Guidelines for the Diagnosis and Management of Asthma

Luis A de Jesus Vargas, MD, MBA, RPSGT, RST, FCCP, FACP
Pulmonologist, Critical Care & Sleep Medicine Specialist
Registered Polysomnographic Technologist
Assistant Professor ad Honorem UPR School of Medicine
Medical Director Sleep Medicine Section Pulmonary Fellowship
San Juan City Hospital

Medical Director
Sleep Disorders Diagnosis AASM Accredited Center
64 Goyco Street; 112 Gautier Benitez PD Plaza Suite 4, Caguas PR
Office
Goyco 64 & Muñoz Rivera Corner,
Caguas PR
(787) 743 0236, 743 0150, 349 8182
pulmodoc@hotmail.com www.sleepcenterspr.com
Señor, estamos reunidos aquí porque esa es tu voluntad ya que tu diriges nuestras vidas. Dios de sabiduría y de inteligencia, maestro de maestros, con esta humilde oración te imploramos que así como envíaste a Jesús con el Espíritu Santo a enseñar a sus discípulos, lo envíes a nosotros para que aprendamos todo lo necesario para ayudar a nuestro prójimo.
Amen
Pueden accesar el PDF de esta conferencia bajo “Educacion” - “SSS Asthma” en www.sleepcenterspr.com
Why Do We Need Asthma Guidelines?

NIH Expert Panel Review 3 (EPR3 2007)

Global Initiative for Asthma

www.ginasthma.org

http://www.nhlbi.nih.gov/guidelines/asthma/index.htm
Asthma

- In 2008, it was estimated that **16.4 million adult (≥ 18 years)** Americans currently had asthma ⁷
- Is one of the most common chronic disorders in childhood, affecting an approx. **7.1 million children** under 18 years (9.6%) ¹
- In 2007, **3,447** deaths were attributed to asthma, **152** deaths were **children** under the age of 15 ²

1 CDC: National Center for Health Statistics, National Health Interview Survey Raw Data, 2009
3 CDC. National Center for Chronic Disease Prevention and Health Promotion. Healthy Youth! [Health Topics: Asthma](http://www.cdc.gov/), August 14, 2009
4 CDC: National Center for Health Statistics, National Health Interview Survey Raw Data, 2008.
5 NHLBI Chartbook, U.S. Department of Health and Human Services, National Institute of Health, 2009
Asthma

- Is the **third** leading cause of **hospitalization** among children under the age of 15.  

- Is one of the leading causes of **school absenteeism**. In 2008 asthma accounted for approx. 14.4 million lost school days.

- The **annual health care costs** of asthma is approx. **$20.7 billion dollars**.


1 CDC: National Center for Health Statistics, National Health Interview Survey Raw Data, 2009
3 CDC. National Center for Chronic Disease Prevention and Health Promotion. Healthy Youth! [Health Topics: Asthma](http://HealthTopics:Asthma), August 14, 2009
4 CDC: National Center for Health Statistics, National Health Interview Survey Raw Data, 2008.
5 NHLBI Chartbook, U.S. Department of Health and Human Services, National Institute of Health, 2009
Asthma Prevalence and Mortality

Puerto Rico 15.9%


Source: PR Bartolomei-Diaz, Jose Epidemiological Profile of Asthma in PR. Salud.gov.pr

Source: Masoli M et al. Allergy 2004
Asthma Prevalence in Puerto Rico

Figure 1. Lifetime childhood asthma prevalence by health regions, Puerto Rico 2007
Figure 2. Current childhood asthma prevalence by health regions, Puerto Rico 2007.
Asthma Prevalence in Puerto Rico

Figure 3. Lifetime adult asthma prevalence by health regions, Puerto Rico 2007
Asthma Prevalence in Puerto Rico

Figure 4. Current adult asthma prevalence by health regions, Puerto Rico 2007
## Asthma Patient’s Education in Puerto Rico

<table>
<thead>
<tr>
<th>Patient Education: Adults with Current Asthma</th>
<th>Respondents</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever taught how to recognize asthma symptoms</td>
<td>146</td>
<td>66%</td>
</tr>
<tr>
<td>Ever told what to do during an asthma attack</td>
<td>146</td>
<td>59%</td>
</tr>
<tr>
<td>Ever taught how to use a peak flow meter to adjust asthma medications</td>
<td>146</td>
<td>39%</td>
</tr>
<tr>
<td>Ever given an asthma action plan</td>
<td>146</td>
<td>37%</td>
</tr>
<tr>
<td>Ever taken a course on how to manage asthma</td>
<td>150</td>
<td>13%</td>
</tr>
<tr>
<td>Used a prescription asthma medications in the past 3 months</td>
<td>150</td>
<td>59%</td>
</tr>
</tbody>
</table>

1. From CDC’s National Asthma Control Program
http://www.salud.gov.pr/Programas/ProgramaMadresNinosAdolescentes/Pages/ProgramadeASMA.aspx
Primary Care and Asthma

- Primary care providers are expected to manage most cases of asthma.
  - Most cases of asthma -- perhaps 80% -- can be successfully managed by the generalist in the office

- There are disincentives to frequent referrals to specialists.
  - Primary care physicians are under pressure to limit referrals and emergency care visits
  - Better management of asthma in the office can reduce referrals to specialists and trips to the emergency department
Modern Paradox

• Understanding of the pathogenesis and treatment of asthma has increased.
• Understanding the steps to control asthma has increased.
• However, morbidity and mortality from asthma around the world is at an alarmingly high level with only recent flattening in some areas around the globe.

Some Possible Explanations

- Patients and families are not recognizing the symptoms of asthma.
- Clinicians are not making the diagnosis.
- Clinicians are either not providing state of the art care, or, if they are, patients are not adhering to the recommended programs.
Barriers to Achieving Optimal Care

- Patients treat asthma as an acute episodic illness rather than as a chronic disease.

- Physicians assume that patients will put aside their own beliefs, concerns, and goals to follow the treatment plan.
# Barriers to Achieving Optimal Care

<table>
<thead>
<tr>
<th>Medication Usage</th>
<th>Non-Medication Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulties associated with inhalers</td>
<td>Misunderstanding/lack of information</td>
</tr>
<tr>
<td>Complicated regimens</td>
<td>Fears about side-effects</td>
</tr>
<tr>
<td>Fears about, or actual side effects</td>
<td>Inappropriate expectations</td>
</tr>
<tr>
<td>Cost</td>
<td>Underestimation of severity</td>
</tr>
<tr>
<td>Distance to pharmacies</td>
<td>Attitudes toward ill health</td>
</tr>
<tr>
<td></td>
<td>Cultural factors</td>
</tr>
<tr>
<td></td>
<td>Poor communication</td>
</tr>
</tbody>
</table>
Fears About Asthma Medicines

• 39% of patients believe medicines are addictive.

• 36% believe medicines are not safe to take over a long period.

• 58% believe regular use will reduce effectiveness.
Clinical Aspects of Asthma and Long-term Plan
Key Points

1. Appropriate asthma management requires the proper use of long term control and quick-relief medications.

2. Assessment of severity and control forms the basis of the treatment plan.

3. Because asthma symptoms are variable, patients and families need to recognize symptoms and adjust medications at home according to the clinician’s written asthma action plan.
Key Points

4. **Good communication** between patient and clinician helps identify patient concerns, makes patient teaching more effective and promotes patient self-confidence to follow the treatment plan.

5. Initial patient education can be efficiently and effectively accomplished in **several standard primary care visits.**
Definition of Asthma

- Asthma is a common chronic disorder of the airways that is complex and characterized by variable and recurring symptoms, airflow obstruction, bronchial hyper-reponsiveness and underlying inflammation.
- The interaction of these features of asthma determines the clinical manifestations and severity of asthma and the response to treatment.
A Lot Going On Beneath The Surface

Signs & Symptoms
Diagnosis of Asthma: Chief Complaint

- Identify the symptoms likely to be due to asthma
- And that support the likelihood of asthma

  - History of any of the following:
    - Cough, worse particularly at night
    - Recurrent wheezes
    - Recurrent difficulty breathing
    - Recurrent chest tightness
    - Recurrent bronchitis

  - Wheezing – high – pitched whistling sounds when breathing out – especially in children (Warning: Lack of wheezing and a normal chest examination do not exclude asthma)
Symptoms occur or worsen in the presence of:
- Exercise
- Viral infection
- Animals with fur or hair
- House – dust mites (in mattresses, pillows, upholstered furniture, carpets)
- Mold
- Smoke (Tobacco, Wood)
- Pollen
- Changes in weather
- Strong emotional expression (laughing or crying hard)
- Airborne chemicals or dusts
- Menstrual cycles
- Work Related Asthma, RADS & Work Exacerbated Asthma

Symptoms occur or worsen at night awakening the patient
Diagnosis of Asthma: Physical Examination

- **Chest (Lower Respiratory Tract) - Inspection**
- Absence of these findings **does not rule out asthma**

- Hyper – expansion (hyperinflation) of the thorax
- Appearance of hunched shoulders
Diagnosis of Asthma: Physical Examination

- Focused in the upper respiratory tract, chest and skin
- Absence of these findings **does not rule out asthma**

  - Prolonged expiratory phase during forced exhalation (**Inspection**)
  - Use of accessory muscles of respiration (**Inspection**)
  - Hyper resonance (**Percussion**)
  - Sounds of wheezing during normal breathing (**Auscultation**)

- Absence of these findings **does not rule out asthma**
Diagnosis of Asthma: Physical Examination

- **Upper Respiratory Tract & Skin**
  - Absence of these findings **does not rule out asthma**
  - Increased nasal secretions
  - Increased nasal mucosal swelling
  - Nasal polyps

- **Skin**
  - Atopic dermatitis
  - Eczema

- **Nose**
Diagnosis of Asthma: Lab & X rays

• Immunoglobulin E
  ✔ High levels in allergic asthma

• Chest X ray
  ✔ Normal or Hyperinflation
A Lot Going On Beneath The Surface

Airway inflammation

Signs & Symptoms
Features of Airway Remodeling

- Allergens & Irritants
- Mucus Hypersecretion
- Subepithelial Fibrosis
- Smooth Muscle Hypertrophy
- Angiogenesis

**Pathophysiology & Pathogenesis**

**FIGURE 2-2. FACTORS LIMITING AIRFLOW IN ACUTE AND PERSISTENT ASTHMA**

- Allergens, Irritants & Inflammatory Products
A Lot Going On Beneath The Surface

Signs & Symptoms

Bronchial hyperresponsiveness

Airway inflammation
A Lot Going On Beneath The Surface

Airway inflammation
Airflow obstruction
Bronchial hyperresponsiveness
Airway inflammation

Signs & Symptoms
Pulmonary Function: Forced Spirometry

Flow Volume Loops:
- Flow (liters/sec)
- Exp
- FRC
- RV
- TLC
- Insp
- Volume (liters)

Flow-Volume Plot:
- Lung force vector
- Chest wall force vector

Volume Time Curve:
- VC = Vital Capacity
- VT = Tidal Volume
- TLC = Total Lung Capacity
- FRC = Functional Residual Capacity
- RV = Residual Volume
- FVC = Forced Vital Capacity

Instructions to subject: "Take a deep breath in, blow out as fast and as hard as you can all the way."

Pause
Show FVC
Diagnosis of Asthma: Pulmonary Function

- Spirometry measurements – FEV$_1$, FVC, FEV$_1$/FVC before and after the patient inhales a short-acting bronchodilator should be undertaken for patients in whom the diagnosis of asthma is being considered, including children $\geq$ 5 years of age.

