

## DEFINITION

Asthma is a chronic inflammatory disease of the airways characterized by repeated episodes of wheezing, shortness of breath, and cough due to reversible airflow obstruction and bronchial hyper-responsiveness. An asthma exacerbation is a worsening of respiratory symptoms in a client with a pre-existing diagnosis of asthma.

## IMMEDIATE CONSULTATION REQUIRED IN THE FOLLOWING SITUATIONS

- Acute respiratory distress (moderate to severe exacerbation) as indicated by:
  - Difficulty speaking (unable to complete sentences)
  - Marked use of accessory muscles of respiration
  - Breath sounds decreased in intensity
  - Diffuse, high-pitched wheezes (inspiratory, expiratory, or both)
  - SpO<sub>2</sub> < 90%
- Agitated, diaphoretic
- No prior relief afforded by β<sub>2</sub>-agonists
- Status asthmaticus: beware of the "silent chest" (poor air entry, no wheezing) in a client with a history of asthma that presents in acute respiratory distress

## CAUSES

Although the exact cause is unknown, three principle triggers for exacerbation of asthma have been identified:

1. Allergies and environmental factors
  - a. Allergens may include inhaled substance (e.g., molds, pollens, dust, animal dander, cosmetics, and tobacco smoke).
  - b. Medications, particularly beta-blockers, aspirin, or aspirin containing drugs.
2. Infections
  - a. Upper respiratory tract infections (URTIs) are common precursors to an asthma attack.
  - b. Viral infections commonly precede an asthma attack.
3. Psychological factors
  - a. Stressful events at work or home or a series of crises may precipitate an asthma attack. Many times the stressor is overlooked or dismissed.

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Inflammation of the airways contributes to bronchial hyperreactivity, airflow limitation, and the resultant signs and symptoms of asthma: wheezing, breathlessness, chest tightness, and cough.

**PREDISPOSING AND RISK FACTORS**

- Familial tendency
- Poorly controlled asthma
- Frequent, viral infections of the respiratory tract
- Overcrowded housing
- Dust/mold/poor status of housing (e.g., exposed walls, insulation, increased humidity)
- Long delay in seeking medical care
- Non-adherence to pharmacological treatment

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**HISTORY**

Table 1

*Elements to Consider when Assessing Asthma Exacerbation*

<p>History</p>	<ul style="list-style-type: none"> <li>• Cough</li> <li>• Recurrent wheeze (absence does not rule out asthma)</li> <li>• Recurrent episodic dyspnea</li> <li>• Recurrent chest tightness</li> <li>• Compliance and/or frequency of medication use</li> </ul>
<p>Symptoms worsen in relation to specific factors</p>	<ul style="list-style-type: none"> <li>• Airborne chemicals or dust</li> <li>• Animals with fur or feathers</li> <li>• Changes in weather</li> <li>• Exercise</li> <li>• Gastroesophageal reflux</li> <li>• Sensitivity to ASA, other NSAIDs, and sulfites</li> <li>• Dust mites in house (mattresses, furniture, carpets)</li> <li>• Menses</li> <li>• Mold/pollen</li> <li>• Night time (client awakens)</li> <li>• Smoke (tobacco, wood, etc.)</li> <li>• Strong emotional expression (laughing, crying hard)</li> <li>• Viral infection/rhinitis/sinusitis</li> </ul>

Adapted from *Primary care: The art and science of advanced practice nursing* (4th ed.), p. 249, by L. M. Dunphy, J. E. Winland-Brown, B. O. Porter, & D. J. Thomas, 2015, Philadelphia: F.A. Davis.

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**PHYSICAL FINDINGS**

Determining Severity

The severity of asthma is determined by the frequency and chronicity of symptoms, the presence of persistent airflow limitations, and the medication needed to maintain control of the condition.

