



Rx Update

October 2007

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PROPER USE OF ORAL INHALERS

Oral inhalers are used to deliver a variety of medications. It is important that oral inhalers are used correctly to deliver the drug to the site of action in the lungs to optimize clinical efficacy and prevent systemic absorption and side effects (if deposited in mouth and swallowed). There are different types of inhaler devices.

Metered-dose inhalers (MDI) are pressurized and contain a propellant that dispenses the correct dose as a spray or “puff.” The dose is generally released by squeezing the canister, but one MDI is breath activated (Maxair Autohaler). MDI do require hand-breath coordination. They generally need to be properly primed before the first use and after prolonged non-use, and most need to be shaken well before each inhalation to ensure the proper dose is administered. **Spacers can be used with an MDI to help deliver a greater amount of medication directly to the lower airways and reduce local side effects.** They do not require the same breath/actuation coordination as with a MDI alone and are recommended to be used especially with children and elderly.

To administer MDI, shake the inhaler well. Have the patient exhale all the way. The inhaler should be placed in the mouth (preferred method) or the inhaler can be held 1 to 2 inches in front of a wide open mouth (not recommended for anticholinergics or with spacer). As they start to inhale, press down on the inhaler once, and continue to breathe in (slowly over 3 to 5 seconds). If using a spacer, press down on the MDI and then inhale within 5 seconds (not before actuation). Inhale to total lung capacity. Patients should hold their breath for 10 seconds (or as long as they comfortably can), then breathe normally. If more than one inhalation is ordered, repeat the previous steps after waiting the recommended time period between inhalations (e.g., 1 minute, see Table 1 on back). Sometimes, the mouthpiece of a MDI is removed in order to administer the medication to patients on ventilators. Several MDI now contain dose counters to keep track of the available doses in the canister. **These MDI have the mouthpiece heat-sealed onto the canister and the mouthpiece cannot be removed without potentially damaging the canister and affecting the delivery of the medication and should not be forced off.**

Dry-powder inhalers (DPI) do not use propellants. The medication is released by the patient inhaling the contents with a **deep, fast breath**. These do not require hand-lung coordination like a MDI, so it may be easier for the patient to use. However, some inhalers do require some dexterity to load the dose/cock the device before each use. Young children and elderly patients may not be able to generate sufficient inspiratory flow to activate the device. A similar technique as with MDI is used with DPI. After loading the dose, the mouthpiece needs to be placed in the mouth with a tight seal. A deep, fast breath is used. The patient should also hold their breath for 10 seconds to help disperse the medication into the lungs and wait before inhaling the next dose. **Spacers should not be used with dry powder inhalers.** It is important to keep these devices dry or the drug powder may clump and not work properly, and the patient should never exhale into these devices which could blow the dose away.

If more than one inhaler is used in a patient, the proper sequence of inhaler use is important for maximal drug effectiveness. It is recommended that patients using multiple inhalers use the following order when administering inhalers at the same time: first use the beta-agonist (e.g., albuterol, pirbuterol), then anticholinergic (e.g., ipratropium), then mast cell stabilizer (e.g., cromolyn, nedocromil), and finally the corticosteroid (e.g., budesonide, fluticasone, etc.).

Patients can rinse their mouth (rinse and spit) following use of inhalers to reduce the amount of drug swallowed and absorbed. This is also important with corticosteroids to help prevent oropharyngeal fungal infections. The patient instructions should be consulted for each inhaler for instructions on how to properly clean the inhaler to ensure the proper amount of medication is administered over time.

Table 1 (on the back) lists the inhalers available on the UIHC Formulary, general information on the inhaler device, and the recommended time interval between inhalations.

Table 1: Oral Inhalers Available at UIHC

| Medications (UIHC Formulary) | Type of Device | Dose Counter | Recommended Time Between Inhalations (Per Package Insert/ Patient Instructions) |
|---|-------------------|-----------------|--|
| Albuterol & Ipratropium (Combivent [®]) | MDI | No | 2 minutes |
| Albuterol (ProAir HFA [®] , Proventil HFA [®]) | MDI | No | 1 minute |
| Beclomethasone (Qvar [®]) | MDI | No | 1 minute [#] |
| Budesonide & Formoterol (Symbicort [®]) | MDI | No | Re-shake canister for 5 sec, then inhale next dose |
| Budesonide (Pulmicort Flexhaler [®]) | DPI | Yes | 1 minute [#] |
| Cromolyn (Intal [®]) | MDI | No | 1 minute [#] |
| Flunisolide (Aerobid [®]) | MDI | No | 1 minute |
| Fluticasone & Salmeterol (Advair Diskus [®]) | DPI | Yes | 1 puff (max) per dose |
| Fluticasone (Flovent HFA [®]) | MDI | Yes | 30 seconds |
| Ipratropium (Atrovent HFA [®]) | MDI | No | ≥ 15 seconds |
| Metaproterenol (Alupent [®]) | MDI | No | 2 minutes |
| Mometasone (Asmanex [®]) | DPI | Yes | 1 minute [#] |
| Nedocromil (Tilade [®]) | MDI | No | 1 minute [#] |
| Pirbuterol (Maxair Autohaler [®]) | MDI | No | 1 minute |
| Salmeterol (Serevent Diskus [®]) | DPI | Yes | 1 puff (max) per dose |
| Tiotropium capsules for inhalation (Spiriva [®]) | DPI | No | 2 inhalations/capsule (1 capsule/dose); 1 minute [#] |

[#] No time frame specified by the manufacturer; use 1 minute.