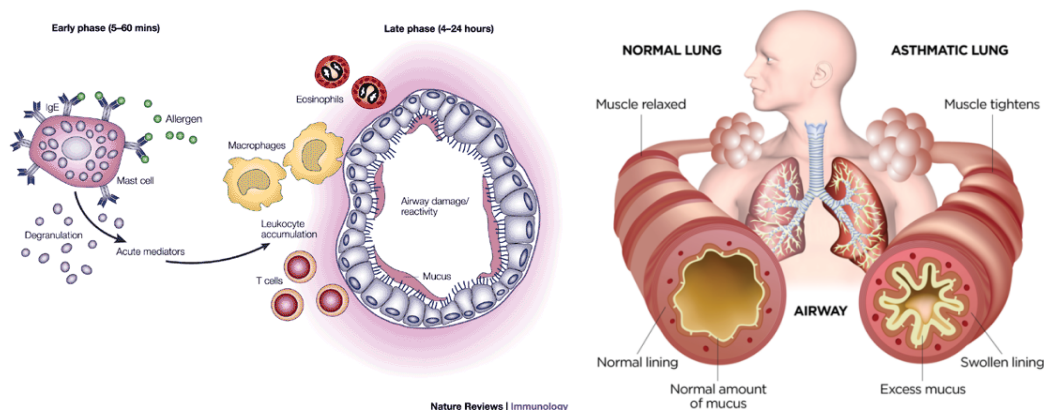


Asthma¹

- ❖ Asthma is a prevalent, chronic respiratory disease
- ❖ Heterogenous disease
- ❖ Causes include: allergy, irritant exposure, weather change, physical activity, or viral respiratory infections
- ❖ Asthma exacerbation: is defined by episodic or worsening symptoms

Pathophysiology of Asthma^{2,3,4}



Environmental stimuli expose dendritic cells to allergens, which are then presented to Th2 cells. The subsequent secretion of cytokines such as IL-4 and IL-5 by Th2 cells causes a variety of asthma symptoms. IL-4 induces the production of IgE antibodies, which coat the mast cells and stimulate their release of histamine, leukotrienes, and prostaglandins. IL-5 induces eosinophils to secrete leukotrienes and cytokines, which further stimulate the immune response. There is an increase in mucous secretion and bronchial smooth muscle spasms, both of which constrict the airways and make it difficult to breathe. In addition, there is a rise in vascular permeability and an increase in immune cell recruitment from the circulation. These immune cells, eosinophils, release chemical mediators that degrade the pulmonary endothelium. This is initially reversible, but over time it can cause irreversible injuries, including edema, fibrosis, scarring, and thickening of the epithelial basement membrane, resulting in a narrowing of the airway diameter.

| | |
|--|--|
| Risk Factors^{1,4,5} | Family history of asthma, formula feeding, caesarian section, lower socioeconomic status, smoking, obesity, poor medication adherence, seasonal changes, food allergy. |
| Protective Factors^{1,4,5} | Breastfeeding, natural birth, healthy diet, physical activity, low stress levels, increased educational level. |
| Risk factors that increase asthma-related death^{1,4,5} | Prior hospitalization or ER visit in the previous 12 months; excessive use of SABAs (i.e., albuterol); poor adherence to proper medication; food allergies; comorbidities (i.e., diabetes, pneumonia, arrhythmias); psychiatric disease diagnosis; and a history of requiring intubation/mechanical ventilation. |
| Clinical Presentation^{1,4,5} | Shortness of breath, wheezing, chest tightness, coughing, difficulty sleeping and exercising. |
| Non-Pharmacological^{1,4,5} | Physical activity, health diet, smoking cessation, avoid irritants |

Pharmacological: Treatment of Asthma Exacerbation in Adults, Adolescents, Children (6-11 years)¹**Self-Management of Exacerbation – Written Action Plan**

Purpose: A patient-specific action plan is a document that lists the medications that need to be taken and when they need to be taken. The goal is to help patients keep track of their symptoms and how well their lungs are working so they can respond appropriately. The written action plan should include the name of the medication, usage instructions, and information on how to seek medical care. This asthma action plan should prevent the patient from visiting the ER or hospital.

Inhaled Reliever Medication (as needed low- dose ICS-formoterol or SABA)*Budesonide-Formoterol (Symbicort®)**Albuterol**Beclomethasone-Formoterol**Levalbuterol***Clinical Pearls:**

- ❖ Budesonide-formoterol and beclomethasone-formoterol were found to be the most efficacious in terms of symptom control, hospitalization reduction, and preventing flare-ups. This combination should be used for both maintenance and reliever purposes.
- ❖ ICS-formoterol may also be administered to children aged 4 to 11 years.
- ❖ When compared to SABA treatment alone, increasing the dose of the inhaled corticosteroid (ICS) formoterol during asthma exacerbations reduces the frequency of severe exacerbations in patients with mild asthma.
- ❖ Ventolin® is recommended in the treatment of asthma exacerbation in the primary care setting in adults, adolescents, and children ≥ 6
 - In mild to moderate exacerbations: 4-10 puffs every 20 minutes by pMDI and spacer for the first hour is effective in the treatment of flare-ups; then continue with albuterol as needed
- ❖ Ventolin® is recommended in the treatment of asthma exacerbation in the ED because it is cost effective. However, there is weaker evidence in severe cases.
- ❖ ADE of Symbicort®: nasopharyngitis, upper respiratory tract infections, headache, oral candidiasis
- ❖ ADE of Ventolin®: excitement, bronchospasm, tremor

Proper Technique⁶ – Symbicort®

First use; must be primed; shake the inhaler for 5 seconds; remove mouthpiece; fully exhale, then place your mouth onto the mouth piece; Inhaler must be upright and pointed towards the back of the throat; press down on the top of the inhaler; then remove; Hold your breath for 10 seconds; remove the inhaler from your mouth; breath out; rinse mouth; second puff: shake the inhaler well for 5 seconds and repeat the steps.

Reference

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Answer Key

1. Non-Pharmacologic: physical activity, health diet, smoking cessation, avoid irritants
2. Brand name of budesonide-formoterol: (*Symbicort*[®])
3. Symbicort ADE: nasopharyngitis, upper respiratory tract infections, headache, oral candidiasis
4. If the inhaler hasn't been used ___ days; when would you have to reprime it: 7 days
5. Bonus: World Asthma Day: May 2, 2023