# IN THE NAME OF GOD

## Asthma Attack

An asthma attack is a sudden worsening of asthma symptoms caused by the tightening of muscles around your airways. This tightening is called a bronchospasm. During the asthma attack, the lining of the airways also becomes swollen or inflamed and thicker mucus -- more than normal -- is produced. All of these factors -- bronchospasm, inflammation, and mucus production -- cause symptoms of an asthma attack such as trouble breathing, wheezing, coughing, shortness of breath, and difficulty performing normal daily activities.

## <u>Diagnosis</u>

Asthma exacerbations can be classified as mild, moderate, severe, or life threatening. Criteria for exacerbation severity are based on symptoms and physical examination parameters, as well as lung function and oxygen saturation.

Degree of severity	Symptoms and signs	Initial PEF (or FEV <sub>1</sub> )	Clinical course
Mild	Dyspnea only with activity (assess tachypnea in young children)	PEF ≥ 70 percent of predicted or personal best	Usually treated at home Prompt relief with inhaled short-acting beta <sub>2</sub> agonist Possible short course of oral systemic corticosteroids
Moderate	Dyspnea interferes with or limits usual activity	PEF 40 to 69 percent of predicted or personal best	Usually requires office or emergency department visit Relief from frequent inhaled short-acting beta <sub>2</sub> agonist Oral systemic corticosteroids; some symptoms last for one to two days after treatment begins
Severe	Dyspnea at rest; interferes with conversation	PEF < 40 percent of predicted or personal best	Usually requires emergency department visit and likely hospitalization Partial relief from frequent inhaled short-acting beta <sub>2</sub> agonist Oral systemic corticosteroids; some symptoms last for more than three days after treatment begins Adjunctive therapies are helpful
Subset: life threatening	Too dyspneic to speak; perspiration	PEF < 25 percent of predicted or personal best	Requires emergency department visit/hospitalization; possible intensive care unit Minimal or no relief from frequent inhaled short-acting beta <sub>2</sub> agonist Intravenous corticosteroids Adjunctive therapies are helpful

#### Table 1. Classifications of Severity of an Asthma Exacerbation

 $FEV_1$  = forced expiratory volume in one second; PEF = peak expiratory flow.

Adapted from the National Heart Lung and Blood Institute. National Asthma Education and Prevention Program. Expert panel report 3: Guidelines for the diagnosis and management of asthma; 2007:375. http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm.

Although no single parameter has been identified to assess exacerbation severity,lung functionis a useful method of assessment,with a PEF of 40 percent or less of predicted function indicating a severe attack in patients five yearsor older.

The most useful signs for determining the severity of an asthma exacerbation in children younger than five years, or any child unable to perform a PEF, include the use of accessory muscles of respiration, chestwall retractions, tachypnea greater than 60 breaths per minute, cyanosis, and the presence of inspiratory and expiratory wheezing.

For all patients, pulse oximetry on room air is a useful initial assessment. An oxygen saturation of less than 92 to 94 percent one hour after beginning standard treatment is a strong predictor of the need for hospitalization. Laboratory data are not required for most patients with acute exacerbations.

Chest radiography is not routinely recommended because it has not been shown to alter the care of patients withan uncomplicated asthma exacerbation.



### HOME TREATMENT

## EMERGENCY DEPARTMENT TREATMENT

#### Management of Asthma Exacerbations: Home Treatment

#### **Assess severity**

Patients at high risk of a fatal asthma attack require immediate medical attention after initial treatment

Symptoms and signs suggestive of a more serious exacerbation (e.g., marked breathlessness, inability to speak more than short phrases, use of accessory muscles, drowsiness) require initial treatment and immediate consultation with a physician

Less severe signs and symptoms can be treated initially with assessment of response to therapy and further steps, as listed below

If available, measure PEF; persons at 50 to 79 percent of predicted or personal best need quick-relief medication. Depending on the response to treatment, consultation with a physician also may be needed. Persons with PEF below 50 percent need immediate medical care.

#### Initial treatment

Inhaled short-acting beta<sub>2</sub> agonist: up to two treatments, 20 minutes apart, of two to six puffs by metered-dose inhaler with spacer or nebulizer treatments NOTE: Medication delivery is highly variable; children and persons who have exacerbations of lesser severity may need fewer puffs

#### **Good response**

No wheezing or dyspnea (assess tachypnea in young children)

PEF ≥ 80 percent of predicted or personal best

- Contact physician for follow-up instructions and further management
- May continue inhaled short-acting beta<sub>2</sub> agonist every three to four hours for 24 to 48 hours
- Consider short course of oral systemic corticosteroid

#### Incomplete response

Persistent wheezing and dyspnea (tachypnea)

PEF of 50 to 79 percent of predicted or personal best

- Add oral systemic corticosteroid
- Continue inhaled short-acting beta<sub>2</sub> agonist
- Contact physician immediately for further instructions

#### Poor response

Marked wheezing and dyspnea

PEF < 50 percent of predicted or personal best

- Add oral systemic corticosteroid
- Repeat inhaled short-acting beta<sub>2</sub> agonist immediately
- If distress is severe and nonresponsive to initial treatment: call physician and proceed to the emergency department; consider calling 911

#### Figure 1. Algorithm for home management of acute asthma exacerbations. (PEF = peak expiratory flow.)

Adapted from the National Heart Lung and Blood Institute. National Asthma Education and Prevention Program. Expert panel report 3: Guidelines for the diagnosis and management of asthma; 2007:382. http://www.nhlbi.nih.gov/guidelines/asthma/asthgdln.htm.

