Hamilton Family Health Team
Green Initiative

The C.A.R.E Project

Clean Air, Respiratory Excellence
Good for you and good for the planet

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Confirmation of COPD and asthma diagnosis with spirometry, evidence-based inhaler selection, and correct inhaler usage technique can benefit patients' respiratory health and significantly reduce greenhouse gas emissions.

HFHT Green Initiative: C.A.R.E.

Section #1: The Environmental Impact

Section #1: The Carbon Impact of MDIs

Metered Dose Inhalers have a large carbon footprint.

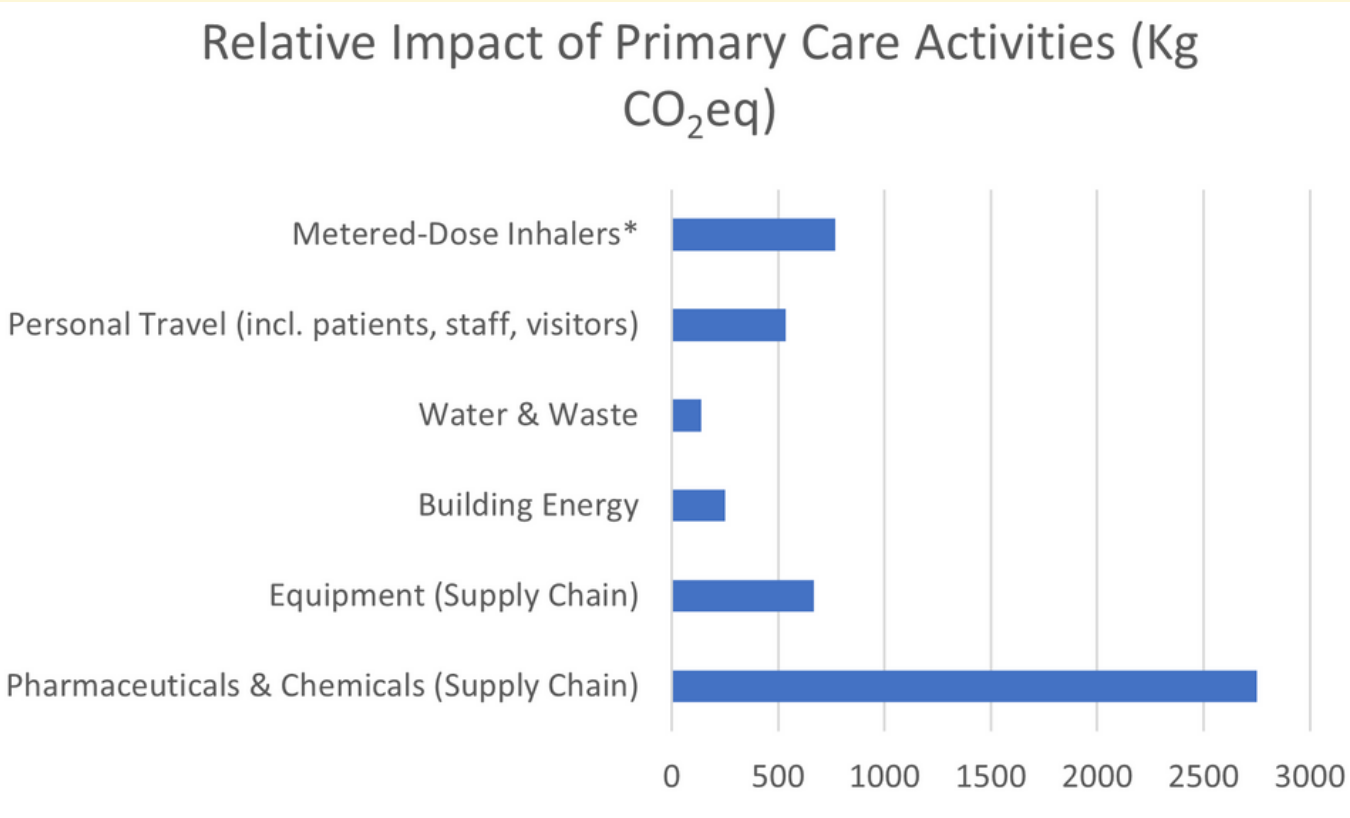
Metered dose inhaler (MDI) devices rely on propellants to deliver medication when the device is actuated. These hydrofluorocarbon (HFC) propellants are **1300-3350 times more potent greenhouse gases** than **carbon dioxide.**[1(suppl 1)]

The propellants account for **90-98% of the global warming potential (GWP) of MDIs** over their life cycle.[1]

2

The HFHT Green Team calculated Canadian emissions data from the life-cycle of inhalers (including waste impacts), which we used for the audit impact calculations (below). See Appendix E for those calculations.

Metered-dose inhalers are estimated to contribute 3.1% of the carbon footprint of the National Health Service in the United Kingdom.[3]



Based on data from the U.K. in 2019

*In this study, MDI and anesthetic gas emissions were combined. However, in primary care, MDI prescription far outweighs anesthetic gas use.

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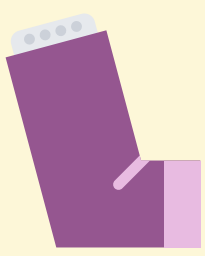
Section #1: The Environmental Impact

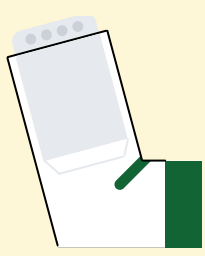
The Relative Impact of Different Puffers

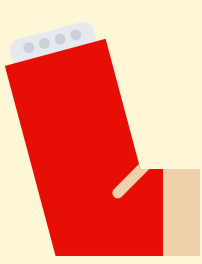
These are some Metered Dose Inhalers (10-28kg CO_2 equivalents/ inhaler[5]) **available in Canada:**

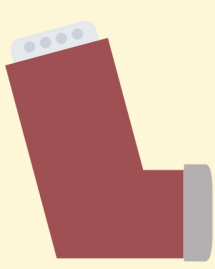
$\uparrow CO_2$

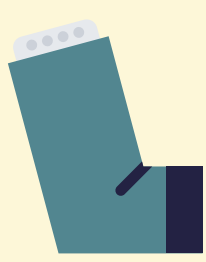

Advair pMDI

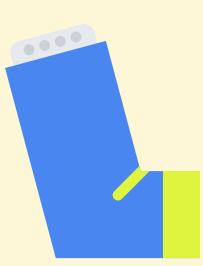

Alvesco pMDI


Atrovent pMDI


FloVent pMDI


QVar pMDI

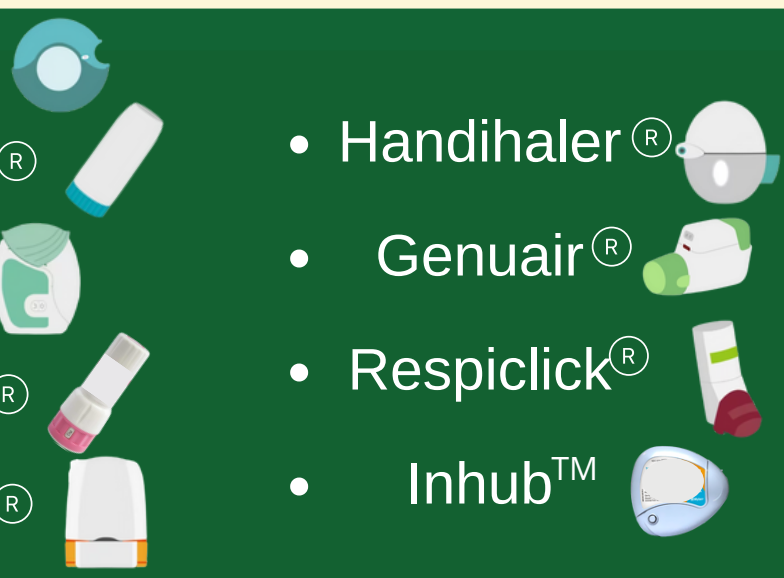

Ventolin pMDI


Zenhale pMDI

These are some Dry Powder Inhalers (0.5-1kg CO_2 equivalents/ inhaler[5]) **available in Canada:**

$\downarrow CO_2$

- Diskus®
- Turbuhaler®
- Ellipta®
- Twisthaler®
- Breezhaler®



- Handihaler®
- Genuair®
- Respiclick®
- Inhub™

Adapted from: Wintemute K, Chang B, Green S, Wilson J, Busque G. Climate Impact of Inhalers: A call for professional practice change. Presented: June 17, 2021; Toronto.