Mild Exacerbation

- Exertion-related dyspnea, no acute distress
- Cough
- Respiratory rate normal or minimally elevated
- Heart rate < 100 beats per minute
- Low pitched wheezes (inspiratory or expiratory, or both, or none)
- Good response (usually) to short-acting  $\beta_2$ -agonists

Moderate Exacerbation

- Dyspnea at rest (appears short of breath)
- Respiratory rate elevated
- Heart rate > 100 beats per minute
- Congested cough
- Tightness of the chest (some use of accessory muscles of respiration)
- Audible wheeze (high pitched wheezes in all lung fields - inspiratory or expiratory, or both)
- Nocturnal symptoms
- $\beta_2$ -agonists needed > q4h (may only provide partial relief)
- Preceding or current URTI
- Allergy history
  - Recent exposure to known allergens (e.g., pollen)
  - Eczema (current or history of)
  - Frequent nose rubbing (crease across nose)
  - Watery eyes and nose
- Symptoms over previous 2-4 weeks
- Frequency of bronchodilator use (> 2 times per week)
- Activity level changes (e.g., missed work, sedentary activity)
- Hospital admissions for acute exacerbations

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**Severe Exacerbation**

- Dyspnea at rest (interferes with conversation)
- Partial relief achieved with frequent inhaled short-acting  $\beta_2$ -agonist
- Signs and symptoms as per those indicated in the “Immediate Consultation Required in the Following Situations” section

For moderate and severe exacerbation, consultation with a physician/RN(NP) is recommended for treatment plan and evacuation.

**DIFFERENTIAL DIAGNOSIS**

Airflow obstruction may result from foreign body aspiration or viral infection as well as a variety of pulmonary infections, such as:

- Tuberculosis
- Hypersensitivity pneumonitis or habitual cough

Hyperventilation syndrome, mitral valve prolapse, recurrent pulmonary emboli, congestive heart failure, and chronic obstructive pulmonary disease may mimic asthma.

Cough may be secondary to the use of certain drugs, such as:

- ACE inhibitors
- Beta blockers
- Aspirin
- NSAIDs

One key feature in making the determination of asthma is the reversibility of the condition.

**COMPLICATIONS**

- Severe acute attack may lead to hypoxia, respiratory distress that may progress to respiratory failure, atelectasis, pneumothorax, and death.

**INVESTIGATION AND DIAGNOSTIC TESTS**

Investigation and diagnostic tests are determined in consultation with a physician/RN(NP) and may include the following:

- Spirometry

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- Peak Expiratory Flow self-monitoring by client

**MAKING THE DIAGNOSIS**

- Suspect asthma exacerbation in the presence of signs and symptoms listed under Physical Findings.

**MANAGEMENT AND INTERVENTIONS**

**Goals of Treatment**

- Relieve symptoms (reverse airflow obstruction, correct hypoxemia)
- Prevent complications (early bronchodilators and systemic corticosteroids)
- Prevent recurrence (adjust baseline therapy)

**Appropriate Consultation**

- Consult a physician/RN(NP) for all previously undiagnosed cases and in moderate to severe cases
- Failure to respond to treatment
- The client should be seen by a physician/RN(NP) after any incidence of exacerbation

**Moderate to Severe Asthma Exacerbation Management**

Consider this a respiratory emergency:

- Initiate oximetry and cardiac monitoring (if available)
- Start oxygen by non-rebreather mask
  - Titrate flow to keep SpO<sub>2</sub> > 94%
- Start intravenous (IV) therapy with normal saline; run at 250 mL per hour for the first hour
  - Aggressive fluid administration can help liquefy secretions and replace insensible losses with tachypnea and dyspnea (unless otherwise contraindicated)
- Consult a physician/RN(NP) as soon as possible after initiating emergency treatment

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- Emergency Pharmacological Interventions:
  - Salbutamol (Ventolin) MDI (metered dose inhaler) and spacer 100 micrograms/puff, 4-8 puffs q15-20 minutes, 3 times
    - Salbutamol nebulizer 2.5-5 mg q30 minutes, maximum 3 doses
  - In addition to salbutamol:
    - Ipratropium bromide (Atrovent) by MDI and spacer 20 micrograms/puff, 4-8 puffs q15-20 minutes, 3 times
    - Ipratropium bromide nebulizer 500 micrograms may be combined with Salbutamol nebulizer 2.5-5 mg q30 minutes, maximum 3 doses
  - In addition to salbutamol and ipratropium bromide:
    - MethylPREDNISolone (SoluMEDROL) 60-80 mg IV or prednisone 40-60 mg orally

Any additional doses of the above are in consultation with a physician/RN(NP) and according to client response.

**Non-Pharmacological Interventions**

- Recommend that the client avoid known precipitating factors such as environmental allergens and occupational irritants.
- Offer counselling for smoking cessation (if applicable).
- Recommend that the client avoid NSAIDs and ASA products.