- These measurements help to determine whether:
  - There is airflow obstruction,
  - Severity
  - Reversibility over the short term

- Office-based physicians who care for asthma patients should have access to spirometry.
  - For diagnosis and periodic monitoring
  - Equipment and techniques should meet standards developed by the American Thoracic Society
Typical Spirometric (FVC & FEV$_1$) Tracings

- Normal Subject
- Asthmatic (After Bronchodilator)
- Asthmatic (Before Bronchodilator)

Volume (liters)

Time (seconds)

FEV$_1$

FVC
Pulmonary Function Interpretation ATS – ERS

**Interpretative strategies for lung function tests**


**TABLE 6** Severity of any spirometric abnormality based on the forced expiratory volume in one second (FEV1)

<table>
<thead>
<tr>
<th>Degree of severity</th>
<th>FEV1 % pred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>&gt;70</td>
</tr>
<tr>
<td>Moderate</td>
<td>60–69</td>
</tr>
<tr>
<td>Moderately severe</td>
<td>50–59</td>
</tr>
<tr>
<td>Severe</td>
<td>35–49</td>
</tr>
<tr>
<td>Very severe</td>
<td>&lt;35</td>
</tr>
</tbody>
</table>

% pred: % predicted.

**LLN = Lower Limit of Normal of Predicted Values**

**Flowchart:**
- **FEV1/VC ≥ LLN**
  - Yes
    - **VC ≥ LLN**
      - Yes
        - **TLC ≥ LLN**
          - Yes: Normal
          - No: Restriction
      - No: Obstruction
  - No
    - **VC ≥ LLN**
      - Yes
        - **TLC ≥ LLN**
          - Yes: Normal
          - No: Emphysema
      - No: Mixed defect

**Legend:**
- **DL_co ≥ LLN**
- **PV disorders**
- **CW and NM disorders**
- **ILD Pneumonitis**
- **Asthma CB**
Measuring Airway Responsiveness

© Global Initiative for Asthma
Differential Diagnosis of Asthma

- Adults
  - COPD (Chronic Bronchitis or Emphysema)
  - Congestive Heart Failure
  - Pulmonary Embolism
  - Mechanical Obstruction of the Airways (Benign or Malignant tumor)
  - Pulmonary Infiltration with Eosinophilia
  - Cough secondary to drugs (ACE inhibitors)
  - Vocal cord dysfunction
  - Obstructive Sleep Apnea
Differential Diagnosis of Asthma

- **Infants and children**
  - Upper airway disease
    - Allergic rhinitis and sinusitis
  - Obstruction involving large airways
    - Foreign body in trachea or bronchus
    - Vocal cord dysfunction
    - Vascular rings or laryngeal webs
    - Laryngotracheomalacia, tracheal stenosis or bronchostenosis
    - Enlarged lymph nodes or tumor
  - Obstruction involving small airways
    - Viral bronchitis
    - Cystic fibrosis
    - Bronchopulmonary dysplasia
    - Heart disease
  - Aspiration due to gastroesophageal reflux
CASE STUDIES
You evaluate a 23-year-old man with a long history of recurrent coughing who was recently seen in the urgent care due to a severe cough. He was given oral steroids for 3 days and is improving. The patient has history of cigarette smoking 5 pack/years. His history is remarkable for several emergency room visits during the last three years for “bronchitis” during the winter. After further questioning, he complains of dyspnea on exertion.

- What is your differential diagnosis?
- What diagnostic tests would you recommend?
Forced Spirometry Results: Graphics

Key: FEV₁, forced expiratory volume in 1 second
Forced Spirometry Results: Pre and Post Bronchodilators

### Prebronchodilator

<table>
<thead>
<tr>
<th>Study: bronch</th>
<th>ID:</th>
<th>Height:</th>
<th>Test date:</th>
<th>Test time:</th>
<th>System:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age: 59</td>
<td>175 cm</td>
<td>8/7/06</td>
<td>9:38 a.m.</td>
<td>7 20 17</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trial</th>
<th>FVC</th>
<th>FEV₁</th>
<th>FEV₁/ FVC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.34</td>
<td>2.68</td>
<td>61.8%</td>
</tr>
<tr>
<td>2</td>
<td>4.44</td>
<td>2.62</td>
<td>58.9%</td>
</tr>
<tr>
<td>3</td>
<td>4.55</td>
<td>2.71</td>
<td>59.6%</td>
</tr>
</tbody>
</table>

#### Best Values

<table>
<thead>
<tr>
<th>Predicted Values*</th>
<th>Percent Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.23</td>
<td>107.8%</td>
</tr>
</tbody>
</table>

#### Reference Values

<table>
<thead>
<tr>
<th>Difference (L)</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.22</td>
<td>4.8%</td>
</tr>
</tbody>
</table>

### Postbronchodilator

<table>
<thead>
<tr>
<th>Study: bronch</th>
<th>ID:</th>
<th>Height:</th>
<th>Test date:</th>
<th>Test time:</th>
<th>System:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age: 59</td>
<td>175 cm</td>
<td>8/7/06</td>
<td>9:58 a.m.</td>
<td>7 20 17</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trial</th>
<th>FVC</th>
<th>FEV₁</th>
<th>FEV₁/ FVC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.73</td>
<td>2.94</td>
<td>62.2%</td>
</tr>
<tr>
<td>2</td>
<td>4.76</td>
<td>3.07</td>
<td>64.5%</td>
</tr>
<tr>
<td>3</td>
<td>4.78</td>
<td>3.04</td>
<td>63.5%</td>
</tr>
</tbody>
</table>

#### Best Values

<table>
<thead>
<tr>
<th>Predicted Values*</th>
<th>Percent Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.56</td>
<td>79.7%</td>
</tr>
</tbody>
</table>

#### Reference Values

<table>
<thead>
<tr>
<th>Difference (L)</th>
<th>Difference (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.36</td>
<td>13.4%</td>
</tr>
</tbody>
</table>

**FEV₁ increased 360 ml**

What is your diagnosis?
Allergen and Irritant Exposure Control

Clinicians should review each patient’s exposure to allergens and irritants and provide a multipronged strategy to reduce exposure to those allergens and irritants to which a patient is sensitive and exposed, i.e. that make the patient’s asthma worse.
Major Triggers

- Tobacco smoke
- Dust mites
- Animal dander
- Cockroach allergens
- Indoor mold
- Wood smoke
- Formaldehyde
- Volatile organic compounds

- Air pollution
- Cold, damp, windy, stormy weather
- Sudden temperature changes
- Weeds, trees, grass
- Strenuous exercise
- Respiratory infections
- Common food allergies
“You could pretend that you're on the planet Venus. And looking at the air, that doesn't take much imagination these days.”
TREATMENT OF ASTHMA
Benchmarks of Good Asthma Control

- Prevent exacerbations
- No coughing or wheezing
- No shortness of breath or rapid breathing
- No waking up at night
- Normal physical activities
- No school absences due to asthma
- No missed time from work for the patient, parent or caregiver
- Maintain pulmonary function as close to normal levels as possible
- Avoid adverse effects from asthma medications
- Prevent asthma mortality
Key Point #1

• Appropriate asthma management requires the proper use of long term control and quick-relief medications.
Selecting Appropriate Medications

- **Quick-relief medications**
  - *Short acting beta2-agonists* - relief of acute symptoms
  - *Anticholinergics* - may provide additive benefit to beta2 drugs in severe exacerbation. May be alternative to beta2-agonists
  - *Systemic steroids* - moderate-to-severe persistent asthma in acute exacerbations or to prevent recurrence of exacerbations
Safety of Short-Acting Beta$_2$-Agonists (SABA’s)

- 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** (MDI nor Nebulized Respiratory Therapy)
Daily Respiratory Therapy with Albuterol Sulfate or Ipratropium Bromide Solution is not recommended for long term control of asthma
Selecting Appropriate Medications

• **Long-term control medications**
  - Daily inhaled corticosteroids
  - Leukotriene modifiers
  - Long-acting inhaled beta 2 agonists (should never be used alone)
  - Cromolyn and nedocromil
  - Methylxanthines
Treatment/Long Term Control

• Corticosteroids
  • ICS’s are the most effective long-term therapy available, are well tolerated & safe at recommended doses
    – Reduction in symptoms, improvement in PEF and spirometry, diminished airway hyper responsiveness, prevention of exacerbations
    – Suppresses: cytokine production, airway eosinophilic recruitment, chemical mediators
Inhaled Corticosteroids

• 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
Dose Response Curve of ICS
### Estimated Comparative Daily Dosages for ICS by Age (GINA 2009)

<table>
<thead>
<tr>
<th>Drug</th>
<th>FDA Max Daily Dose (mcg)</th>
<th>Low Dose mcg Age (yrs)</th>
<th>Medium Dose Age (yrs)</th>
<th>High Dose Age (yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beclomethasone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q var 40 HFA</td>
<td>≥ 12 y/o 640</td>
<td>200-500</td>
<td>&gt;500-1000</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>Q var 80 HFA</td>
<td>≥ 12 y/o 640</td>
<td>200-500</td>
<td>&gt;500-1000</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>Fluticasone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flovent (44,110,220)</td>
<td>Adult 880 Child 100</td>
<td>100-250</td>
<td>&gt;250-500</td>
<td>&gt;500</td>
</tr>
<tr>
<td>Fluticasone/Salmeterol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advair 100 – 50 (LABA Salmeterol)</td>
<td>≥12y/o 500/50 twice 4-11y/o 100/50 twice</td>
<td>100-250</td>
<td>&gt;250-500</td>
<td>&gt;500</td>
</tr>
<tr>
<td>Advair 250– 50</td>
<td></td>
<td>100-250</td>
<td>&gt;250-500</td>
<td>&gt;500</td>
</tr>
<tr>
<td>Advair 500-50</td>
<td></td>
<td>100-250</td>
<td>&gt;250-500</td>
<td>&gt;500</td>
</tr>
<tr>
<td>Drug</td>
<td>FDA Max Daily Dose (mcg)</td>
<td>Low Dose mcg</td>
<td>Medium Dose</td>
<td>High Dose</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------</td>
<td>--------------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age (yrs)</td>
<td>Age (yrs)</td>
<td>Age (yrs)</td>
</tr>
<tr>
<td>Budesonide</td>
<td></td>
<td>&gt; 5</td>
<td>&lt; 5</td>
<td>&gt; 5</td>
</tr>
<tr>
<td>Pulmicort 90 DPI</td>
<td>Adult 1200</td>
<td>200-600</td>
<td>&gt;600-1000</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>(80 mcg)</td>
<td>Child 400</td>
<td>100-200</td>
<td>&gt;200-400</td>
<td></td>
</tr>
<tr>
<td>Pulmicort 180 DPI</td>
<td>Adult 1200</td>
<td>200-600</td>
<td>&gt;600-1000</td>
<td>&gt;1000</td>
</tr>
<tr>
<td>(160 mcg)</td>
<td>Child 400</td>
<td>100-200</td>
<td>&gt;200-400</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Budesonide/</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formoterol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symbicort 80/4.5</td>
<td>≥ 12y/o 640/18</td>
<td>200-600</td>
<td>&gt;600-1000</td>
<td>&gt;1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100-200</td>
<td>&gt;200-400</td>
<td></td>
</tr>
<tr>
<td>Symbicort 160/4.5</td>
<td>≥ 12y/o 640/18</td>
<td>200-600</td>
<td>&gt;600-1000</td>
<td>&gt;1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100-200</td>
<td>&gt;200-400</td>
<td></td>
</tr>
<tr>
<td>Drug</td>
<td>FDA Max Daily Dose (mcg)</td>
<td>Low Dose mcg</td>
<td>Medium Dose</td>
<td>High Dose</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------------------------</td>
<td>--------------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age (yrs)</td>
<td>Age (yrs)</td>
<td>Age (yrs)</td>
</tr>
<tr>
<td>Mometasone Furoate</td>
<td></td>
<td>&gt; 5</td>
<td>&lt; 5</td>
<td>&gt; 5</td>
</tr>
<tr>
<td>Asmanex 110 &amp; 220</td>
<td>≥ 12y/o 220 twice 4-11 y/o 110 daily</td>
<td>200-400</td>
<td>100-200</td>
<td>&gt;400-800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;800 - 1200</td>
</tr>
<tr>
<td>Mometasone/ Formoterol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dulera 100/5</td>
<td>≥ 12y/o 800/20</td>
<td>200-400</td>
<td>100-200</td>
<td>&gt;400-800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;800 - 1200</td>
</tr>
<tr>
<td>Dulera 200/5</td>
<td>≥ 12y/o 800/20</td>
<td>200-400</td>
<td>100-200</td>
<td>&gt;400-800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;800 - 1200</td>
</tr>
</tbody>
</table>
## Estimated Comparative Daily Dosages for ICS by Age (GINA 2009)

