Helping Patients Get the Most from Asthma Medications and Devices

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Disclosure of Conflicts of Interest

- I have no financial conflicts of interest to disclose.

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Agenda

- Proper use of inhalers
  - Metered-dose inhalers
  - Dry-powder inhalers
  - Soft-mist inhaler
- Spacers
- Nebulizers
- Peak flow meters

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The Challenge

- The most commonly prescribed asthma medications are administered by inhalation.
- Unless the inhaled medication is delivered to the bronchial tubes, it will be ineffective.
- Proper use of inhalers is not easy or intuitive; errors in their use are common.

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The Challenge (cont.)

- Some patients/families are prescribed more than 1 type of inhaler.
- Instructions for dose and frequency of administration are printed on the box (usually discarded) and not on the inhaler device itself.
- Patients often stop using their daily (preventive) inhalers when feeling well.

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The Opportunity

- Many patients have not been shown (or don't remember being shown) how to use their inhaler.
- As an asthma educator: teach/observe/review.
- Often, it's the basics (proper use of prescribed medication) that make the difference between well-controlled and poorly-controlled asthma.

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1. Metered-Dose Inhalers

- Years ago, asthma medications were administered by squeeze bulb nebulizer, with uncertain amounts of medication released with each squeeze.

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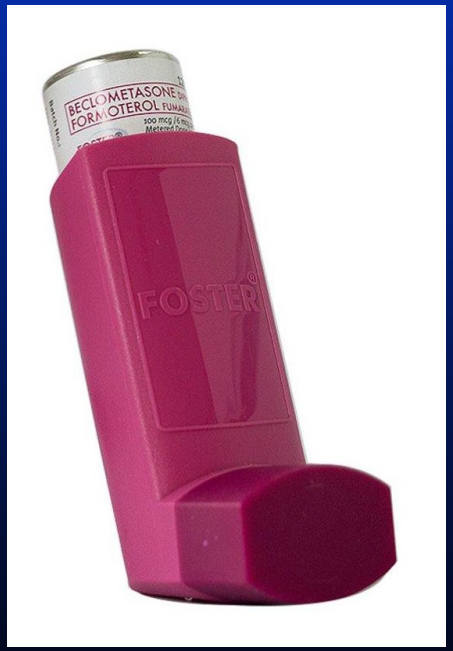
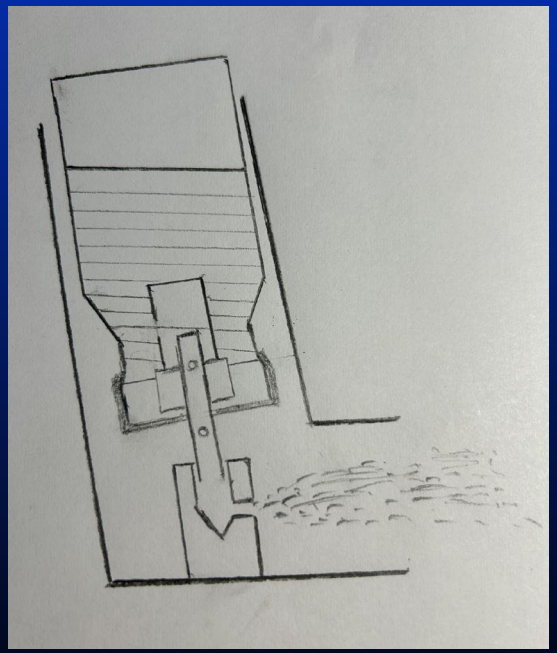
Metered-Dose Inhalers (cont.)

- In 1956 the first metered-dose inhalers were developed, where with each actuation the exact same amount of medication is released.





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Metered-Dose Inhalers (cont.)

- Medication is released from a pressurized canister by depressing (and releasing) the metal canister in its plastic holder.
- The propellant used to pressurize the canister is hydrofluoroalkane (HFA), so medications via metered-dose inhalers are often called by that name, like “albuterol-HFA.”

