Piedmont WellStar HealthPlans, Inc.
ASTHMA CLINICAL GUIDELINE

Relevance to Population: Asthma is a chronic inflammatory disease of the airways affecting 23 million people in the U.S. with increasing prevalence, mortality and cost of care. Asthma is the most common chronic disease of children affecting approximately 7 million children and the leading cause of school absenteeism, accounting for more than 14 million lost school days according to the American Lung Association. It is also the leading cause of work loss for adults, accounting for an estimated 14.2 million lost workdays each year. Asthma affects proportionately more children than adults, more women than men, more nonwhites than whites and those residing in the Northeast compared with those residing in other regions.

Population Covered by Guideline: All members with Asthma.

Clinical Indicators Measured by Piedmont WellStar HealthPlans, Inc.:

1. Use of Appropriate Medications for People with Asthma. HEDIS®
2. Medication Management for People with Asthma. HEDIS®
3. Asthma Medication Ratio. HEDIS®
4. Percentage of people with Asthma on appropriate medication and who are also on inhaled corticosteroids.
5. Percentage of people with a diagnosis of Asthma who have had a spirometry test within the last 24 months.

Additional HEDIS® Measures for Respiratory Conditions

- Appropriate Treatment for Children with Upper Respiratory Infection
- Appropriate Testing for Children with Pharyngitis
- Avoidance of Antibiotic Treatment in Adults with Acute Bronchitis

Key Points:

- Airway inflammation contributes to hyper-responsive airways, airflow limitation, respiratory symptoms, and disease chronicity.
- Viral respiratory infections are one of the most important causes of asthma exacerbation.
- Use of Asthma Action Plan containing the following written information:

  - Details on how the patient should monitor his or her asthma, either by symptoms or peak flow monitoring.
  - Patient should speak with their doctor regarding taking the flu vaccine and the pneumonia vaccine.
  - List of medications patient should take, described either as daily controllers taken routinely or quick relief medications taken as needed for symptoms or to prevent exercise-induced asthma.
  - If asthma symptoms and or peak flow readings are worsening, and/or previous medications are no longer effective, then the member should call his or her physician immediately or go to the emergency room.

The current full Asthma Guideline is available at http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm.

Goal of Asthma Management: To maintain long-term monitoring and control of asthma with minimal adverse effects by using optimal asthma education and therapy.

Asthma Diagnosis: History, Physical Examination, and Spirometry measurement demonstrating:

- Episodic symptoms of airflow obstruction/airway hyper-responsiveness: breathlessness, wheezing, coughing, and chest tightness.
- Spirometry, performed pre- and post-bronchodilator, to confirm evidence of airflow obstruction that is at least partially reversible in adults and children ≥ 5 years old.
- Exclusion of other diagnoses: foreign body, Cystic Fibrosis, vocal cord dysfunction, tracheomalacia,

COPD, CHF, PE, tumor, GERD, medications.

- Allergy testing such as Skin and RAST (RadioAllergoSorbent Test) can help identify risk factors that may cause asthma symptoms in individual patients.
- For suspected asthma with normal spirometry, bronchoprovocation (methacholine, histamine, cold air, or exercise) may be useful.

http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf; refer to section 2.

Spirometry Measurement:

- Objective assessment of pulmonary function using spirometry to measure FEV1, FVC (or FEV6), and FEV1/FVC pre- and post-bronchodilator is necessary for the diagnosis of asthma.
  - ✓ Significant reversibility is demonstrated by an increase of ≥ 12% or 200 mL in FEV_1, after a short-acting bronchodilator. (Sveum 2012)
  - ✓ Spirometry measures should be followed over the patient's lifetime to detect decline of pulmonary function.
    - Spirometry frequency (NHLBI Expert Panel 2007)
      - At the time of initial assessment
      - After stabilization on treatment, to document return to near normal airway function
      - During periods of progressive or prolonged loss of asthma control
      - At least every 1-2 years to assess maintenance of airway function
  - ✓ Office-based physicians who care for asthma patients should have access to spirometry for asthma diagnosis and monitoring.
  - ✓ For children, FEV1/FVC appears to be a more sensitive measure of severity; FEV1 is useful to assess risk of exacerbations.

http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.pdf; refer to section 3.

