

There is no evidence to suggest one device works better than another. Poor inhaler technique: ↓ efficacy. Pt device dissatisfaction: ↓ adherence. Choose device based on pros/cons below & patient preference.

DEVICE	MDI	Respimat	HandiHaler, Breezhaler	Turbuhaler	Diskus	Genuair	Ellipta
	beclomethasone QVAR ciclesonide ALVESCO fluticasone FLOVENT formoterol/mometasone ZENHALE salmeterol/fluticasone ADVAIR ipratropium ATROVENT salbutamol VENTOLIN	olodaterol STRIVERDI salbutamol/ipratropium COMBIVENT tiotropium SPIRIVA tiotropium/olodaterol INSPIOLTO	HandiHaler: tiotropium SPIRIVA Breezhaler: glycopyrronium SEEBRI glycopyrronium/indacaterol ULTIBRO indacaterol ONBREZ	formoterol OXEZE formoterol/budesonide SYMBICORT terbutaline BRICANYL	salbutamol VENTOLIN salmeterol SEREVENT salmeterol/fluticasone ADVAIR	acclidinium TUDORZA acclidinium/formoterol DUAKLIR	umeclidinium INCRUSE vilanterol/fluticasone BREO vilanterol/umeclidinium ANORO fluticasone furoate ARNUITY
Description	Delivers aerosolized stream of medication over ~0.2 seconds.	Uses a spring to deliver a "soft mist" of medication over ~1.5 seconds.	Capsules containing medication are pierced, then powder inside is inhaled.	Dry powder inhaler containing a reservoir of medication.	Dry powder inhaler containing single dose blisters of medication.		
Pros	Low inspiratory flow ≈ 20L/min required		Breath-actuated: reduces need for hand-breath coordination				
	<ul style="list-style-type: none"> Suitable for all ages. Note: spacer strongly recommended regardless of age (see comments below). Spacer with a mask available for cognitive impairment, frail, < 5 years old, etc. Can be used with mechanical ventilation (e.g. in critical care units) 	<ul style="list-style-type: none"> Slower actuation may improve technique vs MDI DOSE COUNTER: numbered by interval (frequency of interval varies by medication); loading base locks to signal empty COMBIVENT Respimat has cost advantage over COMBIVENT nebulers. INSPIOLTO Respimat has cost advantage over other LAMA/LABA combos. <p>Note: Pharmacies should pre-load the Respimat canister before dispensing</p>	<ul style="list-style-type: none"> Rattling or whirring heard if capsule's contents inhaled correctly. Can look to view empty capsules (and Breezhaler has clear capsules). Low inspiratory effort needed DOSE COUNTER: each capsule equals 1 dose; thus no dose counter required 	<ul style="list-style-type: none"> Few steps, easy to use (compared to HandiHaler or Breezhaler). Dose is not lost even if base is twisted multiple times; however dose counter will no longer be accurate DOSE COUNTER: every 20th dose numbered to give approximation of doses remaining 	<ul style="list-style-type: none"> DOSE COUNTER: displays exact number of remaining doses 	<ul style="list-style-type: none"> Simple to use & less errors during dose preparation vs HandiHaler Provides visual (window changes green → red) & audible ("click") feedback when dose taken correctly In one study, majority of patients (80%) preferred Genuair over HandiHaler. DOSE COUNTER: every 10th dose numbered; loading button locks to signal empty 	<ul style="list-style-type: none"> Simple to use; one step to open & load dose. Sub-analysis of RCT data: 95% of asthmatics able to use correctly after only one demonstration In one study, majority of patients (>60%) preferred Ellipta over MDI, Diskus, or HandiHaler. DOSE COUNTER: displays exact number of remaining doses with large numbers
Cons	<ul style="list-style-type: none"> DOSE COUNTER: most devices lack dose counter (exceptions: ADVAIR, ZENHALE) Spacer can be cumbersome; however, if using only at home in the morning/evening, additional burden is low. Susceptible to freezing Requires priming (x 4 sprays) if not used for ≥ 5 days 	<ul style="list-style-type: none"> Requires reasonable strength to spring-load dose Incorrect rate of inhalation results in cough Not approved for kids or for use with a spacer New device to the market - limited real-world experience Requires priming (until mist is visible, then 3 more sprays) if first time use OR if not used for ≥ 21 days. Requires priming (x 1 spray) if not used for ≥ 3 (COMBIVENT) or ≥ 7 days (SPIRIVA/INSPIOLTO). 	<ul style="list-style-type: none"> Multi-step process: may be difficult to use for patients with poor manual dexterity (eg: arthritic hands, Parkinson's disease) or cognitive impairment Capsules are packaged in foil blisters; may be difficult to remove (for some) and are light and moisture sensitive Patients have been known to swallow capsules instead of inhaling them. Pieces of capsule may be inhaled if pierced more than once. 	<ul style="list-style-type: none"> When empty, remaining desiccant can still be heard - patients may think there are doses left DOSE COUNTER: displays a "zero", but it can be difficult to tell when the indicator reaches this mark Humidity/moisture (e.g. exhaling into device, storing in bathroom) can clump drug in reservoir 	<ul style="list-style-type: none"> Short expiry date after removal from protective packaging: ADVAIR = 1 month; SEREVENT = 6 weeks - Exception: VENTOLIN = 1 year Medications for Diskus inhalers tend to be among the most expensive in their class 	<ul style="list-style-type: none"> Some patients may experience a bitter taste with acclidinium New device to the market - limited real-world experience. 	<ul style="list-style-type: none"> No way to identify if proper inspiratory effort is being achieved Short expiry date (6 weeks) after removal from protective packaging
	<ul style="list-style-type: none"> • Requires sharp, forceful inhalation of breath to get full dose - some patients (e.g. < 5 years old, some COPD patients with severe symptoms) will be unable to achieve adequate flow rate. 						

COPD=chronic obstructive pulmonary disease MDI=metered dose inhaler RCT=randomized controlled trial

More inhalation devices listed & compared at www.rxfiles.ca

- **Use a spacer with an MDI:** ↑ drug delivery to lungs; ↓ need for hand-breath coordination; ↓ systemic absorption; ↓ local adverse effects e.g. hoarseness & thrush with corticosteroids, dry mouth with anticholinergics.
- **If on more than one inhaler:** (1) consider using the same device for all medications; (2) use the bronchodilator first & the anti-inflammatory last; (3) wait ~5 minutes between puffs of different medications.
- **Nebulizer/compressor solution:** (available for budesonide, ipratropium, salbutamol, and salbutamol/ipratropium) **expensive without added benefit versus spacer** except possibly in **very young & very old**, drug entering room air may ↑ infection transmission, time consuming, & can affect eyes. Useful during exacerbations for patients in too much distress to use proper inhaler technique, but spacer preferred.
- **General inhaler technique:** (1) prepare dose, (2) breathe out, (3) inhale medication, (4) hold 10 seconds, (5) breathe out. (See [RxFiles Inhaler Technique](#).) May take a **second breath** from dry powder devices to ensure the entire dose is inhaled. Rinsing mouth (and spitting) after anticholinergics and corticosteroids decreases side effects. Best to wait ~1 minute between puffs of the same medication.

Online Extras:

Milk allergies and lactose inhalers Most DPIs contain lactose. This lactose is often derived from milk; trace amounts of residual milk protein has caused allergies in a few case reports. Lactose-free: **BRICANYL** Turbuhaler; **PULMICORT** Turbuhaler; all MDIs; all Respimats. Note: lactose-intolerant patients can still use a lactose-containing inhaler.

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