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Metered-Dose Inhalers (cont.)

- Upon activation, the medication spray comes out very rapidly, making it tricky to coordinate the timing of one's breath in with the release of the medication.

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How I Teach My Patients to Use Their Metered-Dose Inhaler (MDI)

Keep it simple!

- Remove the cap covering the mouthpiece.
- Shake the canister briefly to mix all components.
- Put the mouthpiece between lips and teeth.
- Actuate the inhaler by depressing and releasing the canister in its holder, and immediately
- Take in a **slow, deep** breath.
- Hold your breath for a few (5) seconds.

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How I Teach My Patients to Use Their Metered-Dose Inhaler (MDI)

- If the medication is a corticosteroid (steroid), rinse mouth with water after use – to minimize the risk of an oral yeast (candida) infection: “thrush.”

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What I Do NOT Instruct

- No need to breathe out (exhale) before taking a slow, deep breath in -- (*too complicated!).*
- If taking more than 1 puff per dose, no need to wait between puffs -- (*inhaler is ready for use as soon as patient is ready to repeat*).
- Do not use “open mouth” technique – (*medication is wasted; good aim is required!*).

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Determining When Inhaler is Empty

- All inhalers now have built-in dose counters.

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Determining When The Medication Has Expired

- Expiration date is printed on top of the metal canister.
- Medication may remain active for a few months after expiration date, but not a few years!!

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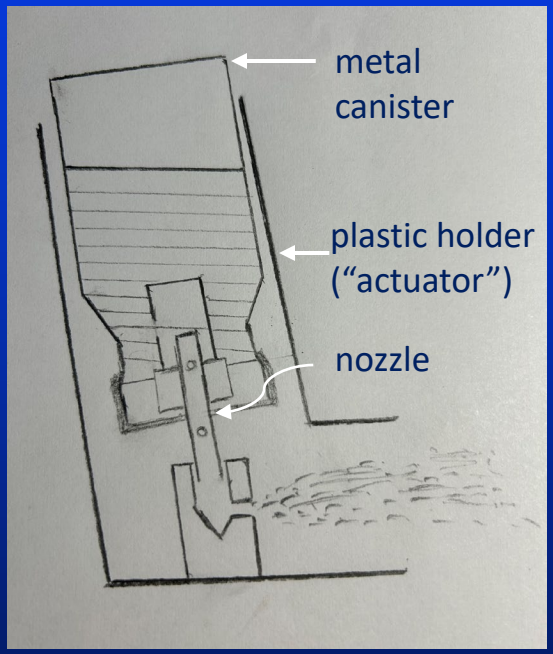
Cleaning the Devices

- MDIs can clog where the nozzle of the metal canister inserts into the well of the plastic holder.
- To clean, pull out metal canister, rinse bottom of plastic holder with water, allow to dry, then reassemble.



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Spacers ("Valved Holding-Chambers")

AeroChamber

Vortex

With attached facemaks

Opti-Chamber

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Value of Spacers

- Less emphasis on matching exact timing of inhalation to release of medication -- improves medication delivery to airways.
- Less medicine deposits on tongue and back of throat (especially helpful with inhaled steroid medicines – less risk of oral yeast infection [thrush]).

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Advantages of Spacer (cont.)

- Allows administration of medicine from MDI to infants and young children.

6 regular breaths/puff

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Use of Spacer

- Attach mouthpiece of MDI to spacer.
- Remove spacer's mouthpiece cover and place mouthpiece between lips and teeth.
- Squirt medication (1 puff) into chamber.
- Then take slow, deep breath from spacer mouthpiece.
- Hold breath for a few seconds.
- If the dose calls for more than 1 puff, repeat procedure (do **not** load chamber with multiple puffs).

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Other Points About Spacers

- Disadvantage: they are slightly bulky; "one more thing" to buy/carry.
- Can only be used with metered-dose inhalers; not meant for use with dry-powder inhalers or soft-mist inhalers.
- Cleaning: Simply disassemble, wash with soapy water, air dry, and reassemble.