Components of Asthma Management:

- Measures of Assessment and Monitoring: Patient history, physical exam, and objective tests to diagnose, assess, and monitor the level of asthma control. Classify asthma severity using measures in the following 2 domains:
  - ✓ Impairment (symptoms over the previous 2 to 4 weeks)
  - ✓ Risk (frequency and intensity of exacerbations)
- Develop a Doctor-Patient Partnership to achieve guided self-management of asthma – giving people the ability to control their own asthma is associated with improved clinical outcomes. Key components include:
  - ✓ Joint goal setting
  - ✓ Education - teaching by health care team with frequent reinforcement. Key components include:
    - Recognition of early signs of worsening asthma and a prompt symptom response plan
    - Medications (actions, benefits, side effects, difference between "relievers" and "controllers")
    - Proper use of inhalers
    - Home allergen control
  - ✓ Self-monitoring (regular use of either symptom-based or peak flow monitoring are effective)
  - ✓ Regular health care visits to review asthma control, treatment, and self-management skills
  - ✓ Written action plan that integrates self-monitoring with evidence-based management for both long-term control of asthma and treatment of acute exacerbations.
- Control Environmental Factors and Comorbid Conditions that Affect Asthma: avoid tobacco smoke exposure.
- Diet: High intake of fruits, vegetables and the Mediterranean diet appears protective against developing asthma and allergies in early childhood (Chatzi and Kogevinas).
- Pharmacotherapy for Asthma – general points:
  - ✓STEP 1: Acute symptom management: Short-acting Beta-agonist (SABA) meds act rapidly to

relax bronchial smooth muscle and are preferred for relief of acute symptoms and prevention of exercise-induced asthma.

✓STEP 2: Long-term asthma control: Controller meds that reduce airway inflammation and prevent bronchoconstriction are most effective to achieve and maintain good control and should be taken on a long- term daily basis.

- ➢ Preferred Controller - Inhaled Corticosteroids (ICS) are the most effective and the preferred long-acting controllers for mild, moderate, and severe persistent asthma; they are generally safe and well tolerated at moderate doses.
- ➢ Alternative, non-preferred controllers for mild persistent asthma – Leukotriene Receptor Antagonists (LTRAs), Cromolyn, or Theophylline.

✓STEP 3: Step-up or add on therapy for persistent asthma despite compliance with ICS:

- o Preferred – Low-dose ICS + Long-Acting Beta-Agonists (LABA) or Medium Dose ICS
  - ✓ A combination inhaler with ICS + rapid and long-acting B_2-agonist can maintain effective asthma control, reduce exacerbations and hospitalizations
  - ✓ LABAs are more effective than LTRA in restoring normal airway function
  - ✓ LABA monotherapy SHOULD NOT BE USED – it has been linked to fatal asthma attacks and LABAs should not be used for asthma without an ICS
  - ✓ For children ≥ 5 yrs with moderate persistent asthma not controlled on low- dose ICS, increasing ICS is given equal weight to adding LABA.
  - ✓ For children ≥ 5 yrs with severe persistent asthma, the combination of ICS + LABA is preferred.
- o Alternative – Low-dose ICS + LTRA or Theophylline
  - ✓ Consider LTRA especially if there is strong desire for an oral agent, lung function is normal, and/or there is allergic rhinitis (Currie).
  - ✓ LTRAs are more effective than LABAs in reducing airway inflammation
  - ✓ Monitoring of serum theophylline is essential

✓STEP 4:

- o Preferred – Medium-dose ICS + LABA
- o Alternative – Medium-dose ICS + LTRA or theophylline

✓STEP 5:

- o Preferred – High-dose ICS + LABA and consider Omalizumab for patients with allergies