Soft Mist Inhalers, like Respimat®, produce 0.8kg CO_2 equivalents/inhaler.[3]

For a quick overview of puffer categories see Appendix A from the Lung Association.

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Section #1: The Environmental Impact

MDI Prescribing is Very Common in Canada

- MDI are a very commonly prescribed medication: **~900 000 salbutamol MDIs are distributed per month in Canada**[6]
- In Canada, **approximately 9.5% of the population has an asthma diagnosis**[7]

Do Patients Care?

YES: 44% of patients in one study expressed that their carbon footprint is "important" or "very important" to them.[8]

Section #1: Recommendations

When clinically appropriate, consider Dry-Powdered Inhalers (DPIs), which have a lower carbon footprint compared to MDIs, even when including the impact of waste over each inhaler's life cycle.[1,9]

See Appendix B for MDI alternatives including cost and ODB coverage.

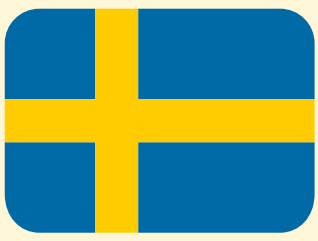
Switching 1 year of a patient's daily controller MDI to a DPI = **234kg** CO_2 emissions prevented

≈ 11.7m² of forest[10]

Forest area equivalency based on Southern Ontario carbon stock estimate.[11]

Section #1: Recommendations

"*In many countries, like Finland and Sweden,* ***good control of asthma and COPD is achieved*** *at a national level while the* ***majority of patients*** *using inhaled therapies are* ***treated with DPIs****, (56% in Finland and 71% in Sweden)."*[12]



After one study switched people from MDIs to DPIs, 92% remained on the DPI.[13]

Sometimes MDIs are necessary:

- Severe COPD
- Preschoolers
- Older age
- Financial/drug coverage issues
- Patient preference
- Insufficient inspiratory flow

To minimize carbon impact if MDIs are necessary:

a. Ensure proper MDI usage including a spacer device, which improves drug delivery and can therefore reduce amount needed.[14, 15] Refer to **Section 2C** for information on technique.

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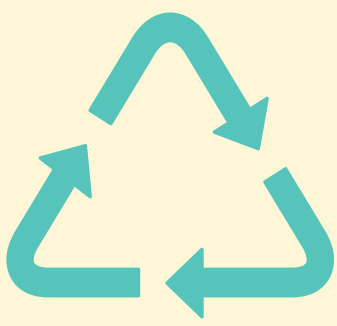
Section #1: The Environmental Impact

Airomir

b. If salbutamol is needed as a reliever, **consider prescribing Airomir MDI as that reliever** (a specific generic of salbutamol) instead of other formats of salbutamol MDI when an MDI reliever is necessary (~1/3 of the carbon footprint of other salbutamol MDIs).[1] On these prescriptions, write "dispense as written" so it is not switched to generic salbutamol or Ventolin.



c. Encourage patients to return their old inhalers to pharmacies for recycling and incineration.[16] Compared to landfill disposal, this saves 4-18 kg CO_2(eq) per inhaler.[9] **See this link for a list of pharmacies accepting inhalers.**

d. Clinicians can use an inspiratory flow check device to choose between MDI and DPI. You can **order a C.A.R.E. Project Support Kit here**, which includes DPI whistles for use with low- to average-risk patients. For high-risk patients (especially COPD), you may require an **InCheck DIAL device** to measure if they have a suboptimal peak inspiratory flow rate.

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Section #2A: Confirming Diagnoses

Section #2: High Quality, Low Carbon Care

Part A: Ensure Accurate Diagnosis

Long-term inhalers are often prescribed for asthma and COPD without confirmation of diagnosis.

We can avoid unnecessary puffer prescribing for asthma and COPD by ensuring diagnosis with spirometry.[17, 20-24]

44% of Canadians who receive a diagnostic label of **asthma have never had spirometry testing.**[18] **Up to 67% of Canadians with COPD**, chronic bronchitis, and emphysema **have had no spirometry**.[19]

When the diagnosis is not confirmed, there is **potential patient harm** due to **missed alternative diagnoses,**[20, 24] **unnecessary medication costs** [20-23, 24] and **side effects,**[20, 21, 23, 24] and patients **believing they have a chronic illness.**[23]

Section #2A: Recommendations

Ensure accurate diagnosing of asthma and COPD using spirometry to avoid unnecessary MDI prescribing.[17]

Diagnosing Asthma

Not all wheezes are due to asthma! In a large Canadian study, **33% of patients who had received a diagnosis of asthma from their physician in the last 5 years did not have asthma when assessed objectively** with lung function tests.[21] However, **79% of these non-asthmatic patients** were in fact **using asthma medications.**[21]

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Section #2A: Confirming Diagnoses

Diagnosing Asthma

Guidelines uniformly recommend objective testing to establish asthma diagnosis. Cough, wheeze, or dyspnea can be caused by other conditions.[25,26,28]

"Don't initiate medications for asthma (e.g., inhalers, leukotriene receptor antagonists, or other) in patients ≥ 6 years old who have not had confirmation of reversible airflow limitation with spirometry, and in its absence, a positive methacholine or exercise challenge test, or sufficient peak expiratory flow variability."

~Choosing Wisely[17]

Diagnosing Asthma

The best time to perform spirometry is when the patient is symptomatic.[17, 27] Spirometry can generally be performed in children 6+ years of age.[28]

In children < 6 years of age who are unable to perform spirometry, a trial of therapy (8–12 weeks in duration) and monitoring of symptoms can act as a surrogate method to diagnose asthma.[27]

This recommendation may not be applicable in patients who cannot reproducibly undergo objective testing for asthma (including children less than 6 years old), and in settings where such testing is not available.[17]

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Section #2A: Confirming Diagnoses

Diagnosing COPD

Not all shortness of breath, chronic cough, and sputum are COPD. Guidelines uniformly recommend objective testing to establish a COPD diagnosis.[17, 29]

"A diagnosis of COPD should be considered in any patient who has dyspnea, chronic cough, and/or sputum production and an appropriate history of exposure to noxious stimuli. However, not all patients with these symptoms have COPD, and a ***spirometry demonstrating a post-bronchodilator forced expiratory volume in one second to forced vital capacity (FEV1/FVC) ratio < 70% (or less than the lower limit of normal, if available)*** *is required to make a definitive diagnosis."* ~Choosing Wisely[17]

Viral Infections: How long should that cough last?

Adults:

The majority of adults with a short duration of cough from an acute respiratory tract infection have a viral rather than a bacterial infection. Patients often underestimate the typical cough duration from an infectious illness. The average duration of cough (not treated with antibiotics) is around 18 days, though patients only expect to cough for 5 to 7 days.[30]

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Section #2A: Confirming Diagnoses

Viral Infections: How long should that cough last?