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2. Dry-Powder Inhalers

- No pressurized spray; medicine is made available as a fine powder, inhaled from the device with the force of a breath in.
- Each pharmaceutical company has patented its own unique dry-powder inhaler (DPI) device, which needs to be prepared for medication release in its own way.

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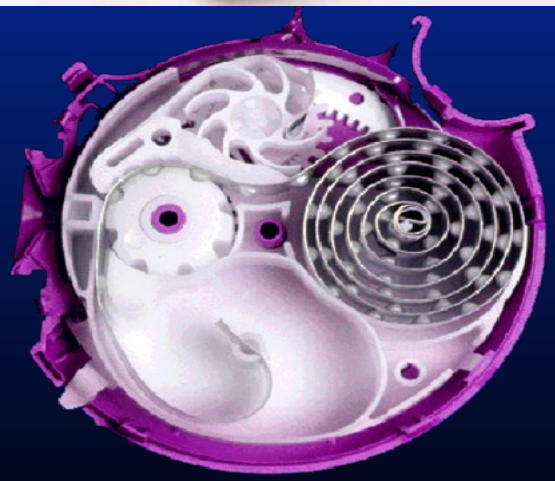
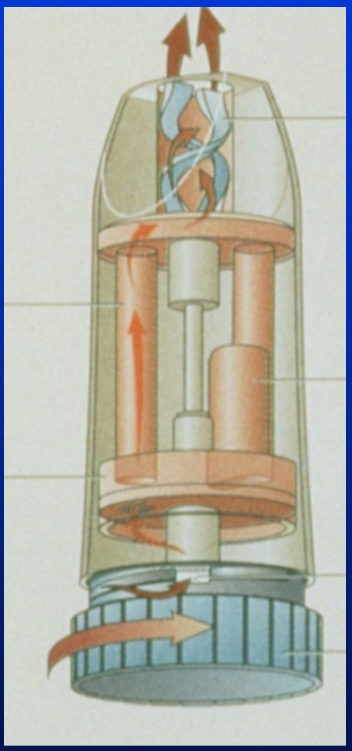
Examples of Dry-Powder Inhalers



Diskus



Turbuhaler

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More Examples of DPI Devices

Ellipta

Twisthaler

Respiclick

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General Instructions for DPI Use

- Open device to expose mouthpiece and prepare medication release.
- Place lips around mouthpiece.
- **Forceful** and **deep** breath in.
- Hold breath for few seconds before exhaling.

… and rinse mouth after use of inhaled steroid.

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Advantages of DPIs

- Medication only delivered when breathing in.
- If uncertain whether all of the medication was inhaled, it's o.k. to pull in a second breath of medicine (without re-setting for 2nd puff).
- No HFA propellant (which contributes a little to global warming).
- No need to shake inhaler before use.

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DPIs: Expiration Date

- Expiration date is printed on the packaging but not the device.
- General recommendation: discard 30-60 days after opening foil pouch.

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3. Soft-Mist Inhaler (Respimat)

- Unique delivery system from 1 pharmaceutical manufacturer (for their short- and long-acting bronchodilators).
- Upon actuation of the device, medication is released as a mist over about 1 ½ seconds, to be inhaled **slowly** and **deep** into the lungs.

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3. Soft-Mist Inhaler Use

Several steps needed to release spray:

- Twist bottom (clear plastic) half of device half-way round clockwise.
- Then, open cover on its hinge, exposing mouthpiece and gray button.
- Place lips and teeth over mouthpiece.
- Press gray button to release mist and inhale.

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3. Soft-Mist Inhaler – Initial Set-Up

- Before first use of each new device, “slight assembly required.”

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Nebulizers

- Nebulizers take liquid medication (typically about ½ teaspoonful) and convert it to a continuous mist lasting 5-10 minutes.
- No special coordination is needed for its use: one simply puts the mouthpiece in one's mouth and breathes normally.

