Pharmacology and Anatomy of Inhalers for Asthma Management

Pharmacology

- Inhaled Corticosteroids (ICS)
  - First-line Asthma Control
- Short-Acting Beta Agonists (SABA)
  - Rapid Relief; Overuse Indicates Poor Control
- Long-Acting Beta Agonists (LABA)
  - Must be combined with ICS. ICS/LABA = maintenance and reliever
  - Single Maintenance and Reliever Therapy (SMART)
  - Maintenance and Reliever Therapy (MART)

- Triple inhalers
  - ICS
  - LABA
  - Long-Acting Muscarinic Antagonist (LAMA)
- Alternatives:
- Leukotriene Receptor Antagonists (LKTi) (e.g., montelukast)
- Short-Acting Muscarinic Antagonist (SAMA) (e.g., ipratropium)

Anatomy of Inhalers

- Metered Dose Inhaler (MDI)
  - Requires actuation and inhalation coordination; spacer improves delivery
- Dry Powder Inhaler (DPI)
  - Breath-actuated; strong inhalation needed

- Soft Mist Inhaler (SMI)
  - Slow mist; easier inhalation
- Nebulizer
  - For severe disease or those unable to use handheld devices

Step 1: Medication/Device Matching

- ICS (budesonide, fluticasone)
  - Control inflammation
- SABA (albuterol)
  - Rapid relief
- ICS/LABA (budesonide/formoterol, fluticasone/salmeterol)
  - Dual therapy

- Triple therapy fluticasone/umeclidinium/vilanterol **OR** Tiotropium/Olodaterol + mometasone
  - For difficult-to-control asthma
- LKTi (Montelukast)
  - Oral alternative; monitor for neuropsychiatric events
- SAMA (Ipratropium)
  - Adjunct during exacerbations

Step 2: Inhaler Selection by Patient Ability

- Assess inspiratory flow, coordination
- Choose MDI and spacer if poor coordination
- Choose DPI or SMI based on inspiratory ability

Patient Education

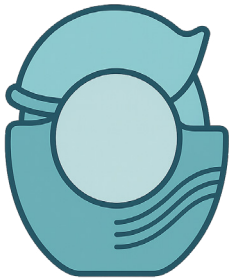
- Verify inhaler technique
- Reinforce daily controller use (ICS)
- Rinse mouth after ICS
- Develop/update asthma action plan

Monitoring and Therapy Adjustment

- Frequent SABA (> 1 canister/month)
- Taper ICS cautiously; avoid abrupt cessation
- Consider specialist referral if poor control persists

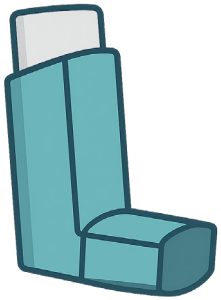
Defense Health Administration Inhaler Formulary

Dry Powder Inhaler (DPI)



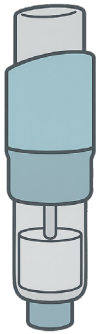
- Fluticasone/Salmerterol (Wixela) - (C)
- Fluticasone propionate / Salmeterol (Advair) - (C)
- Fluticasone furoate / Umeclidinium / Vilanterol (Trelegy) - (C)
- Fluticasone (Flovent) - (C)
- Albuterol (ProAir / RespiClick) - (R)

Metered Dose Inhaler (MDI)



- Albuterol - (R)
- Fluticasone (Flovent) - (C)
- Fluticasone propionate / Salmeterol (Advair) - (C)
- Budesonide/Formoterol (Symbicort) - (C)
- Budesonide/Formoterol (Breyna) - (R)/(C)

Soft Mist Inhaler (SMI)



- Tiotropium (Spiriva Respimat) - (C)

- Fluticasone/Salmerterol (Wixela) - (C)
- Mometasone (Asmanex Twisthaler) - (C)
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- Tiotropium/Olodaterol (Stiolto Respimat) - (C)

Reliever - (R)

Controller - (C)

Patient Handout

Pharmacology and Anatomy of Inhalers for Asthma Management

Why We Use Inhalers

Inhalers help control asthma and stop breathing problems before they get worse.

Kinds of Inhalers

- Daily Control (Controller): Helps stop asthma before it starts. (Example: budesonide, fluticasone.)
- Quick-Relief (Reliever): Helps you breathe fast during an attack. (Example: albuterol.)
- Combo Inhalers: Have two medicines in one to make it easier to use.

Different Kinds of Devices

- Puffer (MDI): You push and breathe in at the same time.
- Dry Powder (DPI): You breathe in fast and deep.
- Mist (SMI): A gentle mist you breathe in slowly.
- Nebulizer: A machine that makes a mist you breathe in.

How to Use Inhalers Correctly

- Always shake your puffer first.
- Always breathe out before using your inhaler.
- If you use a daily inhaler, rinse your mouth after to keep your mouth healthy.
- Ask your doctor to check how you are using it.

When to Ask for Help

- If you need your rescue inhaler more than twice a week.
- If you wake up at night with trouble breathing.
- If your inhaler isn’t helping like it used to.
- If you run out of medicine faster than before.

What You Should Know

- Take your daily inhaler even when you feel fine.
- Always keep your rescue inhaler with you.
- Work with your doctor to make an asthma plan just for you.

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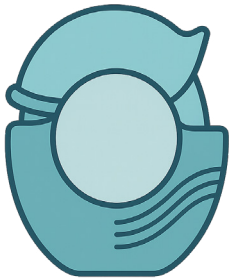

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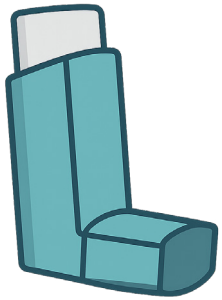

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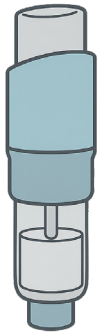
Soft Mist Inhaler (SMI)



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Reliever - (R)

Controller - (C)

Metered Dose Inhaler (MDI)

A MDI is a common inhaler that delivers a measured dose of medication using a propellant to push the drug into the lungs. This device is used for maintenance or rescue therapy in asthma and COPD management, especially for quick relief from symptoms.

Dry Powder Inhaler (DPI)

A DPI is an inhaler that delivers medication in the form of a dry powder. The patient needs to inhale forcefully to activate the device. It is used for maintenance therapy in asthma and COPD treatment.

Soft Mist Inhaler (SMI)

A SMI delivers a slow-moving mist of medication, allowing easier inhalation compared to MDIs. It is designed for patients who have difficulty using an MDI. It is typically used for maintenance therapy for chronic respiratory conditions.

Spacer Device

A spacer device is an attachment for MDIs that helps improve the delivery of medication to the lungs. It allows the medication to be inhaled more effectively and reduces the chance of medication deposition in the mouth and throat.

Peak Expiratory Flow Meter

A peak expiratory flow meter is used to measure the maximum speed of expiration (how fast a person can exhale air) and is used to monitor airway function in asthma patients. It helps in assessing the degree of asthma control.

Incentive Spirometer

An incentive spirometer is used to encourage deep breathing and improve lung expansion. It is often used post-surgery to help prevent atelectasis (collapse of the lung) and improve lung function.

Nebulizer

A nebulizer is a device that turns liquid medication into a fine mist that can be inhaled. It is used for patients who have difficulty using inhalers and is common for delivering bronchodilators or steroids in cases of acute asthma exacerbations or COPD.