

Asthma – ED Clinical Practice Guideline

These guidelines are modified from the 1997 National Heart, Lung, and Blood Institute (NHLBI) Asthma Guidelines and the 2007 update. They are intended for use in patients with known asthma who are greater than 2 years of age. Please direct any questions to Drs. Mette or Mick at Maine Medical Center.

ACUTE ASTHMA EXACERBATION CLASSIFICATION

Mild Exacerbation

- Patient is alert and oriented, speaks in sentences, is dyspneic only with activity, may have slight expiratory wheezing, and is tachypneic.
and/or
- FEV₁/peak flow \geq 70% of predicted or personal best
and/or
- O₂ saturation > 95% (O₂ saturation not usually necessary)

Moderate Exacerbation

- Patient is agitated, not playful, and speaks in phrases. Patient is using accessory muscles, may have loud wheezing, and is tachypneic.
and/or
- FEV₁/peak flow 40 - 69% of predicted or personal best
and/or
- O₂ saturation 90 - 95% (O₂ saturation not usually necessary)

Severe Exacerbation

- Patient is breathless at rest. Dyspnea interferes with conversation (e.g. speaks in words). Patient is using accessory muscles, has suprasternal retractions, may or may not have loud wheezing (throughout inhalation and exhalation), and is tachypneic.
and/or
- FEV₁/peak flow < 40% of predicted or personal best
and/or
- O₂ saturation < 90%

Algorithms are not intended to replace providers' clinical judgement or to establish a single protocol. Some clinical problems may not be adequately addressed in this guideline. As always, clinicians are urged to document management strategies.

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At Maine Medical Center



Risk Factors for Acute Decompensation and Mortality

The following are some of the risk factors that increase the potential for acute decompensation and mortality for patients with acute asthma exacerbations. These issues should be reviewed with the patient during the initial history. More conservative treatment for patients with any of the following risk factors is advised.

- Previous severe exacerbation (e.g. intubation or ICU admission for asthma)
- Two or more hospitalizations for asthma in the past year
- Three or more ED visits in the past year for asthma exacerbations
- Hospitalization or ED visit for asthma in the past month
- Recent course of oral corticosteroids
- Using > two canisters of short-acting beta₂-agonist (e.g. albuterol) in the past month
- Difficulty perceiving the severity of asthma symptoms in the context of an exacerbation
- Cardiovascular disease
- Chronic lung disease
- Major psychosocial problems
- Chronic psychiatric disease

Co-Morbidities Associated with Acute Asthma Exacerbations

A number of medical conditions are associated with acute asthma exacerbations. Treatment of these co-morbidities shortens the duration of acute asthma exacerbations, and long-term therapy, when appropriate, may prevent future exacerbations. Consider diagnosis and treatment of the following conditions in patients with acute asthma exacerbations.

Allergic Rhinitis
Sinusitis
Otitis media

Pneumonia
Gastroesophageal reflux

Patient Education

Patient education is essential during acute asthma exacerbations and for management of chronic asthma. Educational efforts for all patients and families should begin prior to discharge with emphasis on:

- Basic facts about asthma
- Roles of medications
- Skills using inhalers, nebulizers, peak flow meters, and spacer devices
- Environmental control measures
- Action plans – home and school
- If patient is in a smoking environment, encourage a smoking cessation program -- 800-207-1230, The Maine Tobacco Helpline.

Mild Exacerbation

These patients rarely require inpatient treatment for asthma. When classifying severity, consider therapy received prior to hospital encounter and response to initial treatments.

Assess patient. Obtain T, P, R, weight, and height (as appropriate) in ED. Obtain FEV₁/peak flow if ≥ 5 y old.

- Patient is alert and oriented, speaks in sentences, is dyspneic only with activity, may have slight expiratory wheezing, and is tachypneic; and/or,
- FEV₁/peak flow $\geq 70\%$ of predicted or personal best; and/or,
- Oxygen saturation $> 95\%$ (O₂ saturation not usually necessary).

Administer nebulized albuterol 2.5 mg or albuterol MDI 2 - 8 puffs, with valved holding chamber (spacer). Up to 3 treatments via traditional nebulizer or MDI may be given over the first hour. If using a BAN (breath actuated nebulizer) only one treatment may be needed.

Check pulse, respirations, chest exam, and FEV₁/peak flow 20 minutes after inhaled treatment completed.

If patient does not improve

Follow guideline for [Moderate Exacerbation](#)

If patient improves:

- Response sustained 60 minutes after last treatment
- No wheezing, no shortness of breath
- Normal physical exam

Discharge home with the following:

- Inhaled albuterol q 4 - 6 hours for 24 - 48 hours and, then, q 4 - 6 hours *prn* or as directed by healthcare provider
- If the patient has recently been on systemic corticosteroids, consider treatment with oral corticosteroids 0.5 - 1 mg/kg q 12 hours for 3 - 10 days (maximum 60 mg/day in children, 80 mg/day in adults). Adults may be dosed daily. Consider tapering for patients requiring > 6 days of oral corticosteroids.
- Continue controller medications
- If not on inhaled corticosteroids, consider initiating treatment

Follow-up by phone or office visit with primary care provider within 1 - 5 days.

Moderate Exacerbation

Assess patient. Obtain T, P, R, weight, and height (as appropriate) in ED. Obtain FEV₁/peak flow if ≥ 5 y old.

- Patient is agitated, not playful, and speaks in phrases. Patient is using accessory muscles, may have loud wheezing, and is tachypneic; and/or,
- FEV₁/peak flow 40 - 69% of predicted or personal best; and/or,
- Oxygen saturation 90 - 95% (O₂ saturation not usually necessary).