Children:

The duration of normal paediatric acute cough can be 5-20 days,[31] or 10-14 days on average.[32] Several studies confirm that prescribing MDIs does not benefit these coughs:

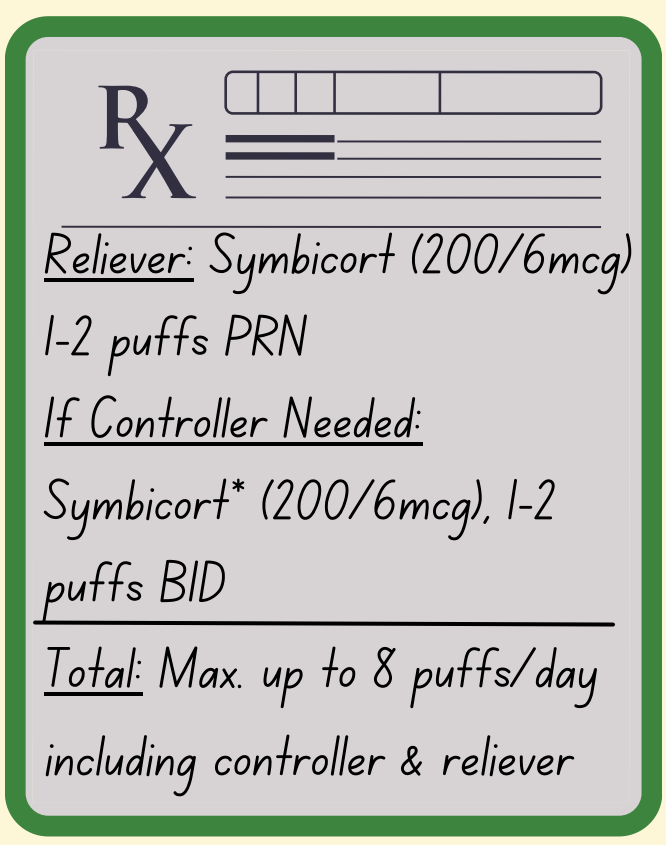
"*There is **no evidence to support using beta-2-agonists in children with acute cough** and no evidence of airflow obstruction.*" [33]

Section #2B: New Asthma Treatment Guidelines

Asthma treatment guidelines (> age 12) have recently changed.[25,26]

"There is new evidence in children ≥12 years of age and adults that PRN budesonide/formoterol (bud/form) decreases exacerbations in comparison to PRN SABA, with different levels of evidence in those with very mild versus mild asthma." [34]

Pilot Site Physician's Example of Anti-Inflammatory Reliever Strategy:



*Symbicort is currently the only Canadian puffer with the evidence-based formoterol/budesonide combination. A generic is expected Fall 2022.

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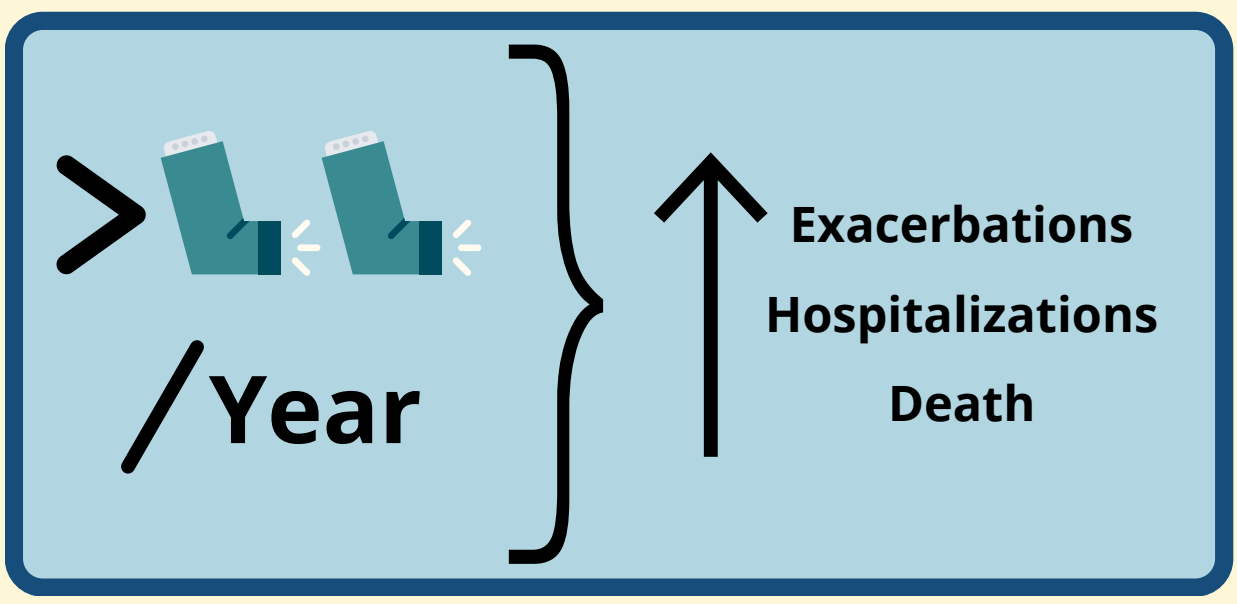
Section #2B: New Guidelines

Reduce SABA Prescribing

"*For safety,* ***GINA no longer recommends treatment of asthma in adults and adolescents with Short-Acting Beta-2-Agonists (SABA) alone****, without inhaled corticosteroids (ICS).* ***There is strong evidence that SABA-only treatment****, although providing short-term relief of asthma symptoms,* ***does not protect patients from severe exacerbations****, and that* ***regular or frequent use of SABA increases the risk of exacerbations.***" [25]

The Risks Associated with Frequent SABA overuse:

- Rebound Hyperresponsiveness [35]
- Decreased Broncho-protection [35]
- Decreased Bronchodilator Response [35]
- Increased Allergic Response [35]
- Increased Eosinophilic Inflammation [35]
- Increased E.D. presentations [36]
- Increased death rate from asthma [37]



According to 2020 SABINA studies, the use of more than 2 SABA inhalers per year (regardless of additional maintenance/controller medication (e.g. ICS)) is correlated with increased exacerbation and hospitalization incidence and mortality. [38, 39]

Asthma Control with DPIs

ICS use is 73% higher when patients only have 1 inhaler (e.g. combined ICS/LABA).[40]

With better asthma control (including maintenance therapy), fewer relievers are necessary because fewer exacerbations occur. [25,27,28,41]

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Section #2B: New Guidelines

What's the Alternative?

For asthmatics aged 12+, GINA states:

"***Every adult and adolescent with asthma should receive ICS-containing controller medication to reduce their risk of serious exacerbations, even patients with infrequent symptoms.*** *Every patient with asthma should have a reliever inhaler for as-needed use, either low-dose ICS-formoterol or SABA.* ***ICS-formoterol is the preferred reliever,*** *because it reduces the risk of severe exacerbations compared with treatment options in which the reliever is SABA. However,* ***ICS-formoterol should not be used as the reliever by patients who are taking a different maintenance ICS-LABA****; for these patients, the appropriate reliever is SABA."* [25-26, 42-45]

CTS Guidelines State:

"Individuals with well controlled asthma on no medication or PRN SABA at lower risk of exacerbation can use PRN SABA, daily ICS + PRN SABA, and if ≥ 12 years of age PRN bud/form. Individuals at higher risk of exacerbation even if well-controlled on PRN SABA or no medication, and those with poorly-controlled asthma on PRN SABA or no medication should be started on daily ICS + PRN SABA. In individuals ≥ 12 years old with poor adherence despite substantial asthma education and support, PRN bud/form* can be considered."* [34]

The only current Canadian DPI containing budesonide/ formoterol is Symbicort. **Formoterol provides immediate and longer-acting bronchodilation.**[42-43, 46-48]

See pg. 3-4 of the **Symbicort product monograph for indications and clinical use for asthma.**[49] **A generic format is expected Fall 2022.**

The **MDI Zenhale also contains an ICS/formoterol combination**, although its use as a reliever has not been studied.

