

Asthma Medication Devices: Best Practice and Pitfalls

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Relievers / Rescue / Bronchodilators

Short-acting Beta₂ Agonists



Asthma Medications

Ipratropium Bromide



* Ipratropium bromide is not a recommended rescue inhaler outside of use in the emergency room or urgent care but may, on occasion, be prescribed to supplement short-acting Beta₂ agonists.

Controllers

Inhaled Corticosteroids (ICS): Metered-Dose Inhalers (MDI)



Inhaled Corticosteroids (ICS): Dry Powder Inhalers



Combination Therapies



Inhaled Corticosteroids (ICS): Nebulized



Anticholinergic Controller Long acting anti-mucinaci agent (LAMA)



Long-acting Beta₂ Agonists (LABA)

Aerospan (flunisolide) HFA

- 80 mcg/puff
- MDI- 30 L/min inspiratory effort
- Controller
- 1-4 puffs twice daily
- Recommended dosing:
 - Ages 6-11: 80 mcg twice daily (max 160 mcg twice daily)
 - 12 and older: 160 mcg twice daily (max 320 mcg twice daily)
- Built-in spacer, no cleaning necessary
- FDA approved ages: 6 and older
- MMAD 1.2 +/- 0.1 mcm – estimated 68% of drug gets to lung*



*J All Clin Immunol. 2002; 109(2 Supp):S457.

Aerospan HFA notes

- Does not have a counter
- Canister will either have 60 doses or 120 doses
- Prime with two puffs at start and if have not used in 2 weeks
- Need to wait 20 second between doses
- Discard the canister and chamber when empty

Asmanex (mometasone) HFA

- 100 mcg, 200 mcg
- MDI
- Controller
- 2 puffs twice daily with spacer
- FDA approved ages: 12 and older (Twisthaler: 4 and older)
- MMAD of HFA = ? vs Twisthaler 2.2-3.7 mcm



Arnuity Ellipta (fluticasone furoate)

- 100 mcg, 200 mcg
- DPI- 60 L/min for 4 seconds
- Controller
- One inhalation once daily
- FDA approved ages: 12 and older
- Approx 24% of dose is in range of 1-4.5 mcm in size*



*AC Grant, R Walker, M Hamilton, K Garrill, "The ELLIPTA Dry Powder Inhaler: Design, Functionality, *in Vitro* dosing performance and critical task compliance by patients and caregivers." *J Aerosol Med Pulm Drug Deliv.* 2015 Dec; 28(6): 474-485.

Arnuity Notes

- Increased systemic exposure to fluticasone furoate when concomitantly with ketoconazole or similar drugs
- Opening and closing the cover without inhaling the medication will drop the dose into the inhaler– not available for inhalation
- Each inhaler contains 30 doses
- Need to discard the inhaler 60 days after opening.
- Rinse mouth without swallowing to decrease risk of adverse side effects

Breo Ellipta (fluticasone-furoate + vilanterol)

- 110/25 mcg, 200/25 mcg
- DPI- 60 L/min for 4 seconds
- Combination controller
- One dose once daily
- FDA approved ages: 18 and older



Breo Notes

- Increased systemic exposure to fluticasone furoate when concomitantly with ketoconazole or similar drugs
- Opening and closing the cover without inhaling the medication will drop the dose into the inhaler– not available for inhalation
- Each inhaler contains 30 doses
- Need to discard the inhaler 60 days after opening.
- Rinse mouth without swallowing to decrease risk of adverse side effects

ProAir RespiClick (albuterol sulfate)

- 117 mcg
- DPI- 60 L/min inspiratory flow rate
- Rescue medication
- 1-2 doses every 4-6 hours
- No chamber needed
- FDA approved ages: 4 and older



ProAir Respclick Notes

- Median time to onset of action: 5.7 minutes
- No washing, priming or shaking required
- Dose delivered with a small amount of powder
- Each device has 200 doses – dose counter on back

ArmonAir RespiClick (fluticasone propionate)

- 55 mcg, 113 mcg, 232 mcg
- DPI, 88 L/min for 1.4 seconds
- Controller
- One dose twice daily
- No chamber needed
- FDA approved for ages: 12 and older



AirDuo RespiClick (fluticasone propionate+ salmeterol)

- 55/14 mcg, 113/14 mcg, 232/14 mcg
- DPI
- Combination controller
- One dose twice daily
- No chamber needed
- FDA approved ages: 12 and older



