dose ICS + either LTRA (A), Theophylline (B), or Zileuton (D)

#### Step 3
- **Preferred:** Low-dose ICS + LABA (B) or Medium-dose ICS + either LTRA (B), Theophylline (B), or Zileuton (D)

#### Step 4
- **Preferred:** High-dose ICS + LABA (B) AND Omalizumab (D)
- **Alternative:** Consider Omalizumab for Patients Who Have Allergies (B)

#### Step 5
- **Preferred:** High-dose ICS + LABA + Oral Corticosteroid AND Omalizumab for Patients Who Have Allergies
- **Alternative:** Consider Omalizumab for Patients Who Have Allergies

#### Step 6
- **Preferred:** High-dose ICS + LABA + Oral Corticosteroid

#### Step Up if Needed
- (first, check adherence, environmental control, and comorbid conditions)

#### Step Down if Possible
- (and asthma is well controlled at least 3 months)

**Assess Control**

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.
- Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and the need to step up treatment

ICS = inhaled corticosteroids; LABA = long-acting β₂ agonist; LTRA = leukotriene receptor antagonist.

## Overview of Asthma Medications

### Long-Term Control
- Corticosteroids
- Cromolyn/nedocromil
- Long-acting beta$_2$-agonists
- Methylxanthines
- Leukotriene modifiers

### Quick Relief
- Short-acting inhaled beta$_2$-agonists
- Anticholinergics
- Systemic corticosteroids

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### Metered Dose Inhalers-MDI

![Image of Metered Dose Inhalers](image-url)
Dry Powder Inhalers-DPI

Medications to Treat Asthma: How an MDI Works
ICS + LABA Combinations

- Greater efficacy in combination products versus ICS alone:
  - Improved daytime and nighttime symptoms
  - Improved lung function
  - Decreased SABA need
  - Reduced frequency of exacerbations
  - Improved asthma control
  - Reduced ICS dose
- Increased convenience
- May improve adherence
- U.S. combinations:
  1. Budesonide + formoterol (HFA) Approved 2007
  2. Fluticasone + salmeterol (DPI & HFA)
  3. Mometasone + formoterol (HFA)

GINA Guidelines 2006

Step Therapy: Modifying Therapy As Needed For Severity and Control

- Evaluate asthma control in weeks. Step up if not well controlled\(^1\)
- Before stepping up, review:
  - Adherence
  - Inhaler technique
  - Environmental control measures
  - Comorbid conditions\(^1\)
- A step down is necessary to identify the minimum therapy required to maintain good control\(^2\)
- Consider a step down once asthma is well controlled for ≥3 months\(^4\)
- LABAs should be used for shortest duration of time required to achieve control, then discontinued\(^2\)

Consider Referral to a Specialist When:

- Symptoms are prolonged
- Symptoms interfere with daily activities, sleep (QOL)
- Patient has a suboptimal response to medications
- Comorbid conditions (asthma, sinusitis, otitis media) are present
- Structural abnormalities exist
- Allergic triggers need to be identified
- Immunotherapy is to be considered
- Oral corticosteroids are required

QOL = Quality of life.

Asthma Summary

- Severity, control, and responsiveness to treatment are key elements of asthma assessment and monitoring
- The goal of asthma therapy is to achieve control based on NAEPP draft guidelines
- Clinical assessment and patient self-assessment are primary methods for monitoring asthma control
- ICS is preferred monotherapy to achieve asthma control in patients with persistent asthma, across all ages
- LABAs are preferred adjunctive agents in patients aged ≥12 years who cannot be controlled with ICS monotherapy
QUESTIONS?