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Section #2B: New Guidelines

Preferred treatment is found using a step-wise approach (as shown in Appendix C) depending on severity, starting with low dose prn ICS-Formoterol.[25]

Section #2C: High Quality Low Carbon Care: Puffer Technique

Inhaler technique studies show that between **12-71% of the time, they are not used correctly.**[50-54]

MDI administration misuse is even **more common in older adults** (79% conducting critical errors)[55] **and children** (97% misuse).[56]

Inhaler misuse is associated with:

- **Increased hospitalization and Emergency Department visits**[54,57]
- **Increased need for oral steroids and antimicrobials**[50]
- **Poor disease control**[52, 57, 58]
- **Decreased quality of life.**[52,59]

MDI Technique

Proper Technique:[60-61]

1. Shake inhaler before every actuation
2. Breathe out
3. Slow inhale (4-5s) with lips on inhaler while actuating medication
4. Hold breath for 10s (adults)
5. Wait >30s before next actuation

Common Errors:[61]

- Actuate 2x in a row
- Inhaling too quickly
- Not using aerochamber/spacer device

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Section #2C: Technique

DPI Technique

Proper Technique: [50, 62-63]

1. Deploy medication/load device
2. Breathe out away from device
3. Quick & forceful inhaler (~2s) with mouth on device opening, inhaler must be upright
4. Hold breath for 10s (adults)

Common Errors:

- Inhalation too slow/does not generate enough force[63]

DPIs are easier to use, tend to have fewer inhalation errors with use, and often contain dose counters.[64-68]

Section #2C: Puffer Technique Recommendations

When prescribing inhalers (MDI or DPI), review and encourage accurate technique, as well as proper frequency and dose.[62,69]

Section #3: Action Plan

Section #3A: Tools for Change

Engage the Healthcare Team:

Pharmacists, respiratory educators, MDs, nurse practitioners, physicians, registered nurses, physician assistants, and other allied healthcare providers.

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Section #3: Action Plan

If you have access to an **in-house pharmacist**, consider a referral when:

- Refills for MDI inhalers are required and a diagnosis is confirmed in adults
- A patient is ready or contemplating smoking cessation
- Inhaler technique assessment is required

If you have access to a **respiratory educator**, consider a referral for:

- All adolescents and adults with asthma or COPD
- Confirmation of a diagnosis
- Spirometry history review is required
- Inhaler technique assessment is required

Engage the Healthcare Team

The Respiratory Therapist/Certified Respiratory Educator with the pilot office is supplied by and works within the Best Care program. The educator is a highly valued member of our team for asthma and COPD care and a key part of the pathway for clinically appropriately inhaler prescribing with a focus on disease control and SABA/MDI overuse.

For **Ontario primary care** offices interested in hosting the Best Care program contact: **bestcare@argi.on.ca**.

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Section #3: Action Plan

More Tools for Change:

If you are a team with a respiratory educator, consider referral to the **Respiratory Educators** for:

- Patients with a confirmed diagnosis of Asthma or COPD that would benefit from further education
- Higher needs for ongoing care
- Interest in quitting smoking with enrolment in the STOP program
- Need for inspiratory effort testing
- Referral to the HFHT Respiratory Education program would also be of interest to offices that do not have access to Best Care or an HFHT pharmacist.

Educational Opportunities

- Centre for Sustainable Health Systems, Dalla Lana School of Public Health: **Inhaler Community of Practice, including Climate Impact of Inhalers Webinar**
- Hamilton Family Health Team: **Recording of our Clean Air, Respiratory Excellence webinar**

Print and put up our **MDI Poster** to encourage conversation about puffer prescriptions with patients.

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Section #3: Action Plan

More Tools for Change:

Helping your patient **quit smoking** is good and green care. See our **Smoking Cessation infographic** which includes patient support links.

Make these sample templates for communication your own (Appendix D):

Template A: To pharmacist to stop MDI repeats

Template B: Ocean E-Form "Inhaler Prescription"

Template C: Internal to admin requesting appt with patient

Template D: Ocean E-Form "Inhaler Technique Link"

Resources for Staff and Patients Regarding Good Inhaler Use

- Canadian Lung Association: **How to use various DPIs**
- **How to use Turbuhaler**
- **How to use MDI inhaler video**
- **How to use soft mist inhalers**

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Section #3: Action Plan

More Tools for Change:

EMR MDI Prescription Search

To conduct an MDI, you can use our pre-made search queries:

- **Oscar query text file**
- **Oscar How-to Load Template**
- **Telus PS Query zip file**

You can Contact the Green Team or your QI lead for details. For information on searching other EMRs, **read this article**. See our example audit below!

MDI Prescription Audit- Example

The HFHT MDI team did primary care practice audits to investigate the extent of MDI prescription in Hamilton.[70]

- A typical-sized practice (2000 patients) had, on average, 330 patients with an MDI prescription
- Assumptions: 1 inhaler/year/patient
- This represents ~9438kg of CO_2 (eq) emissions/site/year

What we prescribe makes a difference.

The average primary care practice in our audit could cause emissions equivalent to **7.8 one-way car trips from Halifax to Vancouver a year via MDI prescriptions.** Appendix E

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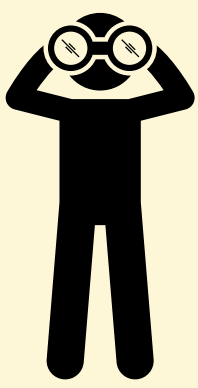
Section #3: Action Plan

Section #3B: Pilot Site Tips for Success

Note: Our pilot site has access to an RN, pharmacist, and respiratory educator. We encourage providers with a team to engage their team's scope of practice.



Observations from the Pilot Site

Patient preference and symptom control are prioritized when prescribing puffers. Puffer selection decisions are **shared between provider and patient.**

The most common opportunity to reduce MDI prescribing is when **puffer prescriptions refills are requested from the pharmacy.**

Patients are generally receptive to switching to PRN ICS/LABA strategy when clinially appropriate.

Having a **confirmed diagnosis** in a patient's chart is key to **avoiding unnecessary prescribing** of any inhaler. We used our disease registry for this.

Approach the matter from a clinical perspective unless a patient brings up an environmental concern (e.g. review new GINA guidelines with patient so they know they can have better asthma control and less need for rescue meds).

ODB coverage can be a barrier (for example, some DPI relievers are not covered by ODB). **Bricanyl Turbuhaler is covered**.

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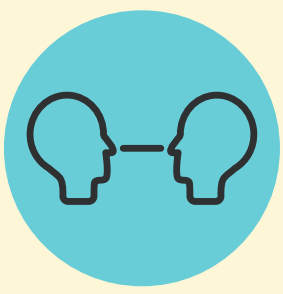
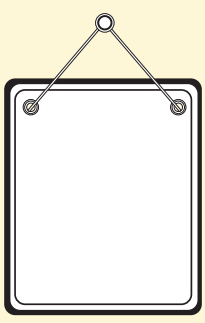
Section #3: Action Plan



Offer visits for **inhaler technique review** to assess patients' inhalation technique from device and make suggestions/ changes.



Have **aids at your disposal** to make the MDI to DPI transition smoother (e.g. demonstration devices, posters in clinical rooms).

Airomir

Patients with confirmed diagnosis who are well-controlled with MDI strategy may not want to switch. **Consider substituting Airomir MDI.** It is an alternate form of salbutamol with 1/3 of the propellent and is covered under ODB, although patients may need to cover a $0.84 cost difference between this and generic salbutamol.[1]

Patients who are currently on MDI therapy with prior unconfirmed diagnosis and no confirmatory testing **may not feel comfortable coming off of their inhalers** even if their (recent) spirometry and subsequent methacholine challenge test results are normal.

New Diagnosis of COPD/asthma: Ensure accurate diagnosis with spirometry (and methacholine if necessary for asthma). Warn patients if tests are negative, they may get a call to discuss inhalers. Whenever clinically appropriate, the pilot site physician started newly-diagnosed patients on DPI over MDI.

Thank you for learning about sustainable inhaler prescribing that is:

- ☑ **Patient-Centred**
- ☑ **Evidence-Based**
- ☑ **Multidisciplinary**
- ☑ **Low-Carbon**
- ☑ **Supported with tools/pathways**

HFHT Green Initiative: C.A.R.E.