**Pharmacological Interventions**

- Most clients with asthma should be on maintenance inhaled corticosteroids.
- A temporary increase in inhaled corticosteroid may be needed to re-establish control and treat the exacerbation:
  - If client is using inhaled steroids regularly as prescribed, during an exacerbation the dose may need to be increased by 4 times the usual.
  - If client has not been taking prescribed asthma medications recently, restart the usual dose.
- Other treatment options include:
  - Salbutamol (Ventolin) MDI and spacer 100 micrograms/puff, 4-8 puffs q15-20 minutes, 3 times (additional doses dependent on response)
  - Ipratropium bromide (Atrovent) MDI and spacer, 20 micrograms/puff, 4-8 puffs q15-20 minutes, 3 times

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- If MDI with spacer is not accessible, salbutamol or ipratropium bromide may be administered through nebulization:
  - Salbutamol nebulizer 2.5-5 mg q30 minutes, maximum 3 doses
  - Ipratropium bromide nebulizer 500 micrograms may be combined with Salbutamol nebulizer 2.5-5 mg q30 minutes, maximum 3 doses
- For those clients with symptoms that do not resolve, consult with a physician/RN(NP).

The RN(AAP) will ensure clients have the following medications prior to discharge from the clinic. If the client does not have them, the RN(AAP) will prescribe and dispense:

- Fluticasone (Flovent) MDI and spacer 250 micrograms/puff, 1-2 puffs bid for 1 month
- Salbutamol (Ventolin) MDI and spacer 100 micrograms/puff, 2 puffs qid for 1 month

**Adjuvant Therapy**

- Encourage annual influenza vaccine and other influenza vaccines
- Encourage pneumococcal vaccine

**Client and Caregiver Education**

Home management of asthma exacerbation is an integral part of asthma management. It is recommended that there is a written action plan which includes guided self-management. An Action Plan based on symptoms and use of the “stop light” analogy is recommended and is available at:

[http://www.asthma.ca/adults/control/pdf/AsthmaActionPlan\\_ENG.pdf](http://www.asthma.ca/adults/control/pdf/AsthmaActionPlan_ENG.pdf)

Clients need to be educated to recognize *early symptoms* of decreasing lung function and to adjust their medications accordingly:

- Increased frequency of inhaled  $\beta_2$ -agonists (> 2 puffs 4 times a day).
- Initiate or increase corticosteroid treatment under certain circumstances:
  - For mild exacerbation in clients who are already using inhaled corticosteroids, quadruple the dose until chest condition returns to pre-exacerbation status. If no improvement, the client should return for assessment.



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- For moderate to severe exacerbation, a course of oral steroids is needed. Clients who are able to self-manage their asthma may have oral prednisone tablets at home with a management plan so they can begin therapy immediately.
- Clients need to continue more intensive therapy for several days until the condition returns to normal.
- Clients must contact their health care provider any time they begin oral steroids or increase their inhaled corticosteroid dose, if the attack is severe, or if emergent treatment is needed.
- Counsel client/caregiver on how to minimize local side effects (oral candidiasis) by careful rinsing of the mouth and gargling.
- Counsel client/caregiver about the appropriate use of medications (dose, frequency, compliance, etc.).

**Monitoring and Follow-Up**

- Advise follow-up in 24 hours or less if symptoms are not controlled or condition becomes worse.
- Clients at risk of relapse:
  - Previous near-death episode
  - Recent emergency room visit for acute exacerbation
  - Frequent admissions to hospital, past intubations
  - Dependent on steroids and recent use of oral steroids
  - History of sudden attacks
  - Allergic or anaphylactic triggers
  - Recent attack of prolonged duration
  - Poor understanding of illness and poor adherence to therapy
  - No removal of environmental triggers

**Referral**

- Moderate to severe acute symptoms, including those conditions listed in the “Immediate Consultation Required in the Following Situations” section.
- Client not well controlled on current medication.

**DOCUMENTATION**

- As per employer policy

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SASKATCHEWAN REGISTERED NURSES' ASSOCIATION

RNs WITH ADDITIONAL AUTHORIZED PRACTICE  
CLINICAL DECISION TOOL  
AUGUST 2017

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Respiratory Review Panel. (2011). *Updated respiratory (Asthma/COPD) guidelines for family practice*. Toronto, ON: MUMS Guideline Clearinghouse.

Rx Files Academic Detailing Program. (2014). *Rx Files: Drug comparison charts*. Saskatoon, SK: Saskatoon Health Region.

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