### Low Dose Inhaled Corticosteroids

- **Examples in patients > 5 y/o of age**

<table>
<thead>
<tr>
<th>ICS</th>
<th>Dose</th>
<th>24 hrs Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q var 80 mcg</td>
<td>2 – 3 inh q 12 hours</td>
<td>320 – 480 mcg</td>
</tr>
<tr>
<td>Flovent 110 mcg</td>
<td>1 inh q 12 hours</td>
<td>220 mcg</td>
</tr>
<tr>
<td>Pulmicort 160 mcg</td>
<td>1 inh q 12 hours</td>
<td>320 mcg</td>
</tr>
<tr>
<td>Asmanex 110 mcg</td>
<td>1 inh q 12 hours</td>
<td>220 mcg</td>
</tr>
<tr>
<td>Advair 100/50 mcg</td>
<td>1 inh q 12 hours</td>
<td>200 mcg</td>
</tr>
<tr>
<td>Symbicort 160/ 4.5 mcg</td>
<td>1 inh q 12 hours</td>
<td>320 mcg</td>
</tr>
<tr>
<td>Dulera 100/5 mcg</td>
<td>1 – 2 inh q 12 hours</td>
<td>200 – 400 mcg</td>
</tr>
<tr>
<td>Dulera 200/5 mcg</td>
<td>1 inh q 12 hours</td>
<td>400 mcg</td>
</tr>
</tbody>
</table>
#### Estimated Comparative Daily Dosages for ICS by Age (GINA 2009)

### Medium Dose Inhaled Corticosteroids

- **Examples in patients > 5 y/o of age**

<table>
<thead>
<tr>
<th>ICS</th>
<th>Dose</th>
<th>24 hrs Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q var 80 mcg</td>
<td>4 inh q 12 hours</td>
<td>640 mcg *</td>
</tr>
<tr>
<td>Flovent 110 mcg</td>
<td>2 inh q 12 hours</td>
<td>440 mcg</td>
</tr>
<tr>
<td>Pulmicort 160 mcg</td>
<td>2 inh q 12 hours</td>
<td>640 mcg</td>
</tr>
<tr>
<td>Asmanex 220 mcg</td>
<td>1 inh q 12 hours</td>
<td>440 mcg *</td>
</tr>
<tr>
<td>Advair 250/50 mcg</td>
<td>1 inh q 12 hours</td>
<td>500 mcg</td>
</tr>
<tr>
<td>Symbicort 160/ 4.5 mcg</td>
<td>2 inh q 12 hours</td>
<td>640 mcg *</td>
</tr>
<tr>
<td>Dulera 100/5 mcg</td>
<td>Max Formoterol 20</td>
<td>600 – 800 mcg*</td>
</tr>
<tr>
<td>Dulera 200/5 mcg</td>
<td>2 inh q 12 hrs</td>
<td>400 – 800 mcg*</td>
</tr>
</tbody>
</table>

* *Maximum Recommended Dose*
## High Dose Inhaled Corticosteroids

- **Examples in patients > 5 y/o of age**

<table>
<thead>
<tr>
<th>ICS</th>
<th>Dose</th>
<th>24 hrs Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q var 80 mcg</td>
<td>&gt; 1000 mcg</td>
<td>640 mcg *</td>
</tr>
<tr>
<td><strong>Flovent 220 mcg</strong></td>
<td>1 - 2 inh q 12 hours</td>
<td>440 – 880 mcg*</td>
</tr>
<tr>
<td><strong>Pulmicort 160 mcg</strong></td>
<td>3 inh AM 4 inh PM</td>
<td>1200 mcg *</td>
</tr>
<tr>
<td>Asmanex 220 mcg</td>
<td>800 – 1200 mcg</td>
<td>440 mcg *</td>
</tr>
<tr>
<td><strong>Advair 500/50 mcg</strong></td>
<td>1 inh q 12 hours</td>
<td>1000 mcg *</td>
</tr>
<tr>
<td>Symbicort 160/ 4.5 mcg</td>
<td>&gt; 1000 mcg</td>
<td>640 mcg *</td>
</tr>
<tr>
<td>Dulera 100/5 mcg</td>
<td>&gt; 800 – 1200 mcg</td>
<td>800 mcg*</td>
</tr>
<tr>
<td>Dulera 200/5 mcg</td>
<td>&gt; 800 - 1200 mcg</td>
<td>800 mcg *</td>
</tr>
</tbody>
</table>

* Maximum Recommended Dose

---

**Estimated Comparative Daily Dosages for ICS by Age (GINA 2009)**
<table>
<thead>
<tr>
<th>Drug</th>
<th>FDA Max Daily Dose (mcg)</th>
<th>Low Dose mcg</th>
<th>Medium Dose</th>
<th>High Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Age (yrs)</td>
<td>Age (yrs)</td>
<td>Age (yrs)</td>
</tr>
<tr>
<td>Beclomethasone</td>
<td></td>
<td>≥ 12, 5 - 11</td>
<td>≥ 12, 5 - 11</td>
<td>≥ 12, 5 - 11</td>
</tr>
<tr>
<td>Q var 40 HFA</td>
<td>≥ 12 y/o 640</td>
<td>80 – 240 mcg</td>
<td>&gt; 240 – 480 mcg</td>
<td>&gt; 160-320</td>
</tr>
<tr>
<td>Q var 80 HFA</td>
<td>≥ 12 y/o 640</td>
<td>80 – 240 mcg</td>
<td>&gt; 240 – 480 mcg</td>
<td>&gt; 160-320</td>
</tr>
<tr>
<td>Fluticasone</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flovent (44,110,220)</td>
<td>Adult 880 Child 100</td>
<td>100 – 300</td>
<td>&gt; 300 – 500</td>
<td>&gt; 500</td>
</tr>
<tr>
<td>Fluticasone/Salmeterol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advair 100 – 50 (LABA Salmeterol)</td>
<td>&gt;12y/o 500/50 twice 4-11y/o 100/50 twice</td>
<td>100 – 300</td>
<td>&gt; 300 – 500</td>
<td>&gt; 500</td>
</tr>
<tr>
<td>Advair 250– 50</td>
<td></td>
<td>100 – 300</td>
<td>&gt; 300 – 500</td>
<td>&gt; 500</td>
</tr>
<tr>
<td>Advair 500-50</td>
<td></td>
<td>100 – 300</td>
<td>&gt; 300 – 500</td>
<td>&gt; 500</td>
</tr>
<tr>
<td>Drug</td>
<td>FDA Max Daily Dose (mcg)</td>
<td>Low Dose mcg</td>
<td>Medium Dose</td>
<td>High Dose</td>
</tr>
<tr>
<td>-----------------------</td>
<td>--------------------------</td>
<td>--------------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age (yrs)</td>
<td>Age (yrs)</td>
<td>Age (yrs)</td>
</tr>
<tr>
<td><strong>Budesonide</strong></td>
<td></td>
<td>≥ 12</td>
<td>5 - 11</td>
<td>≥ 12</td>
</tr>
<tr>
<td>Pulmicort 90 DPI</td>
<td>Adult 1200 Child 400</td>
<td>180 – 600</td>
<td>&gt;600-1200</td>
<td>&gt;1200</td>
</tr>
<tr>
<td>(80 mcg)</td>
<td></td>
<td>180 -400</td>
<td>&gt;400-800</td>
<td>&gt;800</td>
</tr>
<tr>
<td>Pulmicort 180 DPI</td>
<td>Adult 1200 Child 400</td>
<td>180 – 600</td>
<td>&gt;600-1200</td>
<td>&gt;1200</td>
</tr>
<tr>
<td>(160 mcg)</td>
<td></td>
<td>180 -400</td>
<td>&gt;400-800</td>
<td>&gt;800</td>
</tr>
<tr>
<td><strong>Budesonide/Formoterol</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symbicort 80/4.5</td>
<td>≥ 12y/o 640/18</td>
<td>180 – 600</td>
<td>&gt;600-1200</td>
<td>&gt;1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>180 -400</td>
<td>&gt;400-800</td>
<td>&gt;800</td>
</tr>
<tr>
<td>Symbicort 160/4.5</td>
<td>≥ 12y/o 640/18</td>
<td>180 – 600</td>
<td>&gt;600-1200</td>
<td>&gt;1200</td>
</tr>
<tr>
<td></td>
<td></td>
<td>180 -400</td>
<td>&gt;400-800</td>
<td>&gt;800</td>
</tr>
<tr>
<td>Drug</td>
<td>FDA Max Daily Dose (mcg)</td>
<td>Low Dose mcg</td>
<td>Medium Dose</td>
<td>High Dose</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------------------</td>
<td>--------------</td>
<td>-------------</td>
<td>-----------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Age (yrs)</td>
<td>Age (yrs)</td>
<td>Age (yrs)</td>
</tr>
<tr>
<td>Mometasone Furoate</td>
<td></td>
<td>≥ 12</td>
<td>5 - 11</td>
<td>≥ 12</td>
</tr>
<tr>
<td>Asmanex 110 &amp; 220</td>
<td>≥ 12y/o 220 twice 4-11 y/o 110 daily</td>
<td>200</td>
<td>NA</td>
<td>400</td>
</tr>
<tr>
<td>Mometasone/ Formoterol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dulera 100/5</td>
<td>≥ 12y/o 800/20</td>
<td>200</td>
<td>NA</td>
<td>400</td>
</tr>
<tr>
<td>Dulera 200/5</td>
<td>≥ 12y/o 800/20</td>
<td>200</td>
<td>NA</td>
<td>400</td>
</tr>
</tbody>
</table>
Low Dose Inhaled Corticosteroids