Administer nebulized albuterol 2.5 mg or MDI 2 - 8 puffs, with valved holding chamber (spacer). May consider adding ipratropium. Up to 3 treatments via nebulizer or MDI may be given over the first hour and, then, spaced to q 1 - 3 hours if improvement is noted. If using a BAN (breath actuated nebulizer), fewer treatments may be needed.

Corticosteroids (oral – prednisone or equivalent) 1 - 2 mg/kg up to a maximum 60 mg in children, 80 mg in adults. Consider IV steroids if patient cannot tolerate oral medication.

Frequent vital sign monitoring, including pulse and respirations.

Good Response

- FEV₁ or PEF ≥ 70%
- Sustained response 60 minutes after treatment
- No dyspnea or oxygen requirement
- Normal physical exam

Discharge home (if O₂ saturation is consistently ≥ 90%) with the following:

- Inhaled albuterol q 4 - 6 hours for 24 - 48 hours and, then, q 4 - 6 hours *prn* or as directed by healthcare provider
- Oral corticosteroids 0.5 - 1 mg/kg q 12 hours for 3 - 10 days (maximum 60 mg/day in children, 80 mg/day in adults). Adults may be dosed daily. Consider tapering for patients requiring > 6 days of oral corticosteroids.
- Continue controller medications
- If not on inhaled corticosteroids, consider initiating treatment

Follow-up by phone or office visit with primary care provider within 24 - 48 hours.

Incomplete Response

- FEV₁ or PEF 40 - 69%
- Mild to moderate symptoms

- Continue treatment with inhaled albuterol q 1 - 3 hours
- Continue systemic corticosteroids 0.5 - 1 mg/kg q 12 hours for 3 - 10 days (maximum 60 mg/day in children, 80 mg/day in adults). Adults may be dosed daily. Consider tapering for patients requiring > 6 days of systemic corticosteroids.
- Continue controller medications
- If not on inhaled corticosteroids, consider initiating treatment
- Consider hospitalization and follow guideline for [Inpatient Guideline for Moderate Exacerbation](#)

Poor Response

- FEV₁ or PEF < 40%
- Severe symptoms
Drowsy, confused

Follow guideline for [Severe Exacerbation](#) and admit to ICU

Severe Exacerbation

Assess patient. Obtain T, P, R, weight, and height (as appropriate) in ED. Consider FEV₁/peak flow if ≥ 5 y old. FEV₁/peak flow may be difficult or impossible to measure due to significant dyspnea and cough. Further, FEV₁/peak flow may not be appropriate in very severe cases of obvious airway compromise or cyanosis.

- Patient is breathless at rest. Dyspnea interferes with conversation (e.g. speaks in words). Patient is using accessory muscles, has suprasternal retractions, may or may not have loud wheezing (throughout inhalation and exhalation), and is tachypneic; and/or,
- FEV₁/peak flow $< 40\%$ of predicted or personal best; and/or,
- Oxygen saturation $< 90\%$.

Administer oxygen to keep saturation $\geq 90\%$. Administer moderate to high dose nebulized albuterol plus ipratropium q 20 minutes x 3, or albuterol continuously for 1 hour. BAN (breath actuated nebulizer) is recommended to increase delivery of nebulized medications in severe exacerbations.

Corticosteroids (oral – prednisone or equivalent) 1 - 2 mg/kg up to a maximum 60 mg in children, 80 mg in adults. Consider IV steroids if patient cannot tolerate oral medication.

Frequent vital monitoring, including pulse, respirations, and continuous pulse oximetry.

Good Response

- FEV₁ or PEF $\geq 70\%$
- Sustained response 60 minutes after treatment
- No dyspnea or oxygen requirement
- Improved physical exam

- Consider hospitalization
- Wean oxygen to keep saturations $\geq 90\%$
- Wean nebulized albuterol to q 3 - 4 hours
- Continue systemic corticosteroids 0.5 - 1 mg/kg q 12 hours for 3 - 10 days (maximum 60 mg/day in children, 80 mg/day in adults). Adults may be dosed daily. Consider tapering for patients requiring > 6 days of systemic corticosteroids.
- Continue controller medications
- If not on inhaled corticosteroids, consider initiating treatment

Incomplete Response

- FEV₁ or PEF 40 - 69%
- Mild to moderate symptoms

- Arrange for hospitalization
- Continue supplemental oxygen
 - Continue nebulized albuterol and ipratropium q 1 - 3 hours or albuterol continuously at 0.15 - 0.5 mg/kg/hour (maximum of 10 - 15 mg/hour) while in ED
 - Continue systemic corticosteroids 0.5 - 1 mg/kg q 6 - 12 hours (maximum 60 mg/day in children, 80 mg/day in adults). Consider tapering for patients requiring > 6 days of systemic corticosteroids.
 - Continue controller medications
 - If not on inhaled corticosteroids, consider initiating treatment
 - Refer to [Inpatient Guideline for Severe Exacerbation](#)

Poor Response

- FEV₁ or PEF $< 40\%$
- PCO₂ ≥ 42 mm Hg
- Severe symptoms
- Drowsy, confused

- Admit to ICU – With orders for:
- Supplemental oxygen
 - Nebulized albuterol and ipratropium q 1 - 2 hours or albuterol continuously at 0.15 - 0.5 mg/kg/hour (maximum of 10 - 15 mg/hour)
 - Systemic corticosteroids 0.5 - 1 mg/kg q 6 - 12 hours
 - Consider arterial line for serial ABGs
 - Continue controller medications
 - Consider adjunctive therapies

ICU Admission Criteria

- Intubated or pending intubation
- pCO₂ greater than 55
- Requiring more than 50% FiO₂
- Requiring nebulized therapies more frequently than q 2 hours
- Altered mental status
- Acute pneumothorax
- Use of adjunctive therapies – heliox, terbutaline, magnesium