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If you have any questions, please reach out to us: green.team@hamiltonfht.ca

Appendix A: Types of Respiratory Medications

RESPIRATORY MEDICATIONS

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RELIEVERS

Drug		Use	Strength	Capacity
Short-Acting Beta2-Agonist (SABA)				
Airomir®*†◊ (salbutamol) Valeant			100mcg	200 actuations/canister, 100 actuations for hospital pack
Bricanyl® Turbuhaler®*† (terbutaline) AstraZeneca			0.5mg	100 or 200 doses/device
Ventolin® HFA *†◊ (salbutamol) GlaxoSmithKline			100mcg	200 actuations/canister
Ventolin® Diskus®*† (salbutamol) GlaxoSmithKline			200mcg	60 blisters/device
Salbutamol HFA generic products such as: Apo-Salvent® Apotex, Salbutamol HFA Sanis, Novo-Salbutamol HFA Teva				
Short-Acting Muscarinic Antagonist (SAMA) (Anticholinergic)				
Atrovent® HFA†◊ (ipratropium) Boehringer Ingelheim			20mcg	200 actuations/canister

CONTROLLERS/MAINTENANCE

Drug		Use	Strength	Capacity
Inhaled Corticosteroids (ICS)				
Aermony Respiclick™* (fluticasone propionate) Teva		BID	55mcg, 113mcg, 232mcg	60 actuations/device
Alvesco®*◊ (ciclesonide) AstraZeneca		OD or BID	100mcg, 200mcg	120 actuations/canister
Arnuity™ Ellipta®* (fluticasone furoate) GlaxoSmithKline		OD	100mcg, 200mcg	14 or 30 blisters/device
Asmanex® Twisthaler®* (mometasone) Merck		OD or BID	100mcg, 200mcg, 400mcg	30 (100 & 400mcg) or 60 (200 & 400mcg) doses/device
Flovent® Diskus®* (fluticasone propionate) GlaxoSmithKline		BID	100mcg, 250mcg, 500mcg	60 blisters/device
Flovent® HFA*◊ (fluticasone propionate) GlaxoSmithKline		BID	50mcg, 125mcg, 250mcg	120 actuations/canister
Pulmicort® Turbuhaler®* (budesonide) AstraZeneca		BID	100mcg, 200mcg, 400mcg	200 doses/device
Qvar™*◊ (beclomethasone) Valeant		BID	50mcg, 100mcg	200 actuations/canister

CONTROLLERS/MAINTENANCE

Drug		Use	Strength	Capacity
Long-Acting Bronchodilators also known as: Long-Acting Beta2-Agonist (LABA)				
Foradil®*† via Aerolizer® (formoterol) Novartis		BID	12mcg	60 capsules/carton
Onbrez® Breezhaler®† (indacaterol) Novartis		OD	75mcg	10 or 30 capsules/carton
Oxeze® Turbuhaler®* (formoterol) AstraZeneca		BID	6mcg, 12mcg	60 doses/device
Serevent® Diskus®*† (salmeterol) GlaxoSmithKline		BID	50mcg	60 blisters/device
Combination ICS/LABA				
Advair®*◊ (fluticasone propionate/salmeterol/) GlaxoSmithKline		BID	125/25mcg, 250/25mcg	120 actuations/canister
Advair® Diskus®*† (fluticasone propionate/salmeterol) GlaxoSmithKline		BID	100/50mcg, 250/50mcg, 500/50mcg	28 or 60 blisters/device
Atectura® Breezhaler®* (indacaterol acetate/mometasone furoate) Novartis		OD	150/80mcg, 150/160mcg, 150/320mcg	30 capsules/carton
Breo® Ellipta®*† (fluticasone furoate/vilanterol) GlaxoSmithKline		OD	100/25mcg*†, 200/25mcg*	14 or 30 blisters/device
Symbicort® Turbuhaler®*† (budesonide/formoterol) AstraZeneca		OD or BID	100/6 mcg, 200/6mcg (FORTE)	120 doses/device
Wixela® Inhub®*† (fluticasone propionate/salmeterol) Mylan Inc.		BID	100/50mcg, 250/50mcg, 500/50mcg	60 blisters/device
Zenhale®*◊ (mometasone/formoterol) Merck		BID	100/5mcg, 200/5mcg	120 actuations/canister
Other Fluticasone/salmeterol products: pms-Fluticasone propionate/Salmeterol DPI				

Acronyms: OD = Once daily, BID = Twice Daily, QID = Four times daily Symbols: *Indicated for the treatment of Asthma, †Indicated for the treatment of COPD, ◊Indicated for use with a valved-holding chamber (spacer).
This is not a complete list of respiratory medications. Please refer to the respective product monographs for detailed information on indications, contraindications, adverse events, dosing and administration and patient selection. Health Canada Drug Product Database: https://health-products.canada.ca/dpd-bdpp/index-eng.jsp This chart is provided for information purposes only. Medications are listed in alphabetical order.

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Appendix A: Types of Respiratory Medications

RESPIRATORY MEDICATIONS

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CONTROLLERS/MAINTENANCE

Drug		Use	Strength	Capacity
Combination LAMA/LABA				
Anoro™ Ellipta®† (umeclidinium/vilanterol) GlaxoSmithKline		**OD**	**62.5/25mcg**	**7 or 30 blisters/device**
Duaklir™ Genuair®† (aclidinium/formoterol) AstraZeneca		**BID**	**400mcg/12mcg**	**60 actuations/device**
Inspiolto™ Respimat®† (tiotropium/olodaterol) Boehringer Ingelheim		**OD**	**2.5/2.5mcg per actuation**	**28 or 60 actuations/cartridge**
Ultibro®Breezhaler®† (indacaterol/glycopyrronium) Novartis		**OD**	**110mcg/50mcg**	**6 or 30 capsules/carton**
Combination ICS/LABA/LAMA				
Enerzair® Breezhaler®* (indacaterol acetate/ glycopyrronium bromide/ mometasone furoate) Novartis		**OD**	**150/50/160mcg**	**30 capsules/carton**
Trelegy® Ellipta® (fluticasone furoate/ umeclidinium/vilanterol) GlaxoSmithKline		**OD**	**100/62.5/25mcg**	**7 or 30 blisters/canister**
Combination SAMA/SABA				
Combivent® Respimat®† (ipratropium/salbutamol) Boehringer Ingelheim		**BID**	**20/100mcg**	**120 actuations/cartridge Product monograph recommends: 1 inhalation 4 times/day for COPD**

CONTROLLERS/MAINTENANCE

Drug		Use	Strength	Capacity
Long-Acting Muscarinic Antagonist (LAMA) also known as: Long-Acting Anticholinergic (LAAC)				
Incruse™ Ellipta®† (umeclidinium) GlaxoSmithKline		**OD**	**62.5mcg**	**7 or 30 blisters/device**
Seebri® Breezhaler®† (glycopyrronium) Novartis		**OD**	**50mcg**	**10 or 30 capsules/carton**
Spiriva®† via HandiHaler® (tiotropium) Boehringer Ingelheim		**OD**	**18mcg**	**10 or 30 capsules/carton**
Spiriva®*† Respimat® (tiotropium) Boehringer Ingelheim		**OD**	**2.5mcg/ actuation**	**28 or 60 actuations/cartridge**
Tudorza® Genuair®† (aclidinium) AstraZeneca		**BID**	**400mcg**	**30 or 60 actuations/device**

ADDITIONALS

Additional Medications
Anti-IgE*: Xolair® (omalizumab) Novartis
IL-5 Inhibitor*: Cinqair™ (reslizumab) Teva, Nucala® (mepolizumab) GlaxoSmithKline, Fasenra® (benralizumab) AstraZeneca
Leukotriene Receptor Antagonists (LTRA)*: Accolate® (zafirlukast) AstraZeneca, Singulair® (montelukast) Merck
Immunomodulator, Interleukin Inhibitor*: Dupixent® (dupilumab) Sanofi-aventis
Macrolides†: e.g. Azithromycin
Methylxanthines†: (aminophylline, oxtriphylline, theophylline)
Mucolytic†: oral N-acetylcysteine
Oral Corticosteroid (Oral Corticosteroids)*†: Prednisone e.g. Apotex, Teva, Jaapharm, Pro Doc Ltée
Phosphodiesterase-4 Inhibitor†: Daxas® (roflumilast) AstraZeneca

*◊Note: The addition of a valved-holding chamber (spacer) with a pMDI is helpful in improving coordination, reducing side effects and increasing drug delivery and deposition (CTS 2010 Asthma Guidelines – **https://cts-sct.ca/guideline-library/**)*

Acronyms: OD = Once daily, BID = Twice Daily, QID = Four times daily Symbols: *Indicated for the treatment of Asthma, †Indicated for the treatment of COPD, ◊Indicated for use with a valved-holding chamber (spacer).
This is not a complete list of respiratory medications. Please refer to the respective product monographs for detailed information on indications, contraindications, adverse events, dosing and administration and patient selection. Health Canada Drug Product Database: https://health-products.canada.ca/dpd-bdpp/index-eng.jsp This chart is provided for information purposes only. Medications are listed in alphabetical order.