- Examples in patients ≥ 12 y/o of age

<table>
<thead>
<tr>
<th>ICS</th>
<th>Dose</th>
<th>24 hrs Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q var 40 mcg</td>
<td>2 – 3 inh q 12 hours</td>
<td>80 – 240 mcg</td>
</tr>
<tr>
<td>Flovent 110 mcg</td>
<td>1 inh q 12 hours</td>
<td>220 mcg</td>
</tr>
<tr>
<td>Pulmicort 160 mcg</td>
<td>1 inh q 12 hours</td>
<td>320 mcg</td>
</tr>
<tr>
<td>Asmanex 110 mcg</td>
<td>1 inh q 12 hours</td>
<td>220 mcg</td>
</tr>
<tr>
<td>Advair 100/50 mcg</td>
<td>1 inh q 12 hours</td>
<td>160 mcg</td>
</tr>
<tr>
<td>Symbicort 160 / 4.5 mcg</td>
<td>1 inh q 12 hours</td>
<td>320 mcg</td>
</tr>
<tr>
<td>Dulera 100/5 mcg</td>
<td>1 inh q 12 hours</td>
<td>200</td>
</tr>
</tbody>
</table>
### Medium Dose Inhaled Corticosteroids

- **Examples in patients > 12 y/o of age**

<table>
<thead>
<tr>
<th>ICS</th>
<th>Dose</th>
<th>24 hrs Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q var 80 mcg</td>
<td>2 inh q 12 hours</td>
<td>320 mcg</td>
</tr>
<tr>
<td>Flovent 110 mcg</td>
<td>2 inh q 12 hours</td>
<td>440 mcg</td>
</tr>
<tr>
<td>Pulmicort 160 mcg</td>
<td>2 - 3 inh q 12 hours</td>
<td>960 mcg</td>
</tr>
<tr>
<td>Asmanex 220 mcg</td>
<td>1 inh q 12 hours</td>
<td>440 mcg *</td>
</tr>
<tr>
<td>Advair 250/50 mcg</td>
<td>1 inh q 12 hours</td>
<td>500 mcg</td>
</tr>
<tr>
<td>Symbicort 160/ 4.5 mcg</td>
<td>2 inh q 12 hours</td>
<td>640 mcg *</td>
</tr>
<tr>
<td>Dulera 100/5 mcg</td>
<td>2 inh q 12 hours</td>
<td>400 mcg</td>
</tr>
<tr>
<td>Dulera 200/5 mcg</td>
<td>1 inh q 12 hrs</td>
<td>400 mcg</td>
</tr>
</tbody>
</table>

* Maximum Recommended Dose
## High Dose Inhaled Corticosteroids
- **Examples in patients > 12 y/o of age**

<table>
<thead>
<tr>
<th>ICS</th>
<th>Dose</th>
<th>24 hrs Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q var 80 mcg</td>
<td>3 inh q 12 hours</td>
<td>480 mcg</td>
</tr>
<tr>
<td>Flovent 220 mcg</td>
<td>1 - 2 inh q 12 hours</td>
<td>440 – 880 mcg*</td>
</tr>
<tr>
<td>Pulmicort 160 mcg</td>
<td>3 inh AM 4 inh PM q 12 hours</td>
<td>1200 mcg *</td>
</tr>
<tr>
<td>Asmanex 220 mcg</td>
<td>1 inh q 12 hours</td>
<td>440 mcg *</td>
</tr>
<tr>
<td>Advair 500/50 mcg</td>
<td>1 inh q 12 hours</td>
<td>1000 mcg *</td>
</tr>
<tr>
<td>Symbicort 160/ 4.5 mcg</td>
<td>&gt; 1200 mcg</td>
<td>640 mcg *</td>
</tr>
<tr>
<td>Dulera 100/5 mcg</td>
<td>Max Formoterol 20</td>
<td>800 mcg *</td>
</tr>
<tr>
<td>Dulera 200/5 mcg</td>
<td>2 inh q 12 hours</td>
<td>800 mcg *</td>
</tr>
</tbody>
</table>

* Maximum Recommended Dose
Treatment/Long Term Control

• Cromolyn (Intal) & Nedocromil (Tilade)
  – Have distinctive properties
  – Similar anti-inflammatory reactions
    • blocks Cl⁻ channels
    • modulate mast cell mediator release
    • modulate eosinophilic recruitment
    • inhibits early and late asthmatic response to antigen challenge
Treatment/Long Term Control

- Cromolyn (Intal) & nedocromil (Tilade)
  - Similar anti-inflammatory reactions
    - inhibits bronchospasm (exercise, cold dry air, bradykinin aerosol)
    - nedocromil more potent in inhibiting bronchospasm in the above situations
  - Both reduce asthma symptoms
    - improve Peak Flow
    - reduce need for short acting beta2 agonists
• Long-acting beta-2 agonists
  – Relax airway smooth muscle
  – Duration of action >12 hrs
  – Not used in acute exacerbations
  – Adjunct to anti-inflammatory treatment for long-term symptom control especially nocturnal symptoms
FDA Recommendations for LABA’s
February 2010

- Are contraindicated without the use of an asthma controller medication such as an ICS
- Single-ingredient LABAs should only be used in combination with an asthma ICS controller medication; they should not be used alone
- Should only be used long-term in patients whose asthma cannot be adequately controlled on asthma controller medications
FDA Recommendations for LABA’s Cont.

- Should be used for the shortest duration of time required to achieve control of asthma symptoms and discontinued, if possible, once asthma control is achieved

- Patients should then be maintained on an asthma controller medication

- Pediatric and adolescent patients who require the addition of a LABA to an ICS should use a combination product containing both an ICS and a LABA, to ensure compliance with both medications
Selecting Appropriate Medications

- **Combination medicines**
  - Inhaled corticosteroid and long-acting Beta 2 Agonist combination
Treatment/Long Term Control

- Methylxanthines (Theophillines)
  - Provides mild-moderate bronchodilation
  - Low dose has mild anti-inflammatory action
  - Sustained release form used as alternative but not preferred to long-acting beta$_2$ agonists to control nocturnal symptoms
  - Use may be necessary because of cost or patient compliance
  - Monitor serum levels periodically (10 – 20 mcg/ml)
  - Metabolism affected by multiple factors
Treatment/Long Term Control

• Leukotriene modifiers
  – Leukotrienes are potent biochemical mediators released from mast cells, eosinophils, and basophils that:
    • contract bronchial smooth muscle
    • increase vascular permeability
    • increase mucus secretions
    • attract & activate inflammatory cells in airways
Treatment/Long Term Control

• Leukotriene modifiers
  – Zafirlukast (Accolate), Montelukast (Singulair) & zileuton (Zyflo) (oral tabs)
    • improves lung function and diminishes symptoms & need for short-acting beta$_2$ agonists
  – Studies in mild-moderate asthma showing modest improvements
Treatment/Long Term Control

- Leukotriene modifiers
  - Zafirlukast (accolate) - leuktriene receptor antagonist
    - attenuates late response to inhaled allergen and post-allergen induced bronchospasm
    - modest improvement in FEV$_1$ (11% > placebo)
    - improved symptoms
    - reduced albuterol use
  - Warning - increases warfarin half-life and PT & PTT must be monitored with dose adjustment when indicated
Treatment/Long Term Control

• Leukotriene modifiers
  – Zileuton (Zyflo) - 5-lipoxygenase inhibitor
    • provides immediate & sustained improvement in 
      $\text{FEV}_1$ (mean 15% > placebo) in mild-to-moderate 
      asthma
    • moderate asthmatics had fewer exacerbations 
      requiring oral steroids
    • attenuates bronchospasm from exercise & from 
      aspirin in sensitive people
    • inhibits metabolism of theophylline, warfarin, and 
      must be monitored
Treatment/Long Term Control

• Omalizumab (Xolair)
  – Anti inflammatory properties
    • Binds to free IgE and prevents its interaction with mast cells and basophils
  – Use in moderate to severe persistent asthma
  – Indicated if the serum IgE is between 30 and 700 Int units/ml and has patient’s weight exclusion criteria
  – Should have proven allergic sensitization with skin test or allergen specific IgE to perennial allergen (such as dust mite, animal dander, cockroach or molds)
“Mezclita” is not recommended for acute nor long term treatment of asthma.
• Assessment of **severity** and **control** forms the basis of the treatment plan.

  – **Severity** is assessed **before** the patient is provided **treatment**.

  – **Control** is determined once a **treatment regimen** has been **initiated**.
Current Impairment and Future Risk

- Asthma severity and asthma control include two domains.
  - **Current impairment**: frequency and intensity of the patient’s symptoms and functional limitations (current or recent)
  - **Risk**: likelihood of untoward events (exacerbations, progressive loss of lung function, or medication side effects)
Asthma Severity

All patients should have an initial severity assessment based on measures of current impairment and future risk in order to determine type and level of initial therapy needed.

Priority Message from the EPR-3 Guidelines Implementation Panel
Asthma Severity & Control History

- Frequency of symptoms
- Nighttime awakenings
- Short-acting beta\textsubscript{2}-agonist use for symptom control (not prevention of Exercise Induced Bronchospasm)
- Interference with normal activity
- Lung function
- Exacerbations requiring oral systemic corticosteroids
- Daily use of controlling medications

Priority Message from the EPR-3 Guidelines Implementation Panel
Assessing Asthma Severity
Before Taking Long Term Control Medications
## Asthma Severity Chart

### Classifying Asthma Severity in Youths > 12 Years of Age and Adults

NOT currently taking long-term control medication.

<table>
<thead>
<tr>
<th>Components of Severity</th>
<th>Classification of Asthma Severity (≥ 12 years of age)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impairment</strong></td>
<td></td>
</tr>
<tr>
<td>Normal FEV₁/FVC</td>
<td></td>
</tr>
<tr>
<td>8 – 19 yrs 85%</td>
<td></td>
</tr>
<tr>
<td>20 – 30 yrs 80%</td>
<td></td>
</tr>
<tr>
<td>40 – 59 yrs 75%</td>
<td></td>
</tr>
<tr>
<td>60 – 80 yrs 70%</td>
<td></td>
</tr>
<tr>
<td><strong>Symptoms</strong></td>
<td></td>
</tr>
<tr>
<td>≤2 days/week</td>
<td>&gt;2 days/week but not daily</td>
</tr>
<tr>
<td>≤2x/month</td>
<td>3–4x/month</td>
</tr>
<tr>
<td>≤2 days/week</td>
<td>&gt;2 days/week but not daily, and not more than 1X on any day</td>
</tr>
<tr>
<td><strong>Nighttime awakenings</strong></td>
<td></td>
</tr>
<tr>
<td>≤2x/month</td>
<td>3–4x/month</td>
</tr>
<tr>
<td>≤2 days/week</td>
<td>&gt;2 days/week but not daily, and not more than 1X on any day</td>
</tr>
<tr>
<td><strong>Interference with normal activity</strong></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>Minor limitation</td>
</tr>
<tr>
<td>None</td>
<td>Some limitation</td>
</tr>
<tr>
<td>None</td>
<td>Extremely limited</td>
</tr>
<tr>
<td><strong>Lung function</strong></td>
<td></td>
</tr>
<tr>
<td>Normal FEV₁ between exacerbations</td>
<td>FEV₁ = &gt;80% predicted</td>
</tr>
<tr>
<td>≥80% predicted</td>
<td>FEV₁/FVC normal</td>
</tr>
<tr>
<td>≥80% predicted</td>
<td>FEV₁/FVC reduced 5%</td>
</tr>
<tr>
<td>≥80% predicted</td>
<td>FEV₁ &lt;60% predicted</td>
</tr>
<tr>
<td>≥80% predicted</td>
<td>FEV₁/FVC reduced &gt;5%</td>
</tr>
</tbody>
</table>

| **Risk**                |                                                      |
| Exacerbations requiring oral systemic corticosteroids | 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.