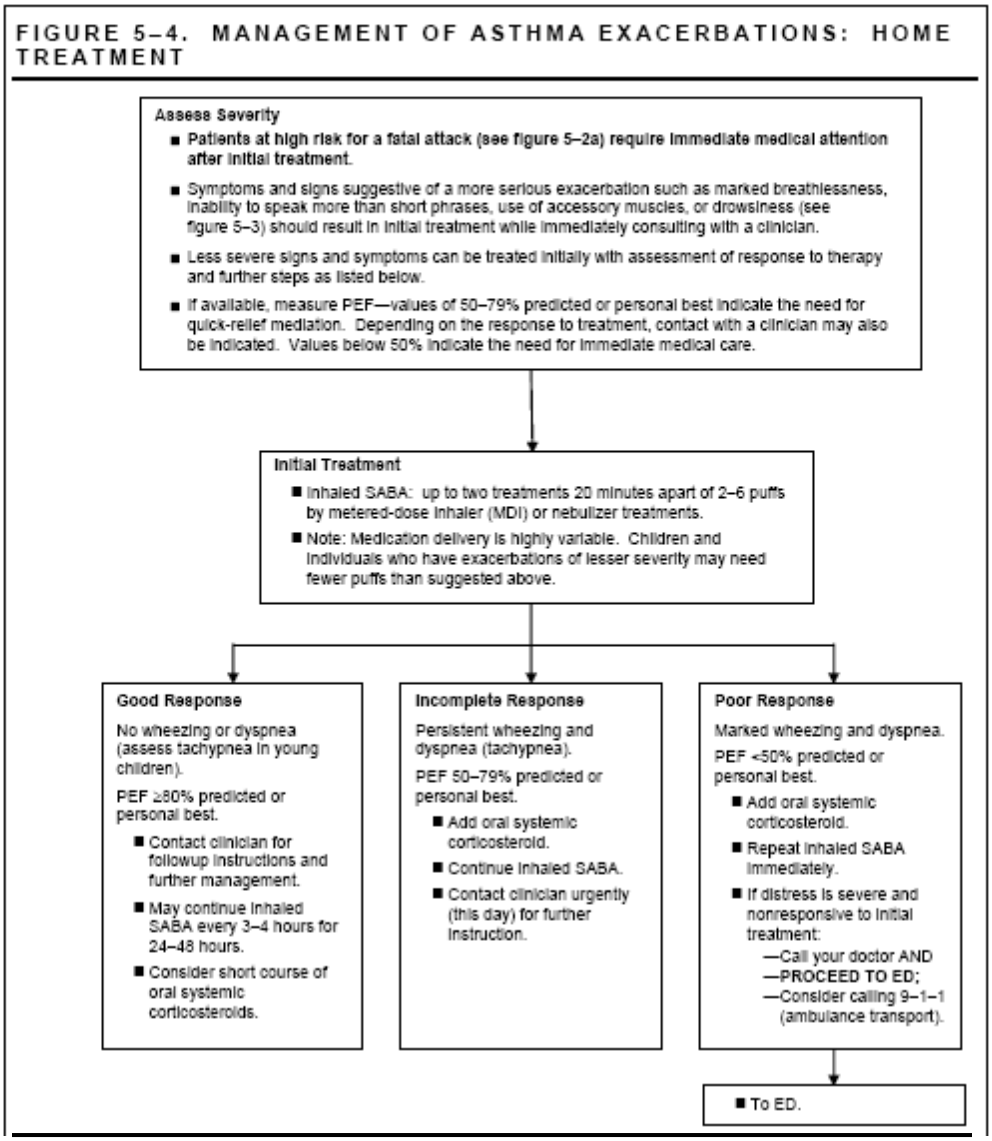
✓STEP 6:

- o Preferred – High-dose ICS + LABA + oral corticosteroid and consider Omalizumab for patients with allergies

