

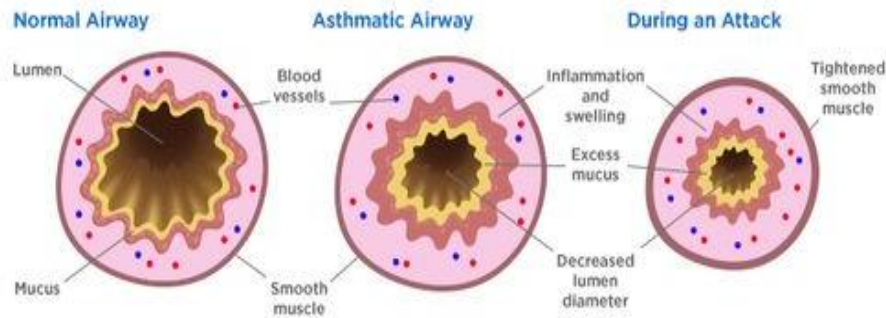


- **Definition:**

- It is a reversible obstructive lung disease in which there is hypersensitivity reaction of bronchial tree to different stimuli/triggers.

- **Pathophysiology:**

- **A stimulus will bind to IgE antibodies which in turn will bind to mast cells that will release different inflammatory mediators. The following changes will occur within the bronchial tree:**
 - ✓ Increased mucous production.
 - ✓ Constriction of bronchial smooth muscle.
 - ✓ Edema and inflammation of bronchial mucosa.



A person may experience a range of symptoms that gradually increase over a period of time and eventually lead to a full-blown asthma attack. Some common signs to be aware of include chest pain, shortness of breath, wheezing, and increased heart rate.

- **Epidemiology:**

- Commonly affecting young patients. 50% of them will be free of asthma when they reach adulthood.

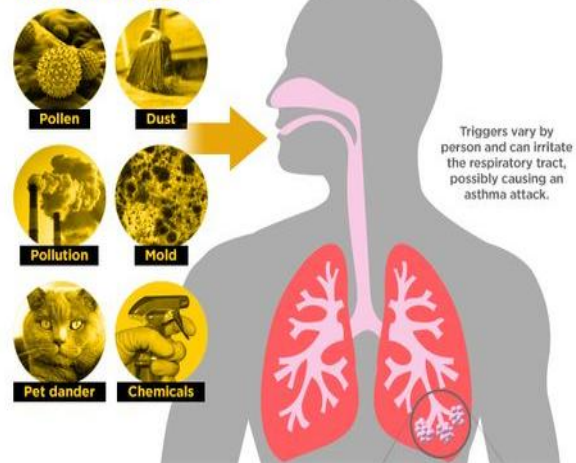
- **Etiology:**

- **There are two types of asthma**
 - ✓ **Intrinsic (non-allergic):** in 50% of asthmatic patients. Secondary bronchial reaction occurs due to non-immunologic stimuli (e.g. infection, exercise). Asthma attacks are severe and prognosis of this type is poor.
 - ✓ **Extrinsic (allergic):** in 20% of asthmatic. It results from sensitization and serum IgE levels are elevated. There is positive family history of allergic diseases (such as eczema). Prognosis of this type is good.

Asthma Attack

Asthma attacks can come on swiftly and strongly. Some asthma attacks are so severe they can result in hospitalization or death. Here's what you need to know.

Common Triggers



- **Respiratory tract infections (most common cause of asthma exacerbations):** RSV in children and rhinovirus in adults.
- **Pharmacologic stimuli:** aspirin and other NSAIDs which cause chronic over-secretion of leukotrienes that activate mast cells. This is the reason why leukotriene inhibitors (e.g. zafirlukast) are considered to be effective in managing asthma especially in children.



- **Clinical manifestations:**

- Cough (might be worse at night).
- Dyspnea (difficulty in breathing).
- Tachypnea (increased respiratory rate)
- Diffuse wheezing with prolonged expiration.

- **Diagnosis:**

- **Labs:** elevated eosinophils $> 4\%$ and elevated serum IgE > 100 IU
- **Pulmonary Function Test (PFT):** which will show an obstructive pattern (FEV1 $< 80\%$ and FEV1/FVC ratio $< 80\%$). There is improvement by $\geq 12\%$ in FEV1 after the use of bronchodilators. If PFT is normal but you still suspect the diagnosis of asthma \rightarrow do methacholine challenge test \rightarrow after which there will be a decrease of 20% in FEV1/FVC ratio.
- **Chest x-ray:** although there might be signs of hyperinflation but it is not specific unless you want to rule out an infection as the trigger for asthma exacerbation.
- **Arterial Blood Gas (ABG):** in patients with severe asthma, it will show respiratory acidosis with hypercapnia ($\uparrow\text{CO}_2$).

- **Treatment (NOTICE THAT ONLY TREATMENT FOR ACUTE EXACERBATION OF ASTHMA WILL BE DISCUSSED IN THIS NOTE. FOR MORE DETAILS ABOUT THE TREATMENT OF ASTHAMTIC PATIENTS PLEASE REVIEW PHARMACOLOGY NOTE):**

- Oxygen supply with measurement of oxygen saturation by oximetry.
- Short-acting B₂-agonists (e.g. inhaled albuterol) which can be combined with inhaled ipratropium.
- Intravenous steroids: methyl prednisolone.
Notice that you do not need to know the doses as mentioned in your slides (not for your level).

- **What are the indications for hospitalization in patients with asthma?**

- Rapidly worsening of asthma or lack of response for initial treatment in emergency department.
- Confusion, drowsiness, signs of respiratory arrest (hypoxemia with $\text{PO}_2 < 60$ mmHg or hypercarbia with $\text{PCO}_2 > 45$ mmHg) or loss of consciousness.
- Intubation is required because of continued deterioration of patient's condition despite treatment.
- Status asthmaticus (acute exacerbation of asthma).