Key: EIB, exercise-induced bronchospasm; FEV₁, forced expiratory volume in second; FVC, forced vital capacity; ICU, intensive care unit.
### Asthma Severity Chart

**CLASSIFYING ASTHMA SEVERITY IN CHILDREN 5–11 YEARS OF AGE NOT currently taking long-term control medication.**

<table>
<thead>
<tr>
<th>Components of Severity</th>
<th>Classification of Asthma Severity (Children 5–11 years of age)</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>≤2 days/week</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤2x/month</td>
</tr>
<tr>
<td>Short-acting beta₂-agonist use for symptom control (not prevention of EIB)</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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk</th>
<th>Exacerbations requiring oral systemic corticosteroids</th>
<th>0–1/year</th>
<th>≥2 in 1 year</th>
</tr>
</thead>
</table>

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.

Key: EIB, exercise-induced bronchospasm; FEV₁, forced expiratory volume in second; FVC, forced vital capacity; ICU, intensive care unit.
CASE STUDIES OF ASTHMA SEVERITY
You meet a 3-year-old boy with a long history of recurrent coughing who was recently seen in the urgent care due to a severe cough. He was given oral steroids for 3 days and is improving, according to his mother. The child is happy and playful in the room with you. His history is remarkable for several emergency room visits between 6 months and 18 months of age for “bronchitis” during the winter. After further questioning, the mother notes the child has a daily cough, chest tightness and shortness of breath. He awakes one night monthly with severe cough and vomits clear sputum.

- **What is your differential diagnosis?**
- **What level of severity does this patient have?**
### Asthma Severity Chart

**FIGURE 3–4a. CLASSIFYING ASTHMA SEVERITY IN CHILDREN 0–4 YEARS OF AGE**
Classifying severity in children who are not currently taking long-term control medication.

<table>
<thead>
<tr>
<th>Components of Severity</th>
<th>Classification of Asthma Severity (Children 0–4 years of age)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intermittent</td>
</tr>
<tr>
<td><strong>Impairment</strong></td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>0</td>
</tr>
<tr>
<td>Short-acting beta₂-agonist use for symptom control (not prevention of EIB)</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td></td>
</tr>
<tr>
<td>Exacerbations requiring oral systemic corticosteroids</td>
<td>0–1/year</td>
</tr>
</tbody>
</table>

Exacerbations of any severity may occur in patients in any severity category.

Classifying severity in patients after asthma becomes well controlled, by lowest level of treatment required to maintain control.

<table>
<thead>
<tr>
<th>Lowest level of treatment required to maintain control</th>
<th>Classification of Asthma Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>(See figure 4–1a for treatment steps.)</td>
<td>Intermittent</td>
</tr>
<tr>
<td>Step 1</td>
<td>Step 2</td>
</tr>
</tbody>
</table>

Key: EIB, exercise-induced bronchospasm
Key Point #3

Managing Asthma Long Term
“The Stepwise Approach”
Stepwise Approach for Managing Asthma in Youths ≥12 Years of Age & Adults

**Persistent Asthma: Daily Medication**
Consult 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 + LABA
OR – Medium dose ICS
Alternative: Low-dose ICS + either LTRA, Theophylline, or Zileuton

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

**Step 4**
Preferred: High Dose ICS + LABA
AND
Consider Omalizumab for patients who have allergies

**Step 5**
Preferred: High dose ICS + LABA + oral corticosteroid
AND
Consider Omalizumab for patients who have allergies

**Step 6**
Preferred: High dose ICS + LABA + oral corticosteroid
AND
Consider Omalizumab for patients who have allergies

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

Each Step: Patient Education and Environmental Control and management of comorbidities
Steps 2 – 4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma.

- Quick-relief medication for **ALL** patients -SABA as needed for symptoms: up to 3 tx @ 20 minute intervals prn. Short course of o systemic corticosteroids may be needed.
- Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control & the need to step up treatment.
**Persistent Asthma: Daily Medication**

Consult asthma specialist if step 4 care or higher is required. Consider consultation at step 3.

**Stepwise Approach for Managing Asthma in Youths ≥12 Years of Age & Adults**

**Step 1**
- **Preferred:** Quick Relief SABA
  - Pro Air HFA: 2 inh q 4 – 6 hours
  - Ventolin HFA: 2 inh q 4 – 6 hours
  - Proventil HFA: 2 inh q 4 – 6 hours
  - Xopenex HFA: 2 inh q 6 hours

**Step 2**
- **Preferred:** Low dose ICS
- **Alternative:** Cromolyn, LTRA, Nedocromil or Theophylline

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

**Step 4**
- **Preferred:** Medium dose ICS + LABA
- **Alternative:** Medium-dose ICS + either LTRA, Theophylline, or Zileuton

**Step 5**
- **Preferred:** High dose ICS + LABA
- **AND** Consider Omalizumab for patients who have allergies

**Step 6**
- **Preferred:** High dose ICS + LABA + oral corticosteroid
- **AND** Consider Omalizumab for allergic asthma

Each Step: Patient Education and Environmental Control and management of comorbidities

Steps 2 – 4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma.

**Assess control**

Step up if needed (first check adherence, environmental control & comorbid conditions)

Step down if possible (and asthma is well controlled at least 3 months)

- **Quick-relief medication intervals prn. Short course of systemic corticosteroids may be needed.**
- **Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control & the need to step up treatment.**
**Stepwise Approach for Managing Asthma in Youths ≥12 Years of Age & Adults**

### Mild Persistent Asthma

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

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

### Stepwise Care

**Step 2**
- **Preferred:** Low Dose ICS (GINA 2009)
  - Flovent 110 mcg → 1 inh q 12 hours
  - Pulmicort 160 mcg → 1 inh q 12 hours
  - Asmanex 110 mcg → 1 inh q 12 hours

**Step 3**
- **Preferred:** Low-dose ICS + LABA OR – Medium dose ICS
  - Flovent 110 mcg → 1 inh q 12 hours
  - Pulmicort 160 mcg → 1 inh q 12 hours
  - Asmanex 110 mcg → 1 inh q 12 hours

### Step 4 Care or Higher

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

**Stepwise Approach**

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

### Step 2
- **Preferred:** SABA PRN
  - Flovent 110 mcg → 1 inh q 12 hours
  - Pulmicort 160 mcg → 1 inh q 12 hours
  - Asmanex 110 mcg → 1 inh q 12 hours

### Step 3
- **Preferred:** Low-dose ICS + LABA OR – Medium dose ICS
  - Flovent 110 mcg → 1 inh q 12 hours
  - Pulmicort 160 mcg → 1 inh q 12 hours
  - Asmanex 110 mcg → 1 inh q 12 hours

### Step 4
- **Preferred:** Medium Dose ICS + LABA
  - Flovent 110 mcg → 1 inh q 12 hours
  - Pulmicort 160 mcg → 1 inh q 12 hours
  - Asmanex 110 mcg → 1 inh q 12 hours

### Step 5
- **Preferred:** High Dose ICS + LABA
  - Flovent 110 mcg → 1 inh q 12 hours
  - Pulmicort 160 mcg → 1 inh q 12 hours
  - Asmanex 110 mcg → 1 inh q 12 hours

### Step 6
- **Preferred:** High dose ICS + LABA + oral corticosteroid
  - Flovent 110 mcg → 1 inh q 12 hours
  - Pulmicort 160 mcg → 1 inh q 12 hours
  - Asmanex 110 mcg → 1 inh q 12 hours

**Consider Omalizumab for patients who have allergies**

**Each Step:** Patient Education and Environmental Control and management of comorbidities

**Steps 2 – 4:** Consider subcutaneous allergen immunotherapy for patients who have allergic asthma

- Quick-relief medication for **ALL** patients -SABA as needed for symptoms: up to 3 tx @ 20 minute intervals prn. Short course of systemic corticosteroids may be needed.
- Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control & the need to step up treatment.
**Step 1**

**Preferred:**
- SABA PRN

**Step 2**

**Preferred:**
- Low dose ICS

**Alternative:**
- Cromolyn, LTRA, Nedocromil, or Theophylline

**Step 3**

**Preferred:**
- Low dose ICS + LABA
- OR - Medium dose ICS

**Alternative:**
- Low dose ICS + either LTRA, Theophylline, or Zileuton

**Step 4**

**Preferred:**
- Medium Dose ICS + LABA

**Alternative:**
- Medium dose ICS + either LTRA, Theophylline, or Zileuton

**Step 5**

**Preferred:**
- High Dose ICS + LABA
- AND - Consider Omalizumab for patients who have allergies

**Step 6**

**Preferred:**
- High dose ICS + LABA + Oral corticosteroid
- AND - Consider Omalizumab for patients who have allergies

---

**Moderate Persistent Asthma**

**Step 3 Alternative**

**Low Dose ICS (GINA 2009)**
- Q var 80 mcg
- Flovent 110 mcg

**Low Dose ICS (EPR3 2007)**
- Q var 40 mcg

**Plus either:**
- Singulair: 10 mg po daily
- Accolate: 20 mg po q 12 hrs
- Theodur (10 – 20 mcg/ml serum levels): 200 mg po q 12 hrs

**Step 3 Preferred**

**Low Dose ICS + LABA (GINA 2009)**
- Advair 100/50 mcg
- Symbicort 160/4.5 mcg
- Dulera 100/5 mcg
- Dulera 200/5 mcg

**Low Dose ICS + LABA (EPR3 2007)**
- Advair 100/50 mcg
- Symbicort 160 / 4.5 mcg
- Dulera 100/5 mcg

**Medium Dose ICS (GINA 2009)**
- Q var 80 mcg
- Flovent 110 mcg
- Pulmicort 160 mcg
- Asmanex 220 mcg

**Medium Dose ICS (EPR3 2007)**
- Q var 40 mcg
- Flovent 110 mcg
- Pulmicort 160 mcg
- Asmanex 220 mcg

---

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

- Step down if possible (and asthma is well controlled at least 3 months)

- Assess control
- Step up if needed (first check adherence, environmental control & comorbid conditions)

- Mild
- Moderate
- Severe
- OR - Medium Dose ICS (GINA 2009)
- Q var 80 mcg
- Flovent 110 mcg
- Pulmicort 160 mcg
- Asmanex 220 mcg
- Q var 80 mcg

- OR - Medium Dose ICS (EPR3 2007)
- Q var 40 mcg
- Flovent 110 mcg
- Pulmicort 160 mcg
- Asmanex 220 mcg

- Each Step: Patient Education and Environmental Control and management of comorbidities

- Steps 2–4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma
### Moderate Persistent Asthma

<table>
<thead>
<tr>
<th>Step 4 Alternative</th>
<th>Step 4 Preferred</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medium Dose ICS (GINA 2009)</strong></td>
<td><strong>Medium Dose ICS + LABA (GINA 2009)</strong></td>
</tr>
<tr>
<td>Q var 80 mcg</td>
<td>Advair 250/50 mcg</td>
</tr>
<tr>
<td>Flovent 110 mcg</td>
<td>Symbicort 160/4.5 mcg</td>
</tr>
<tr>
<td>Pulmicort 160 mcg</td>
<td>Dulera 200/5 mcg</td>
</tr>
<tr>
<td>Asmanex 220 mcg</td>
<td><strong>Medium Dose ICS + LABA (EPR3 2007)</strong></td>
</tr>
<tr>
<td>Q var 80 mcg</td>
<td>Advair 250/50 mcg</td>
</tr>
<tr>
<td>Flovent 110 mcg</td>
<td>Symbicort 160/4.5 mcg</td>
</tr>
<tr>
<td>Pulmicort 160 mcg</td>
<td>Dulera 100/5 mcg</td>
</tr>
<tr>
<td>Asmanex 220 mcg</td>
<td>Dulera 200/5 mcg</td>
</tr>
</tbody>
</table>

#### Alternative Plus either:

- **Singulair**: 10 mg po daily
- **Accolate**: 20 mg po q 12 hrs
- **Theodur (10 – 20 mcg/ml serum levels)**: 200 mg po q 12 hrs

#### AND

- Consider Omalizumab for patients who have allergies
- Consider Omalizumab for patients who have allergies

#### Control and management of comorbidities

**Steps 2 – 4**: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma.

#### Quick-relief medication for **ALL** patients - SABA as needed for symptoms: up to 3 tx @ 20 minute intervals prn. Short course of o systemic corticosteroids may be needed.