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Appendix B: Lower Impact pMDI Alternatives

Life Cycle Carbon Emissions of Common Asthma Medications & Alternatives for Adults

Hamilton Family Health Team Green Initiative

The C.A.R.E. Project
Clean Air, Respiratory Excellence

March 2022

Reliever Medications

Much More Impact

Salbutamol /Ventolin	Airomir MDI	Bricanyl Turbuhaler	Ventolin Diskus	Symbicort Turbuhaler*
✓ ODB	✓ ODB	✓ ODB	✗ No ODB	✓ ODB (LU: 330)
1-2 puffs QID PRN (max 8 puffs/day)	*1-2 puffs QID PRN (max 8 puffs/day)*	*1-2 puffs QID PRN (max 6 puffs/day)*	*1 puff QID PRN (max 4 puffs/day)*	*1-2 puffs BID &/ PRN (max 8 puffs/day)*
100mcg: ~$5/$6 *salbutamol*	100mcg: ~$6 *salbutamol*	500mcg: ~$9 *terbutaline*	200mcg: ~$10 *salbutamol*	200/6: ~$70 *budesonide/ formoterol*
MDI	Low Charge MDI	Dry-Powder Inhalers (DPIs)		

Much Less Impact

Inhaled Corticosteroid Maintenance Therapy

Much More Impact

Flovent MDI	QVar MDI	Alvesco MDI	Arnuity Ellipta	Pulmicort Turbuhaler	Flovent Diskus /Aermony Respiclick		Asmanex Twisthaler
✓ ODB	✓ ODB	✓ ODB	✓ ODB	✓ ODB	✓ ODB (Flovent)	✗ No ODB (Aermony)	✓ ODB
1-8 puffs BID	*1-4 puffs BID*	*1-4 puffs BID*	*1-2 puffs/day*	*200-1200mcg BID*	*100-1000mcg BID*		*2 puffs BID*
125mcg: ~$50 250mcg: ~$90 *fluticasone propionate*	100mcg: ~$70 *beclo-methasone*	100mcg: ~$50 200mcg: ~$80 *ciclesonide*	200mcg: ~$80 *fluticasone furoate*	100mcg: ~$30 200mcg: ~$70 400mcg: ~$100 *budesonide*	100mcg: ~$30 250mcg: ~$50 *fluticasone propionate*		200mcg: ~$40 400mcg: ~$80 *mometasone furoate*
Metered-Dose Inhalers (MDIs)			Dry-Powder Inhalers (DPIs)				

Much Less Impact

ICS/LABA Maintenance Therapy

Much More Impact

Advair MDI	Zenhale MDI	Breo Ellipta	Wixela InHub/ Advair Diskus	Symbicort Turbuhaler	Atectura Breezhaler
✓ ODB (LU: 330)	✓ ODB (LU: 330)	✓ ODB (LU: 330)	✓ ODB (LU: 330)	✓ ODB (LU: 330)	✓ ODB (LU: 626)
1-2 puffs BID	*1-2 puffs BID*	*1 puff/day*	*1 puff BID*	*1-2 puffs BID &/ PRN (max 8 puffs/day)*	*1 puff/day*
125/25:~$110 250/25:~$160 *fluticasone propionate/ salmeterol*	100/5:~$100 200/5:~$120 *mometasone/ formoterol*	100/25:~$90 200/25:~$140 *fluticasone furoate/vilanterol*	100/50:~$42/$90 250/50:~$51/$110 500/50:~$72/$160 *fluticasone propionate/salmeterol*	200/6: ~$70 *budesonide/ formoterol*	80/150:~$60 160/150:~$60 320/150:~$60 *mometasone furoate/ indacaterol acetate*
MDI		Dry-Powder Inhalers (DPIs)			

Much Less Impact

*Generic expected Fall 2022. **All costs based on ODB Drug Formulary & exclude dispensing fee.** With permission, adapted from: *Visentin J. Cost and Coverage Estimates for Less vs. More Sustainable Asthma Therapies. Published online June 2021.*

This resource may not reflect all available medications and does not include all information. Read product monographs before prescribing.

Appendix B: Lower Impact pMDI Alternatives

COST AND COVERAGE ESTIMATES FOR LESS VS. MORE SUSTAINABLE ADULT ASTHMA THERAPIES

Cost estimates are based on generic pricing in all cases where a generic is available. Cost estimates are also based on pricing at Shoppers Drug Mart (includes markup and dispensing fee of $11.99). Cost may be 10-20% lower at Costco or independent pharmacies.

Less sustainable | **More sustainable**

Reliever Therapy

Ventolin pMDI (salbutamol) 200 doses
100-200 mcg QID PRN (max 800 mcg/day)
100 mcg $18.67 ✓ ODB

Symbicort Turbuhaler (budesonide/formoterol) 120 doses
1-2 inh QID PRN (max 6 inh at a time and 8 inh/day) *
100 mcg $94.55 // 200 mcg $118.78
X ODB *(LU code does not apply for reliver therapy)*

Bricanyl Turbuhaler (terbutaline) 100 doses
0.5 -1.0 mg QID PRN (max 3 mg/day)
0.5 mg $23.19 ✓ ODB

Maintenance Therapy

ICS

Qvar pMDI (beclomethasone) 200 doses
100-400 mcg BID (max 800 mcg/day)
100 mcg $97.26 ✓ ODB

Flovent pMDI (fluticasone propionate) 120 doses
125-1000 mcg BID (max 2000 mcg/day)
125 mcg $65.81 // 250 mcg $90.49 ✓ ODB

Alvesco pMDI (fluticasone propionate) 120 doses
100-400 mcg BID (max 800 mcg/day)
100 mcg $68.01 // 200 mcg $103.97 ✓ ODB

LCA **Arnuity Ellipta (fluticasone furoate) 30 doses**
100-200 mcg daily (max 200 mcg/day)
100 mcg $60.90 // 200 mcg $108.71 ✓ ODB

Pulmicort Turbuhaler (budesonide) 200 doses
200-1200 mcg BID (max 2400 mcg/day)
100 mcg $52.29 // 200 mcg $52.29 // 400 mcg $130.33
✓ ODB

Flovent Diskus (fluticasone propionate) 60 doses
100-1000 mcg BID (max 2000 mcg/day)
100 mcg $43.53 // 250 mcg $67.90 // 500 mcg $95.12
✓ ODB (250 mcg and 500 mcg only)

ICS/LABA

Advair pMDI (fluticasone propionate/ salmeterol) 60 doses
1-2 inh BID (max 4 inh/day) *
125 mcg $135.92 // 250 mcg $187.51
✓ ODB LU 330

Zenhale pMDI (mometasone/formoterol) 120 doses
1-2 inh BID (max 4 inh/day) *
100 mcg $128.64 // 200 mcg $153.12
✓ ODB LU 330

Advair Diskus (fluticasone propionate/ salmeterol) 60 doses
1-2 inh BID (max 4 inh/day) *
100 mcg $61.40 // 250 mcg $70.96 // 500 mcg $95.63
✓ ODB LU 330

Symbicort Turbuhaler (budesonide/ formoterol) 120 doses
1-2 inh BID + 1-2 inh QID PRN (max 6 inh at a time and 8 inh/day) *
100 mcg $94.55 // 200 mcg $118.78 ✓ ODB LU 330

LCA **Breo Ellipta (fluticasone furoate/vilanterol) 30 doses**
1 inh daily (max 1 inh/day) *
100 mcg $114.43 // 200 mcg $171.75 ✓ ODB LU 330

*Dosing for ICS/LABA inhalers is denoted as inhalations/day for ease of interpretation since there are multiple active ingredients. Max doses are determined based on LABA content.
LCA denotes the **lowest cost alternative** within the group based on monthly cost (this accounts for the number of doses in each inhaler and the maximum daily dose).