Management of Asthma Exacerbations

- **Initial Evaluation:** Assess symptoms and vital signs. In the absence of impending respiratory failure, spirometry with both inspiratory and expiratory loops should be done to assess baseline level of obstruction and differentiate acute asthma from vocal cord dysfunction or hyperventilation. These measures can also be performed after initial treatment with a SABA if the assessment is limited by patient discomfort.
- **Initial Management:** Inhaled SABA every 20 minutes. Systemic (usually oral) corticosteroids should be utilized in all but the most mild exacerbations, and IV corticosteroids should be considered when the FEV1 is <40% predicted.
- **Discharge Management:** Patients who receive systemic corticosteroids in the ED should be given a course of oral corticosteroids on discharge. If not already on an ICS, the patient should be given a

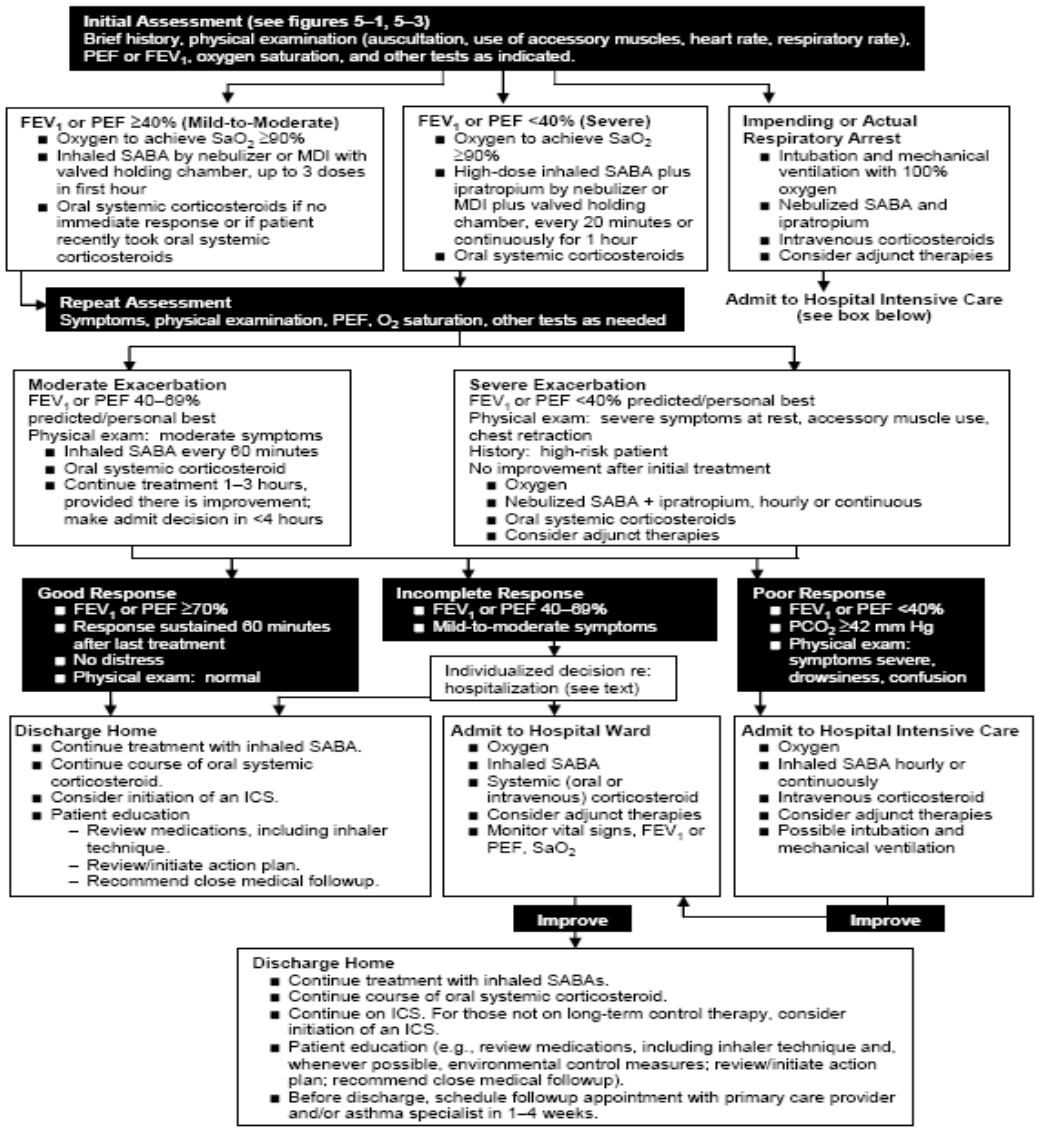
prescription for an ICS, instructed in its use, and a follow-up appointment scheduled with a specialist in asthma or with their primary care physician.