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Nebulizers

- Commonly used for bronchodilator administration in the emergency department or hospital inpatient service.
- Many patients obtain a nebulizer for home use; available as “durable medical equipment” via insurance.

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Traditional Jet Nebulizer with Air Compressor

Nebulizer cup, mouthpiece, and tubing

Electric, plug-in compressor with attached nebulizer cup

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Face Mask Attachments

- Makes possible medication administration to very young children.

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“Blow-By” Technique

Happy? Yes. Effective? No!

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Smaller, Battery-Operated Nebulizers

Mesh nebulizer

Ultrasonic nebulizer

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Medications Available for Nebulization

- Short-acting bronchodilators (e.g., albuterol, levalbuterol)
- Corticosteroid (budesonide)
- Long-acting bronchodilators (e.g., formoterol, revafenacin).

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Use of Nebulizers: Word of Caution in the Age of Covid-19

Care must be taken to avoid aerosolization of SARS-CoV-2 virus and spread of Covid-19 infection.

- Separate room
- Windows open
- Special nebulizer cups with one-way valve or in-line filter are available.

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Peak Flow Meters – Their Purpose

- To find out how your asthma is doing now – how narrow or wide open your bronchial tubes are -- measure how fast you can blow air out through the system of breathing tubes.
- Analogy: with a thermometer, you can measure your temperature, not guess based on how you feel.

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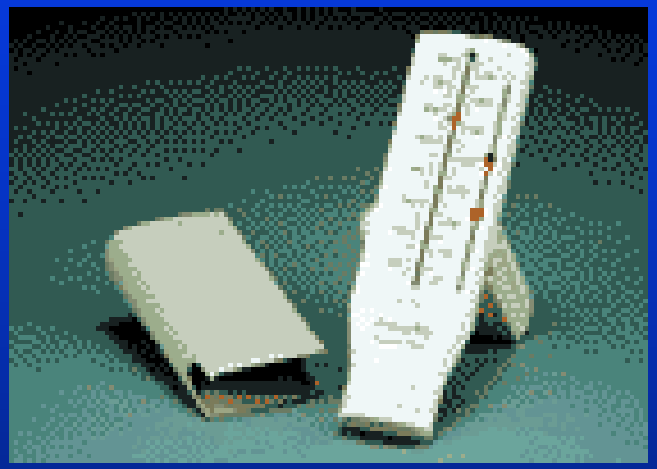
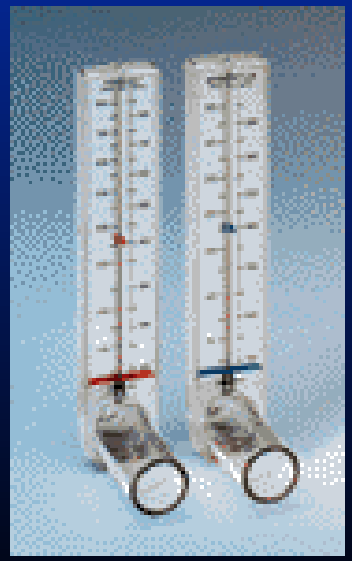
Peak Flow Meters -- Mechanical





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Peak Flow Meters -- Electronic

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Making Good Measurements

- Set marker at zero.
- Take deep breath in, as deep as you can.
- Quick, forceful breath out, quick from the start.
- Repeat total of 3 times.
- Peak flow is the best of the 3 measurements.

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Peak Flow "Zones": The Traffic-Light Model

- Green Zone ("good to go"): ≥**80%** of normal or own personal best
- Yellow Zone ("caution: take action"): **50-80%**
- Red Zone ("stop: this is an emergency")
- **<50%**

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Peak Flow Meter with Zone Indicators

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Conclusions

- Properly inhaling medications can be challenging.
- Understanding and being able to teach patients how to use of their asthma devices correctly can make the difference between poorly-controlled and well-controlled asthma.
- You can have a big impact!

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