JESSICA VISENTIN, PHARMACIST JUNE 2021 REVIEWED BY RITA HA AND BRENDA CHANG

Respiratory Inhaler Comparison Chart

Note: Cost estimates are based on generic pricing in all cases where a generic is available. Cost estimates are also based on pricing at Shoppers Drug Mart (includes markup and dispensing fee of $11.99). Cost may be 10-20% lower at Costco or independent pharmacies.

Class	Drug and Doses/Device	Device Type	ODB Coverage	Cost (as of May 2021)
SABA	Airomir HFA (salbutamol) 200 doses	pMDI	Yes	100 mcg - $19.09
	Bricanyl Turbuhaler (terbutaline) 100 doses	DPI	Yes	0.5 mg - $23.19
	Ventolin HFA (salbutamol) and generics 200 doses	pMDI	Yes	100 mcg - $18.67
	Ventolin Diskus (salbutamol) 60 doses	DPI	**No**	200 mcg - $24.90
SAMA	Atrovent HFA (ipratropium) 200 doses	pMDI	Yes	20 mcg - $36.68
SAMA/SABA	Combivent Respmimat (ipratropium/salbutamol) 120 doses	SMI	**No**	20 mcg/100 mcg - $48.10
ICS	Aermony Respiclick (fluticasone propionate) 60 doses	DPI	Yes	55 mcg - $33.14 113 mcg - $49.21 232 mcg - $69.44
	Alvesco (ciclesonide) 120 doses	pMDI	Yes	100 mcg - $68.01 200 mcg - $103.97
	Arnuity Ellipta (fluticasone furoate) 30 doses	DPI	Yes	100 mcg - $60.90 200 mcg - $108.71
	Asmanex Twisthaler (mometasone) 30 or 60 doses	DPI	**Yes (only 200mcg and 400mcg)**	100 mcg/30 doses - $58.43 200 mcg/60 doses - $58.89 400 mcg/30 doses - $58.89 400 mcg/60 doses - $104.90
	Flovent HFA (fluticasone propionate) and generics 120 doses	pMDI	Yes	50 mcg - $44.74 125 mcg - $65.81 250 mcg - $118.40
	Flovent Diskus (fluticasone propionate) 60 doses	DPI	**Yes (only 250mcg and 500mcg)**	100 mcg - $43.53 250 mcg - $67.90 500 mcg - $95.12
	Pulmicort Turbuhaler (budesonide) 200 doses	DPI	Yes	100 mcg - $52.29 200 mcg - $52.29 400 mcg - $93.57
	Qvar (beclomethasone) 200 doses	pMDI	Yes	100 mcg - $97.26
LABA	Foradil Aerolizer (formoterol) 60 doses	DPI	**Yes (LU code 132 – asthma)**	12 mcg - $77.61
	Onbrez Breezhaler (indacaterol) 30 doses	DPI	**Yes (LU code 443 - COPD)**	75 mcg - $67.53
	Oxeze Turbuhaler (formoterol) 30 doses	DPI	**Yes (LU code 132 - asthma)**	6 mcg - $52.36 12 mcg - $65.55
	Serevent Diskus (salmeterol) 60 doses	DPI	**Yes (LU code 132 - asthma)**	50 mcg - $85.92

Last Updated June 17, 2021

Developed by Brenda Chang, *Clinical Pharmacy Practitioner, St. Michael's Hospital Academic Family Health Team*
Reviewed by Jessica Visentin and Rita Ha.

Appendix B: Lower Impact pMDI Alternatives

Class	Drug and Doses/Device	Device Type	ODB Coverage	Cost (as of May 2021)
LAMA	Incruse Ellipta (umeclidinium) 30 doses	DPI	Yes	62.5 mcg - $71.60
	Seebri Breezhaler (glycopyrronium) 30 doses	DPI	Yes	50 mcg - $75.20
	Spiriva Handihaler (tiotropium) 30 doses	DPI	Yes	18 mcg - $76.55
	Spiriva Respimat (tiotropium) 60 doses	DPI	Yes	2.5 mcg - $76.55
	Tudorza Genuair (aclidinium) 60 doses	DPI	Yes	400 mcg - $75.20
ICS/LABA	Advair (fluticasone propionate/salmeterol) 120 doses	pMDI	**Yes (LU code 330 - asthma)**	125 mcg/25 mcg - $135.92 250 mcg/25 mcg - $187.51
	Advair Diskus (fluticasone propionate/salmeterol) and generics (e.g. **Wixela Inhub and PMS**) 60 doses	DPI	**Yes (LU code 330 - asthma)**	100 mcg/50 mcg - $61.40 250 mcg/50 mcg - $70.96 500 mcg/50 mcg - $95.63
	Breo Ellipta (fluticasone furoate/vilanterol) 30 doses	DPI	**Yes (LU code 456 – COPD; LU code 330 – asthma)**	100 mcg/25 mcg - $114.43 200 mcg/25 mcg - $171.75
	Symbicort Turbuhaler (budesonide/formoterol) 120 doses	DPI	**Yes (LU code 330 – asthma)**	100 mcg/6 mcg - $94.55 200 mcg/6 mcg - $118.78
	Zenhale (mometasone/formoterol) 120 doses	pMDI	**Yes (LU code 330 – asthma)**	100 mcg/5 mcg - $128.64 200 mcg/5 mcg - $153.12
LAMA/LABA	Anoro Ellipta (umeclidinium/vilanterol) 30 doses	DPI	**Yes (LU code 459 – COPD)**	62.5 mcg/25 mcg - $112.97
	Duaklir Genuair (aclidinium/formoterol) 60 doses	DPI	**Yes (LU code 459 – COPD)**	400 mcg/12 mcg - $83.22
	Inspiolto Respimat (tiotropium/olodaterol) 60 doses	SMI	**Yes (LU code 459 – COPD)**	2.5 mcg/2.5 mcg - $87.71
	Ultibro Breezhaler (indacaterol/glycopyrronium) 30 doses	DPI	**Yes (LU code 459 – COPD)**	110 mcg/50 mcg - $103.80
ICS/LABA/LAMA	Trelegy Ellipta (fluticasone furoate/umeclidium/vilanterol) 30 doses	DPI	**Yes (LU code 567 – COPD)**	100 mcg/62.5 mcg/25 mcg - $167.66
	Enerzair Breezhaler (indacaterol/glycopyrronium/mometasone) 30 doses	DPI	**No**	150 mcg/50 mcg/160 mcg - $143.99

Acronyms: COPD = chronic obstructive lung disease; DPI = dry powder inhaler; HFA = hydrofluoroalkane; ICS = inhaled corticosteroid; ODB = Ontario Drug Benefit; LABA = long-acting beta-agonist; LAMA = long-acting muscarinic antagonist; LU = limited use; pMDI = pressurized metered dose inhaler; SABA = short-acting beta-agonist; SAMA = short-acting muscarinic antagonist; SMI = soft mist inhaler

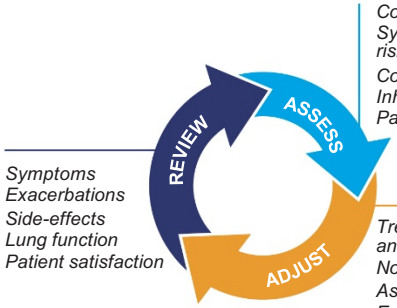
Green Inhaler Option

Developed by Brenda Chang, *Clinical Pharmacy Practitioner, St. Michael's Hospital Academic Family Health Team*
Reviewed by Jessica Visentin and Rita Ha.