#### Management of Asthma Exacerbations: Emergency Department and Hospital-Based Treatment

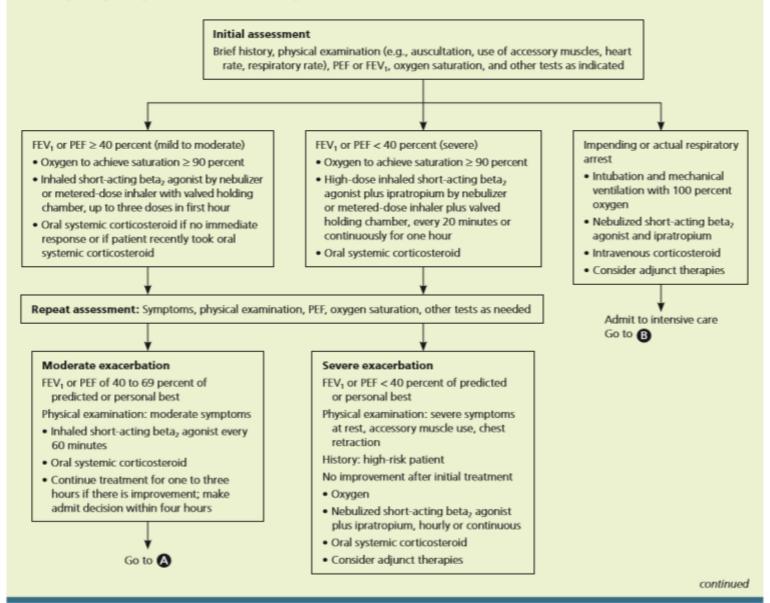
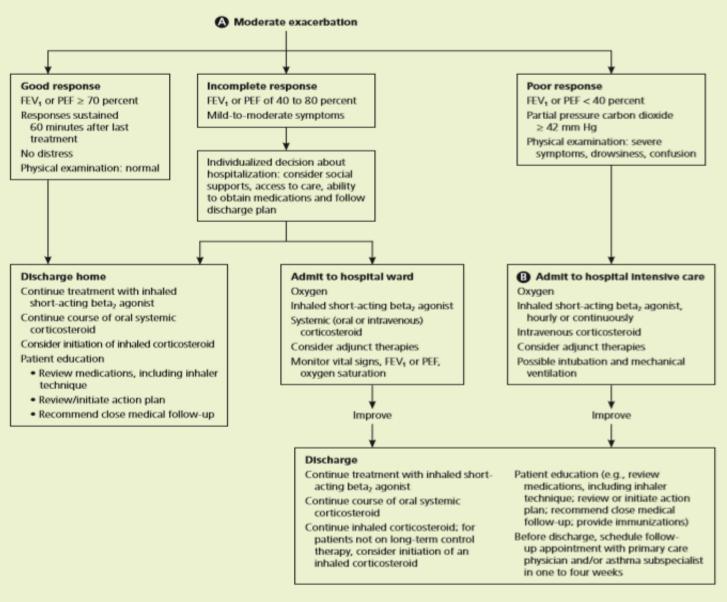


Figure 2. Algorithm for emergency department and inpatient management of acute asthma exacerbations. (FEV<sub>1</sub> = forced expiratory volume in one second; PEF = peak expiratory flow.)

#### Management of Asthma Exacerbations: Emergency Department and Hospital-Based Treatment (continued)



**Figure 2.** Algorithm for emergency department and inpatient management of acute asthma exacerbations. (FEV<sub>1</sub> = forced expiratory volume in one second; PEF = peak expiratory flow.)

Adapted from the National Heart Lung and Blood Institute. National Asthma Education and Prevention Program. Expert panel report 3: Guidelines for the

## **POSTDISCHARGE CARE**

Patients sent home from the emergency department with systemic corticosteroids (a five-to10-day nontapering course of 50- to 100mg prednisone per day in adults) have decreased relapse of asthma symptoms, future hospitalizations, and use of short-acting beta2 agonists. Allergen avoidance is routinely recommended after emergency department discharge to decrease further acute exacerbations of asthma. Regardless of the therapy chosen in the acute care setting, step-up therapy should be continued for several days to weeks after discharge. Because exacerbations vary in severity, close communication between patients and physicians is required. Symptoms may be controlled quickly, but airway inflammation may persist for two to three weeks. Scheduled dosing with inhaled beta2 agonists should be continued until symptoms and PEF return to baseline.