Key: ED, emergency department; MDI, metered-dose inhaler; PEF, peak expiratory flow; SABA, short-acting beta2-agonist (quick-relief inhaler)

Source: The National Institutes of Health, National Heart, Lung, and Blood Institute. Page 382, Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma, Full Report 2007. http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm

FIGURE 5–6. MANAGEMENT OF ASTHMA EXACERBATIONS: EMERGENCY DEPARTMENT AND HOSPITAL-BASED CARE



Key: FEV_1, forced expiratory volume in 1 second; ICS, inhaled corticosteroid; MDI, metered dose inhaler; PCO_2, partial pressure carbon dioxide; PEF, peak expiratory flow; SABA, short-acting beta$_2$-agonist; SaO_2, oxygen saturation

Source: The National Institutes of Health, National Heart, Lung, and Blood Institute. Page 388, Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma Full Report 2007. http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm

Clinical practice guidelines are designed to assist clinicians by providing a framework for the evaluation and treatment of patients. The asthma guideline is based on the most current recommendations from the National Institutes of Health, National Heart, Lung, and Blood Institute, Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma, Full Report 2007 (the current full Asthma Guideline is available at http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm).

Additional Resources for Piedmont WellStar HealthPlans, Inc. patients

- ***My*Health Advice Line** is staffed by experienced Registered Nurses and is available 24/7 to provide telephone support to members. Call 855-514-3679.
- **Online** interactive preventive health programs and resources are available in partnership with WebMD by logging in at www.pwplans.org/individuals.

Scientific Evidence Sources:

1. Chatzi L and M Kogevinas. "Prenatal and Childhood Mediterranean Diet and the Development of Asthma and Allergies in Children." *Public Health Nutrition.* September 2009;12(9A):1629-1634.
2. Currie GP et al. "Long-Acting Bronchodilator or Leukotriene Modifier as Add-on Therapy to Inhaled Corticosteroids in Persistent Asthma?" *CHEST.* 2005;128:2954-2962. http://chestjournal.chestpubs.org/content/128/4/2954.full.pdf+html
3. Global Initiative for Asthma (GINA), National Heart, Lung, and Blood Institute (NHLBI). Global strategy for asthma management and prevention. Bethesda (MD): Global Initiative for Asthma (GINA), National Heart, Lung, and Blood Institute (NHLBI); 103 p. [861 references], 2010.
4. Key Clinical Activities for Quality Asthma Care. Recommendations of the National Asthma Education and Prevention Program. 2002.
5. Moorman JE, Rudd RA, Johnson CA, et al. National Surveillance for Asthma – United States, 1980 – 2004. CDC Surveillance Summaries (October 19). MMWR 56 (SS08). 2007.
6. National Asthma Education and Prevention Program Expert Panel Report: guidelines for the diagnosis and management of asthma update on selected topics — 2002. *Journal of Allergy and Clinical Immunology* 2002. Nov; 110(5 pt 2):S141-219.
7. The National Institutes of Health, National Heart, Lung, and Blood Institute. Expert Panel Report 3: Guidelines for the Diagnosis and Management of Asthma Full Report 2007. http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm
8. Sveum R et al. Institute for Clinical Systems Improvement. Diagnosis and Management of Asthma. Updated July 2012. Available at: http://www.icsi.org/asthma outpatient/asthma diagnosis_management_of guideline_.html.