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

---

[1] Quick-relief medication for **ALL** patients - SABA as needed for symptoms: up to 3 tx @ 20 minute intervals prn. Short course of o systemic corticosteroids may be needed.

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

Persistent Asthma: Daily Medication

Consult 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
Alternative:
Cromolyn, LTRA, Theophylline or Nedocromil

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

Step 4
Preferred:
Medium Dose ICS + LABA
Alternative:
Medium-dose ICS + either LTRA, Theophylline, or Zileuton

Step 5
Preferred
High Dose ICS + LABA (GINA 2009)
Advair 500/50 mcg 1 inh q 12 hours
High Dose ICS + LABA (EPR3 2007)
Dulera 200/5 mcg 2 inh q 12 hours
Advair 500/50 mcg 1 inh q 12 hours
And Consider:
Omalizumab (Xolair) IgE 30 – 700 IU/ml
0.016 mg/kg/IU/ml IgE
Nedocromil or Theophylline
Zileuton
Theophylline, or Zileuton

Step 6
Preferred
High dose ICS + LABA + oral corticosteroid

And Consider:
Omalizumab for patients who have allergies

Assess control

Step down if possible
(and asthma is well controlled at least 3 months)

Step up if needed
(first check adherence, environmental control & comorbid conditions)

Each Step: Patient Education and Environmental Control and management of comorbidities
Steps 2 – 4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma

• Quick-relief medication for ALL patients -SABA as needed for symptoms: up to 3 tx @ 20 minute intervals prn. Short course of oral systemic corticosteroids may be needed.
• Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control & the need to step up treatment.
### Persistent Asthma: Daily Medication
Consult asthma specialist if step 4 care or higher is required. Consider consultation at step 3

### Patient Education and Environmental Control at Each Step
Quick-relief medication for **ALL** patients
SABA as needed for symptoms.
Short course of oral corticosteroids maybe needed.

#### Stepwise Approach for managing asthma in children 5 - 11 years of age

<table>
<thead>
<tr>
<th>Step</th>
<th>Preferred Medication</th>
<th>Alternative Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td>Preferred</td>
<td>Low dose ICS</td>
</tr>
<tr>
<td></td>
<td>Alternative</td>
<td>SABA PRN</td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td>Preferred</td>
<td>Medium Dose ICS</td>
</tr>
<tr>
<td></td>
<td>Alternative</td>
<td>LTRA, Cromolyn, Nedocromil, or Theophylline</td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td>Preferred</td>
<td>Medium Dose ICS + LABA</td>
</tr>
<tr>
<td></td>
<td>Alternative</td>
<td>LTRA, or Theophylline</td>
</tr>
<tr>
<td><strong>Step 4</strong></td>
<td>Preferred</td>
<td>Medium Dose ICS + LABA</td>
</tr>
<tr>
<td></td>
<td>Alternative</td>
<td>High dose ICS + either LTRA, or Theophylline</td>
</tr>
<tr>
<td><strong>Step 5</strong></td>
<td>Preferred</td>
<td>High Dose ICS + LABA + oral corticosteroid</td>
</tr>
<tr>
<td></td>
<td>Alternative</td>
<td>High dose ICS + either LTRA, or Theophylline + oral corticosteroid</td>
</tr>
<tr>
<td><strong>Step 6</strong></td>
<td>Preferred</td>
<td>High Dose ICS + LABA + oral corticosteroid</td>
</tr>
</tbody>
</table>

**Step up if needed**
(first check adherence, environmental control, and comorbid conditions)

**Assess control**

**Step down if possible**
(and asthma is well controlled at least 3 months)
Stepwise Approach for Managing Asthma in Children 0 - 4 Years of Age

**Intermittent Asthma**
Consult asthma specialist if step 3 care or higher is required. Consider consultation at step 2.

**Step 1**
Preferred SABA PRN

**Step 2**
Preferred Medium Dose ICS
Alternative Montelukast or Cromolyn

**Step 3**
Preferred Medium Dose ICS
AND Either: Montelukast or LABA

**Step 4**
Preferred High Dose ICS
AND Either: Montelukast or LABA

**Step 5**
Preferred High Dose ICS
AND Either: Montelukast or LABA
AND Oral corticosteroid

**Step 6**
Preferred High Dose ICS
AND Either: Montelukast or LABA
AND Oral corticosteroid

**Patient Education and Environmental Control at Each Step**
Quick-relief medication for **ALL** patients - SABA as needed for symptoms.
With Viral URI: SABA every 4 - 6 hours up to 24 hours.
Consider short course of corticosteroids with (or hx of) severe exacerbation.
Assessing Asthma Control

Taking Long Term Control Medications
At planned follow-up visits, asthma patients should **review level of control** with their health care provider based on multiple measures of current impairment and future risk in order to **guide clinician decisions to either maintain or adjust therapy.**

Patients should be scheduled for **planned follow-up visits** at periodic intervals in order to **assess their asthma control and modify treatment if needed.**
## Asthma Control Chart

### FIGURE 3-5b. ASSESSING ASTHMA CONTROL IN YOUTHS > 12 YEARS OF AGE AND ADULTS

<table>
<thead>
<tr>
<th>Components of Control</th>
<th>Classification of Asthma Control (&gt; 12 years of age)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impairment</strong></td>
<td>Well Controlled</td>
</tr>
<tr>
<td>Symptom impairment</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤2x/month</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
</tr>
<tr>
<td>Short-acting (\beta_2)-agonist use for symptom control (not prevention of EIB)</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Lung Function</td>
<td>&gt;80% predicted/ personal best</td>
</tr>
<tr>
<td>(\text{FEV}_1) or peak flow</td>
<td>0 ≤0.75</td>
</tr>
<tr>
<td>Validated questionnaires</td>
<td>0 – 1</td>
</tr>
<tr>
<td>ATAQ, ACQ, ACT</td>
<td>0 – 1/year</td>
</tr>
</tbody>
</table>

### Risk

- Exacerbations requiring oral systemic corticosteroids
- Progressive loss of lung function
- Treatment-related adverse effects

### Notes
- 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.

Key: EIB, exercise-induced bronchospasm; \(\text{FEV}_1\), forced expiratory volume in 1 second; FVC, forced vital capacity; ICU, intensive care unit.
Validated Instruments for Assessment and Monitoring of Asthma

**FIGURE 3–8. VALIDATED INSTRUMENTS FOR ASSESSMENT AND MONITORING OF ASTHMA**

- Asthma Control Questionnaire (Juniper et al. 1999b)
- Asthma Therapy Assessment Questionnaire (Vollmer et al. 1999) (See below.)
- Asthma Control Test (Nathan et al. 2004) (See below.)
- Asthma Control score (Boulet et al. 2002)

**ASTHMA THERAPY ASSESSMENT QUESTIONNAIRE® (ATAQ)**

1. In the past 4 weeks did you miss any work, school, or normal daily activities because of your asthma? (1 point for YES)
2. In the past 4 weeks, did you wake up at night because of your asthma? (1 point for NO)
3. Do you believe your asthma was well controlled in the past 4 weeks? (1 point for NO)
4. Do you use an inhaler for quick relief from asthma symptoms? If yes, what is the highest number of puffs in 1 day you took of this inhaler? (1 point for more than 12)

Total points = 0–4, with more points indicating more control problems

Source: Adapted and reprinted with permission from Merck and Co., Inc. Copyright © 1997, 1998, 1999 Merck and Co., Inc. All Rights Reserved.

**CAUTION:** The sample questionnaires in figure 3–8 assess only the impairment domain of asthma control and NOT the risk domain. Measure of risk, such as exacerbations, urgent care, hospitalizations, and declines in lung function, are important elements of assessing the level of asthma control.
Validated Instruments for Assessment and Monitoring of Asthma

FIGURE 3-9. SAMPLE PATIENT SELF-ASSESSMENT SHEET FOR FOLLOWUP VISITS

Name: __________________________  Date: __________________________

Your Asthma Control

How many days in the past week have you had chest tightness, cough, shortness of breath, or wheezing (whistling in your chest)?

____ 0  ____ 1  ____ 2  ____ 3  ____ 4  ____ 5  ____ 6  ____ 7

How many nights in the past week have you had chest tightness, cough, shortness of breath, or wheezing (whistling in your chest)?

____ 0  ____ 1  ____ 2  ____ 3  ____ 4  ____ 5  ____ 6  ____ 7

Do you perform peak flow readings at home?

____ yes  ____ no

If yes, did you bring your peak flow chart?

____ yes  ____ no

How many days in the past week has asthma restricted your physical activity?

____ 0  ____ 1  ____ 2  ____ 3  ____ 4  ____ 5  ____ 6  ____ 7

Have you had any asthma attacks since your last visit?

____ yes  ____ no

Have you had any unscheduled visits to a doctor, including to the emergency department, since your last visit?

____ yes  ____ no

How well controlled is your asthma, in your opinion?

____ very well controlled  ____ somewhat controlled  ____ not well controlled

Average number of puffs per day

Taking your medicine

What problems have you had taking your medicine or following your asthma action plan?

Please ask the doctor or nurse to review how you take your medicine.

Your questions

What questions or concerns would you like to discuss with the doctor?

How satisfied are you with your asthma care?