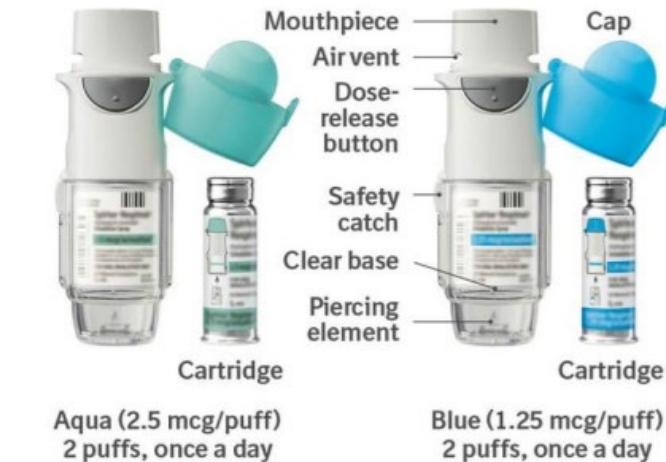
ArmonAir and AirDuo RespiClick Notes

- Do not open the inhaler unless you are going to take a dose- opening and closing the cap wastes medication and may damage the device
- 60 doses per inhaler
- Does not need priming, cleaning or shaking
- Has a counter– numbers will turn red at 20 doses remaining and the background turns red at zero.



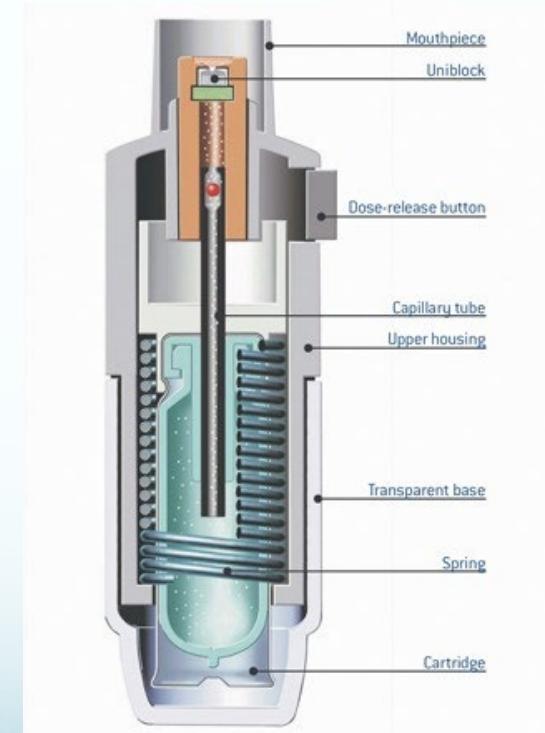
Spiriva Respimat (tiotropium bromate)

- 1.25 mcg
- MDI-ish
- Anticholinergic controller
- Two doses once daily
- No chamber needed, can use with chamber with or without mask
- FDA approved ages: 6 and older



Spiriva Notes

- Technique: **TOP**
 - Turn the clear base
 - Open the cap
 - Press the dose release button and inhale the mist
- Maximum benefits may take up to 4-8 weeks of dosing
- Watch for additive interaction with concomitantly used anticholinergics
- Duration of inspiration should be at least as long as the spray duration- 1.5 seconds
- Need to prime before use and again if the inhaler has not been used for 3 days. Repeat initial priming sequence if not used in 21 days.
- Locks when empty



QVAR Redihaler

- 40 mcg, 80 mcg (per actuation)
- Breath-actuated aerosol- 20 L/min inspiratory rate
- Controller
- Dosing:
 - 4-11 years of age: 40-80 mcg twice daily
 - 12 and older: 40-320 mcg twice daily
- Do NOT use with a chamber
- FDA approved for ages: 4 and older
- Deposition study in kids 5-14 showed age-dependent lung deposition from 37 up to 54% in the older children*



*WM van Aalderen, L Garcia-Marcos et al, "How to match the optimal currently available inhaler device to an individual child with asthma or recurrent wheeze.", *Primary Care Respiratory Medicine*, 2015; 25: article no 14088

Notes on QVAR Redihaler

- Does not require priming
- Do not use with a chamber
- Do not need to shake the inhaler prior to use
- Do not shake the inhaler with the cap open– may cause actuation
- Routine cleaning is not necessary
- Counter- numbers turn to red at 20 doses, at zero the background turns red.
- * QVAR Redihaler needs to be added- should we add it to 0-4 AAP?

Baldwin



"That's a puffer. If you want to blow a house down, you'll also need a huffer."