____ very satisfied  ____ somewhat satisfied  ____ not satisfied

*These questions are examples and do not represent a standardized assessment instrument. Other examples of asthma control questions: Asthma Control Questionnaire (Juniper); Asthma Therapy Assessment Questionnaire (Volmer); Asthma Control Test (Nathan); Asthma Control Score (Boulet)
### Components of Control

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Classification of Asthma Control (Children 5–11 years of age)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>Well Controlled</td>
</tr>
<tr>
<td></td>
<td>≤2 days/week but not more than once on each day</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤1x/month</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
</tr>
<tr>
<td>Short-acting β₂-agonist use for symptom control (not prevention of EIB)</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Lung function</td>
<td>&gt;80% predicted/ personal best 75–80%</td>
</tr>
<tr>
<td>• FEV₁ or peak flow</td>
<td>&gt;80%</td>
</tr>
<tr>
<td>• FEV₁/FVC</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk</th>
<th>Exacerbations requiring oral systemic corticosteroids</th>
<th>0–1/year</th>
<th>≥2/year (see note)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consider severity and interval since last exacerbation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduction in lung growth</td>
<td>Evaluation requires long-term followup.</td>
<td></td>
</tr>
<tr>
<td></td>
<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>
</tr>
</tbody>
</table>

Key: EIB, exercise-induced bronchospasm; FEV₁, forced expiratory volume in 1 second; FVC, forced vital capacity; ICU, intensive care unit
LEVEL OF CONTROL

Well controlled
Not well controlled
Very poorly controlled
exacerbation

TREATMENT OF ACTION

maintain and find lowest controlling step
consider stepping up to gain control
step up until controlled
treat as exacerbation

TREATMENT STEPS

STEP 1
STEP 2
STEP 3
STEP 4
STEP 5-6

REDUCE
INCREASE

© Global Initiative for Asthma
### Components of Control

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Classification of Asthma Control (≥ 12 years of age)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Symptoms</strong></td>
<td>Well Controlled</td>
</tr>
<tr>
<td>≤2 days/week</td>
<td>&gt;2 days/week</td>
</tr>
<tr>
<td><strong>Nighttime awakenings</strong></td>
<td>≤ 2x/month</td>
</tr>
<tr>
<td><strong>Interference with normal activity</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Short-acting beta₂-agonist use for symptom control (not prevention of EIB)</strong></td>
<td>≤ 2 days/week</td>
</tr>
<tr>
<td><strong>Lung function</strong></td>
<td></td>
</tr>
<tr>
<td>• FEV₁ or peak flow</td>
<td>&gt;80% predicted/ personal best</td>
</tr>
<tr>
<td>• Validate questionnaires</td>
<td></td>
</tr>
<tr>
<td>• ATAQ</td>
<td>0 ≤ 0.75</td>
</tr>
<tr>
<td>• ACQ</td>
<td>≥ 20</td>
</tr>
<tr>
<td>• ACT</td>
<td></td>
</tr>
</tbody>
</table>

### Recommended Action For Treatment

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

Key: EIB, exercise-induced bronchospasm; FEV₁, forced expiratory volume in 1 second; FVC, forced vital capacity; ICU, intensive care unit
Assessing Asthma Severity
Taking Long Term Control Medications
Asthma Severity Chart

CLASSIFYING ASTHMA SEVERITY IN YOUTHS > 12 YEARS OF AGE AND ADULTS

Classifying severity in patients after asthma becomes well controlled, by lowest level of treatment required to maintain control.

<table>
<thead>
<tr>
<th>Lowest level of treatment required to maintain control</th>
<th>Classification of Asthma Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>(See figure 4−1b for treatment steps.)</td>
<td>Intermittent</td>
</tr>
<tr>
<td></td>
<td>Persistent</td>
</tr>
<tr>
<td></td>
<td>Step 1</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Severe</td>
</tr>
<tr>
<td></td>
<td>Step 2</td>
</tr>
<tr>
<td></td>
<td>Step 3 or 4</td>
</tr>
<tr>
<td></td>
<td>Step 5 or 6</td>
</tr>
</tbody>
</table>
**Persistent Asthma: Daily Medication**

Consult 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 + LABA  
|    | OR – Medium dose ICS  
|    | Alternative: Low-dose ICS + either LTRA, Theophylline, or Zileuton |
| Step 3 | Preferred: Medium Dose ICS + LABA  
|    | Alternative: Medium-dose ICS + either LTRA, Theophylline, or Zileuton |
| Step 4 | Preferred: High Dose ICS + LABA  
|    | AND Consider Omalizumab for patients who have allergies |
| Step 5 | Preferred: High dose ICS + LABA + oral corticosteroid  
|    | AND Consider Omalizumab for patients who have allergies |
| Step 6 | Preferred: High dose ICS + LABA + oral corticosteroid  
|    | AND Consider Omalizumab for patients who have allergies |

**Assess control**

Step up if needed (first check adherence, environmental control & comorbid conditions)

Step down if possible (and asthma is well controlled at least 3 months)

Each Step: Patient Education and Environmental Control and management of comorbidities

Steps 2 – 4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma

• Quick-relief medication for **ALL** patients -SABA as needed for symptoms: up to 3 tx @ 20 minute intervals prn. Short course of systemic corticosteroids may be needed.

• Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control & the need to step up treatment.
Persistent Asthma: Daily Medication
Consult 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
Preferred
Low dose ICS
Alternative
LTRA, Cromolyn, Nedocromil or Theophylline OR
Medium Dose ICS

Step 3
Preferred
Either
Low Dose ICS + LABA, LTRA, or Theophylline
OR
Medium Dose ICS
Alternative
Medium dose ICS + either LTRA, or Theophylline

Step 4
Preferred
High Dose ICS + LABA
Alternative
Medium dose ICS + either LTRA, or Theophylline

Step 5
Preferred
High Dose ICS + LABA + oral corticosteroid
Alternative
Medium dose ICS + either LTRA, or Theophylline + oral corticosteroid

Step 6
Preferred
High Dose ICS + LABA + oral corticosteroid

Patient Education and Environmental Control at Each Step

Quick-relief medication for ALL patients
SABA as needed for symptoms.
Short course of oral corticosteroids maybe needed.

Step up if needed
(first check adherence, environmental control, and comorbid conditions)
Assess control
Step down if possible
(and asthma is well controlled at least 3 months)
CASE STUDIES OF ASTHMA SEVERITY AND CONTROL
Case Study 3

Your 17 year old female patient has just returned home from her first year in college. She is compliant with her long term control medication and denies nighttime symptoms. She notes that she is doing well and only having asthma symptoms if she forgets her medication prior to workouts. She is using albuterol for exercise pre-treatment about 3-4 times a week, but not requiring rescue medication. She has not needed recent urgent care or prednisone therapy.

• What is her level of control?
## Asthma Control Chart

**FIGURE 3-5c. ASSESSING ASTHMA CONTROL IN YOUTHS ≥ 12 YEARS OF AGE AND ADULTS**

| Components of Control | Classification of Asthma Control  
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Youths ≥ 12 years of age and adults)</td>
</tr>
<tr>
<td></td>
<td>Well Controlled</td>
</tr>
<tr>
<td>Impairment</td>
<td></td>
</tr>
<tr>
<td><strong>Symptoms</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤2x/month</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
</tr>
<tr>
<td>Short-acting beta₂-agonist use for symptom control (not prevention of EIB)</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>FEV₁ or peak flow</td>
<td>&gt;80% predicted/ personal best</td>
</tr>
<tr>
<td>Validated Questionnaires</td>
<td></td>
</tr>
<tr>
<td>ATAQ</td>
<td>0</td>
</tr>
<tr>
<td>ACQ</td>
<td>≤0.75*</td>
</tr>
<tr>
<td>ACT</td>
<td>≥20</td>
</tr>
</tbody>
</table>

**Risk**

| Exacerbations         | 0–1/year | ≥2/year (see note) |
|                       |          |                   |

- Consider severity and interval since last exacerbation

**Progressive loss of lung function**

- Evaluation requires long-term follow-up care.

**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.

---

*ACQ values of 0.76–1.4 are indeterminate regarding well-controlled asthma.

Key: EIB, exercise-induced bronchospasm; FEV₁, forced expiratory volume in 1 second. See figure 3–8 for full name and source of ATAQ, ACQ, ACT.
Case Study 4

Your 20 year old male patient has just returned to your office for follow up. He is compliant with his long term control medication (Medium Dose Inhaled Corticosteroids) and denies nighttime symptoms. He is using albuterol as rescue medication one day per week. He has not needed recent urgent care or prednisone therapy.

• What is his level of severity?

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q var 80 mcg</td>
<td>4 inh q 12 hours</td>
</tr>
<tr>
<td>Flovent 110 mcg</td>
<td>2 inh q 12 hours</td>
</tr>
<tr>
<td>Pulmicort 160 mcg</td>
<td>2 inh q 12 hours</td>
</tr>
<tr>
<td>Asmanex 220 mcg</td>
<td>1 inh q 12 hours</td>
</tr>
</tbody>
</table>
**Persistent Asthma: Daily Medication**

Consult asthma specialist if step 4 care or higher is required. Consider consultation at step 3.

**Step 1**
- Preferred: SABA PRN
- Alternative: Cromolyn, LTRA, Nedocromil or Theophylline

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

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

**Step 4**
- Preferred: High Dose ICS + LABA
- Alternative: Consider Omalizumab for patients who have allergies

**Step 5**
- Preferred: High dose ICS + LABA + oral corticosteroid

**Step 6**
- Preferred: High dose ICS + LABA + oral corticosteroid

Each Step: Patient Education and Environmental Control and management of comorbidities

Steps 2 – 4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma.

- Quick-relief medication for **ALL** patients -SABA as needed for symptoms: up to 3 tx @ 20 minute intervals prn. Short course of o systemic corticosteroids may be needed.
- Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control & the need to step up treatment.
CASE STUDIES OF ASTHMA SEVERITY, CONTROL & TREATMENT
Case Study 5

Your 17 year old female patient came in for evaluation before her regular scheduled follow up appointment. She is compliant with her long term control medication (Low dose ICS). Now she complains of nighttime symptoms. She is awakening with cough and chest tightness and using albuterol rescue treatment about 3 times a week.

- What is her level of severity now?
- What is her level of control?
- What should you recommend?

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose</th>
<th>Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q var 80 mcg</td>
<td>2 – 3 inh q 12 hours</td>
<td></td>
</tr>
<tr>
<td>Flovent 110 mcg</td>
<td>1 inh q 12 hours</td>
<td></td>
</tr>
<tr>
<td>Pulmicort 160 mcg</td>
<td>1 inh q 12 hours</td>
<td></td>
</tr>
<tr>
<td>Asmanex 110 mcg</td>
<td>1 inh q 12 hours</td>
<td></td>
</tr>
</tbody>
</table>
## Asthma Control Chart – Recommended Action

**FIGURE 3-5b. ASSESSING ASTHMA CONTROL IN YOUTHS > 12 YEARS OF AGE AND ADULTS**

<table>
<thead>
<tr>
<th>Components of Control</th>
<th>Classification of Asthma Control (≥ 12 years of age)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Well Controlled</td>
</tr>
<tr>
<td><strong>Impairment</strong></td>
<td></td>
</tr>
<tr>
<td>Symptoms</td>
<td>≤2 days/week</td>
</tr>
<tr>
<td>Nighttime awakenings</td>
<td>≤ 2x/month</td>
</tr>
<tr>
<td>Interference with normal activity</td>
<td>None</td>
</tr>
<tr>
<td>Short-acting beta₂-agonist use for symptom control (not prevention of EIB)</td>
<td>≤ 2 days/week</td>
</tr>
<tr>
<td>Lung function</td>
<td></td>
</tr>
<tr>
<td>• FEV₁ or peak flow</td>
<td>&gt;80% predicted/ personal best</td>
</tr>
<tr>
<td>• Validate questionnaires</td>
<td>0 ≤ 0.75</td>
</tr>
<tr>
<td>• ATAQ</td>
<td>≥ 20</td>
</tr>
<tr>
<td>• ACQ</td>
<td>1 – 2</td>
</tr>
<tr>
<td>• ACT</td>
<td>16 - 19</td>
</tr>
</tbody>
</table>

**Recommended Action For Treatment**

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

Key: EIB, exercise-induced bronchospasm; FEV₁, forced expiratory volume in 1 second; FVC, forced vital capacity; ICU, intensive care unit
Stepwise Approach for Managing Asthma in Youths ≥12 Years of Age & Adults

**Intermittent Asthma**

**Persistent Asthma: Daily Medication**

Consult asthma specialist if step 4 care or higher is required. Consider consultation at step 3

**Step 1**

**Preferred:** SABA PRN

**Alternative:** Cromoly, LTRA, Nedocromil or Theophylline

**Step 2**

**Preferred:** Low dose ICS + LABA

**Alternative:** Medium dose ICS

**Alternative:** Medium dose ICS + either LTRA, Theophylline, or Zileuton

**Step 3**

**Preferred:** Low-dose ICS + LABA

**Alternative:** Medium dose ICS + either LTRA, Theophylline, or Zileuton

**Step 4**

**Preferred:** Medium Dose ICS + LABA

**Alternative:** Medium-dose ICS + either LTRA, Theophylline, or Zileuton

**Step 5**

**Preferred:** High Dose ICS + LABA

**AND**

Consider Omalizumab for patients who have allergies

**Step 6**

**Preferred:** High dose ICS + LABA + oral corticosteroid

**AND**

Consider Omalizumab for patients who have allergies

Each Step: Patient Education and Environmental Control and management of comorbidities

Steps 2 – 4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma

• Quick-relief medication for **ALL** patients -SABA as needed for symptoms: up to 3 tx @ 20 minute intervals prn. Short course of o systemic corticosteroids may be needed.

• Use of SABA >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control & the need to step up treatment.
## Case Study 5

### • Recommended treatment

- **Low Dose ICS + LABA**
  
<table>
<thead>
<tr>
<th>Medicine</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advair 100/50 mcg</td>
<td>1 inh q 12 hours</td>
</tr>
<tr>
<td>Symbicort 160/4.5 mcg</td>
<td>1 inh q 12 hours</td>
</tr>
<tr>
<td>Dulera 100/5 mcg</td>
<td>1 – 2 inh q 12 hours</td>
</tr>
<tr>
<td>Dulera 200/5 mcg</td>
<td>1 inh q 12 hrs</td>
</tr>
</tbody>
</table>

**OR**

- **Medium Dose ICS**

<table>
<thead>
<tr>
<th>Medicine</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q var 80 mcg</td>
<td>4 inh q 12 hours</td>
</tr>
<tr>
<td>Flovent 110 mcg</td>
<td>2 inh q 12 hours</td>
</tr>
<tr>
<td>Pulmicort 160 mcg</td>
<td>2 inh q 12 hours</td>
</tr>
<tr>
<td>Asmanex 220 mcg</td>
<td>1 inh q 12 hours</td>
</tr>
</tbody>
</table>
Case Study 6

A 15-year-old girl is being evaluated in the office for her asthma. She has very few symptoms during the winter, but in the spring when her allergies are severe, she has at least 3 visits to the doctor and 2 bursts of oral corticosteroids due to nighttime cough and wheezing when she is playing outdoor soccer. She fails to complete half of her games in May.

It is now the beginning of the school year, and her parents bring her in for her forms for albuterol at school. She had no symptoms in the past month. She is able to run without difficulty, she has coughed only once a month at nighttime, and has not had albuterol since the spring. The school form asks you to classify her asthma.

• What treatment plan might you suggest and what is her current level of control?
### Classification of Asthma Severity

#### Components of Severity

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Symptom</th>
<th>Nighttime awakenings</th>
<th>Short-acting beta_2-agonist use for symptom control (not prevention of EIB)</th>
<th>Interference with normal activity</th>
<th>Lung function</th>
</tr>
</thead>
</table>
| Normal FEV\(_1\)/FVC | ≤2 days/week | ≤2x/month | ≤2 days/week | None | • Normal FEV\(_1\) between exacerbations
  • FEV\(_1\) >80% Predicted
  • FEV\(_1\)/FVC normal |
| 8 – 19 yrs | 85% | 3–4x/month | >2 days/week but not daily, and not more than 1X on any day | Minor limitation | • FEV\(_1\) >80% predicted
  • FEV\(_1\)/FVC reduced 5% |
| 20 – 30 yrs | 80% | 1x/week but not nightly | Daily | Some limitation | • FEV\(_1\) > 60 < 80% predicted
  • FEV\(_1\)/FVC reduced >5% |
| 40 – 59 yrs | 75% | Often 7x/week | Several times per day | Extremely limited | • FEV\(_1\) <60% predicted
  • FEV\(_1\)/FVC reduced >5% |
| 60 – 80 yrs | 70% | | | | |

#### Risk

<table>
<thead>
<tr>
<th>Exacerbations requiring oral systemic corticosteroids</th>
<th>0–1/year</th>
<th>≥2 in 1 year</th>
</tr>
</thead>
</table>

Classifying severity for patients who are not currently taking long-term control medication.

Classifying severity in patients after asthma becomes well controlled, by lowest level of treatment required to maintain control.

### Classification of Asthma Severity

#### (≥ 12 years of age)

<table>
<thead>
<tr>
<th>Classification of Asthma Severity</th>
<th>Intermittent</th>
<th>Persistent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>≤2 days/week</td>
<td>&gt;2 days/week but not daily</td>
</tr>
<tr>
<td>Moderate</td>
<td>Daily</td>
<td>Throughout the day</td>
</tr>
<tr>
<td>Severe</td>
<td>Several times per day</td>
<td>Extremely limited</td>
</tr>
</tbody>
</table>

Key: EIB, exercise-induced bronchospasm; FEV\(_1\), forced expiratory volume in second; FVC, forced vital capacity; ICU, intensive care unit.
### Components of Severity

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Symptoms</th>
<th>Nighttime awakenings</th>
<th>Short-acting beta₂-agonist use for symptom control (not prevention of EIB)</th>
<th>Interference with normal activity</th>
<th>Lung function</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal FEV₁/FVC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 – 19 yrs</td>
<td>≤2 days/week</td>
<td>≤2x/month</td>
<td>≤2 days/week</td>
<td>None</td>
<td>Normal FEV₁ between exacerbations \ FEV₁ &gt;80% predicted \ FEV₁/FVC normal</td>
<td>Exacerbations requiring oral systemic corticosteroids</td>
</tr>
<tr>
<td>20 – 30 yrs</td>
<td>&gt;2 days/week but not daily</td>
<td>3–4x/month</td>
<td>&gt;2 days/week but not daily, and not more than 1X on any day</td>
<td>Minor limitation</td>
<td>FEV₁ = &gt;80% predicted \ FEV₁/FVC normal</td>
<td>≥2 in 1 year</td>
</tr>
<tr>
<td>40 – 59 yrs</td>
<td>Daily</td>
<td>1x/week but not nightly</td>
<td>Daily</td>
<td>Some limitation</td>
<td>FEV₁ &gt; 60 &lt; 80% predicted \ FEV₁/FVC reduced 5%</td>
<td>Consider severity and interval since last exacerbation. Frequency and severity may fluctuate over time for patients in any severity category.</td>
</tr>
<tr>
<td>60 – 80 yrs</td>
<td>Throughout the day</td>
<td>Often 7X/week</td>
<td>Several times per day</td>
<td>Extremely limited</td>
<td>FEV₁ &lt;60% predicted \ FEV₁/FVC reduced &gt;5%</td>
<td>Relative annual risk of exacerbations may be related to FEV₁</td>
</tr>
</tbody>
</table>

### Classification of Asthma Severity

<table>
<thead>
<tr>
<th>Now</th>
<th>Classification of Asthma Severity (&gt; 12 years of age)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermittent</td>
<td>Mild</td>
</tr>
<tr>
<td>≤2 days/week</td>
<td>&gt;2 days/week but not daily</td>
</tr>
</tbody>
</table>

**Classifying severity for patients who are not currently taking long-term control medication.**

**Asthma Severity Chart**

**FIGURE 3-4b. CLASSIFYING ASTHMA SEVERITY IN YOUTHS > 12 YEARS OF AGE AND ADULTS**

Classifying severity in patients after asthma becomes well controlled, by lowest level of treatment required to maintain control.

<table>
<thead>
<tr>
<th>Lowest level of treatment required to maintain control (See figure 4–1b for treatment steps.)</th>
<th>Classification of Asthma Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermittent Step 1</td>
<td>Persistent Step 2 Step 3 or 4 Step 5 or 6</td>
</tr>
</tbody>
</table>

Key: EIB, exercise-induced bronchospasm; FEV₁, forced expiratory volume in second; FVC, forced vital capacity; ICU, intensive care unit
Follow-up Visits

Patients should be scheduled for planned follow-up visits at periodic intervals in order to assess their asthma control and modify treatment if needed.
Key Point #3

• Because asthma symptoms are variable, patients and families need to recognize symptoms and adjust medications at home according to the clinician’s written asthma action plan.
Key Features of an Asthma Action Plan

• All people who have asthma should receive a written asthma action plan to guide their self-management efforts.

• Written plans should be keyed to symptoms, severity and control and should include:
  – Daily management as well as early recognition and actions for exacerbations
  – Medication names (trade or generic)
  – How much to take and when to take it
  – How to adjust medicines at home as symptoms change

Priority Message from the EPR-3 Guidelines Implementation Panel
Asthma Action Plan Examples

Asthma Action Plan

Name: [Patient's Name]
Primary Care Provider: [Provider's Name]
Phone Number: [Phone Number]
City/State: [City/State]
Text or Friend: [Text or Friend]
Pharmacy: [Pharmacy]

GO
ACTION: Use rescue inhaler and/ or oral corticosteroid as instructed.

You have all of these:
- Breathing is normal
- No cough or wheeze
- Sleep through the night
- Can work and play

For asthma with exercise, take:

For asthma with exercise, take:

If you cannot contact your doctor, go directly to the emergency room. DO NOT WAIT.
Make an appointment with your primary care provider within two days of an ER visit or hospitalization.

CAUTION
ACTION: Continue with your medication, as shown, and add.

You have all of these:
- First signs of a cold
- Exposure to known triggers
- Cough
- Asthma exacerbation
- Tight chest
- Coughing at night

Call your primary care provider.

DANGER
ACTION: Take these medicines until you talk to your doctor.

If your asthma is getting worse fast:
- Moistener is not helping
- Something is hard to get
- Noise comes wide
- Wheeze
- Can't talk well

Plan de Acción para el Asma

Nombre: [Nombre del Paciente]
Proveedor de atención primaria: [Proveedor de atención primaria]
Número de teléfono: [Número de teléfono]
Día de la semana: [Día de la semana]
Amigo/Familiar: [Amigo/Familiar]

PROCEDER
ACCION: Use inhalador de rescate como se indica.

Los enfermos tienen estas reacciones:
- Primera vez
- No hay fiebre ni dolor con el pecho
- No hay asma durante la noche
- Puede toser y llorar

Para el asma cuando tiene asma, tome:

PELIGRO
ACCION: Tome estas medicinas hasta que hable con su médico.

Si no puede ponerse en contacto con su médico, vaya directamente a la sala de emergencia. NO ESPERE.
Long-term daily Peak Flow 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
Review of Key Points Covered

1. Assessment of severity and control forms the basis of the treatment plan.

2. Appropriate asthma management requires the proper use of long term control and quick-relief medications and a step wise approach.

3. Because asthma symptoms are variable, families need to recognize symptoms and adjust medications at home according to the clinician’s written asthma action plan.
Segment 2
Communication Strategies
Key Point #4

• Good communication between patient and clinician helps identify patient concerns that may block adherence, makes patient teaching more effective and promotes patient self-confidence to follow the treatment plan.
Background

- Excellence in medical treatment is worthless if the patient doesn’t take the medicine.
- Compliance is closely linked to clinician communication and patient education.
- Most clinicians believe they are good communicators, but most patients feel clinician communication and education is inadequate.
Implications

• Studies consistently show that less than 50% of patients adhere to daily medication regimens.
• Clinicians cannot predict better than chance which patients will be compliant.
• Therefore, all patients need to be educated to ensure adherence to the medical regimen.
• Communicating well and providing education are as important as prescribing the right medicine.