Adults & adolescents 12+ years

Personalized asthma management

Assess, Adjust, Review
for individual patient needs



Confirmation of diagnosis if necessary
Symptom control & modifiable risk factors (including lung function)
Comorbidities
Inhaler technique & adherence
Patient preferences and goals

Symptoms
Exacerbations
Side-effects
Lung function
Patient satisfaction

Treatment of modifiable risk factors and comorbidities
Non-pharmacological strategies
Asthma medications (adjust down/up/between tracks)
Education & skills training

CONTROLLER and **PREFERRED RELIEVER**
(Track 1). Using ICS-formoterol as reliever reduces the risk of exacerbations compared with using a SABA reliever

STEPS 1 – 2	STEP 3	STEP 4	STEP 5
As-needed low dose ICS-formoterol	Low dose maintenance ICS-formoterol	Medium dose maintenance ICS-formoterol	Add-on LAMA Refer for phenotypic assessment ± anti-IgE, anti-IL5/5R, anti-IL4R Consider high dose ICS-formoterol

RELIEVER: As-needed low-dose ICS-formoterol

CONTROLLER and **ALTERNATIVE RELIEVER**
(Track 2). Before considering a regimen with SABA reliever, check if the patient is likely to be adherent with daily controller

STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
Take ICS whenever SABA taken	Low dose maintenance ICS	Low dose maintenance ICS-LABA	Medium/high dose maintenance ICS-LABA	Add-on LAMA Refer for phenotypic assessment ± anti-IgE, anti-IL5/5R, anti-IL4R Consider high dose ICS-LABA

RELIEVER: As-needed short-acting β2-agonist

Other controller options for either track				
	Low dose ICS whenever SABA taken, or daily LTRA, or add HDM SLIT	*Medium dose ICS, or add LTRA, or add HDM SLIT*	*Add LAMA or LTRA or HDM SLIT, or switch to high dose ICS*	*Add azithromycin (adults) or LTRA; add low dose OCS but consider side-effects*

Template A: To Pharmacist to Stop MDI Repeats

Dear Pharmacist: Please note that there are no repeats on this MDI Rx. Please encourage the patient to contact our office so we can discuss current puffer use guidelines and their options.

Template B: To Patient, Requesting Appointment to Discuss MDI & Alternatives

Hello [patient name]: The pharmacy has requested your puffer renewal. There is new information for puffers that I would like you to discuss with our (respiratory educator or in-clinic pharmacist). Please call the office for an appointment at [clinic contact information].

Template C: To Patient, Asking about switch from MDI to Bricanyl Turbuhaler*

Dear [Patient Name],

Your pharmacy has asked me to renew your salbutamol (blue inhaler).

I wonder if you are open to changing the type of inhaler that delivers the medicine. You've been using the aerosol inhaler. We are moving away from these because the aerosol that pushes the puff out of the container is a strong greenhouse gas.

Stopping using the aerosol inhalers is an important step to reduce our effect on climate change and make the planet healthier.

The new puffer would be "Bricanyl" (terbutaline, which works the same as salbutamol). It looks like a small cylinder and is called a "Turbuhaler." It does not use aerosols. Here is a link to a video that shows you how to use it: https://www.youtube.com/watch?v=02OPJUlsuhQ.

Let me know if you are okay to switch to the Bricanyl at [office contact information].

Template D: Internal Communication to Office Administrator

[Patient Name] has requested a puffer prescription repeat via their PHA. Please book a phone or in person appointment with them to discuss their puffers with [me, NP, RN, PA, pharmacist, respiratory educator].

Template E: To Patient, Information on how to Use New Inhalers

As we discussed, you have a new puffer to try out. Here are some helpful videos on how to use it most effectively: [choose applicable link]

Canadian Lung Association: DPIs available in Canada - https://www.lung.ca/lung-health/get-help/how-use-your-inhaler

Turbuhaler - https://www.youtube.com/watch?v=02OPJUlsuhQ

*This template was developed by Dr. Kimberly Wintemute at North York FHT. All others developed by Dr. Meghan Davis, Hamilton FHT.

Appendix E: HFHT MDI Impact Equivalencies Calculations

Calculation 1: Emissions from MDIs

90-98% of MDI Global Warming Potential (GWP) comes from the propellant emissions when the inhaler is actuated.[1]

In 2018, UNEP reports that 11 500 tonnes of propellant were used for MDIs globally, as below:

- HFC-134a (~10 600 tonnes[2], ~92% of HFC MDI propellants): 20 000-30 000g CO_2 (eq)/200 actuations*
- HFC-227ea (~900 tonnes[2], ~8% of HFC MDI propellants): 60 000-80 000 CO_2 (eq)/200 actuations*

(*These emissions are based on lifecycle analysis)

1. Assumption of average emissions
    a. Average HFC-134a emissions= 25kg CO_2 (eq)/200 actuations
    b. Average HFC-227ea emissions= 70kg CO_2 (eq)/200 actuations
    c. Weighted average based on use:
        i. HFC-134a: 25*0.922 = 23kg, HFC-227ea: 70*0.08= 5.6
        ii. Average inhaler produces: 28.6kg CO_2 (eq)/200 actuations

Calculation 2: Equivalency Calculations

2. Driving Distance Equivalency
    a. Canadian average fuel mileage: 8.9L/100km[3]
    b. 1L gasoline = 2.3kg CO_2 (eq)[4]
    c. (28.6kg CO_2 (eq)/inhaler) / (2.3kg CO_2 (eq)/1L gasoline) = 12.43 L gasoline/inhaler
    d. Based on 2.a., 1 MDI is equivalent to tailpipe emissions from a 139.72km car ride

Confounding Factors:

- The proportion of MDIs using each type of propellant may be different in Canada compared to the global average. These calculations are solely based on the global average manufacturing statistics.
- MDIs can have many different actuation/dosage sizes. Generally, MDIs have 120 or 200 actuations, 120 is often used in the literature, in these calculations, we are assuming 200 actuations/inhaler
- Going forward, HFC-152a is being investigated as an alternative (GWP of 124, lifetime carbon footprint of 1800g CO_2 (eq)/200 actuations), could be used starting in 2025, human trials started in 2019, similar impact to DPI[2]
- Omitted use of diesel fuel, focused on gasoline
- Tailpipe emissions used, does not include vehicle life cycle emissions

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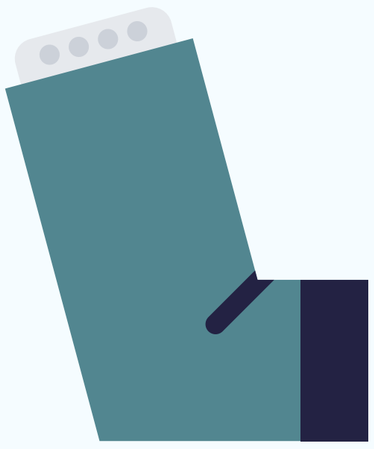
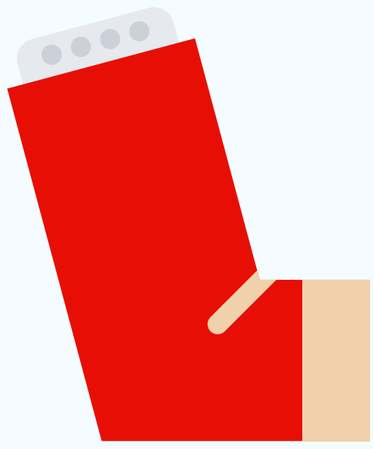
Authored by: Tatiana Gayowsky, H.BASc, Hamilton FHT. Note this calculation has not been peer-reviewed or published.

Hamilton Family Health Team

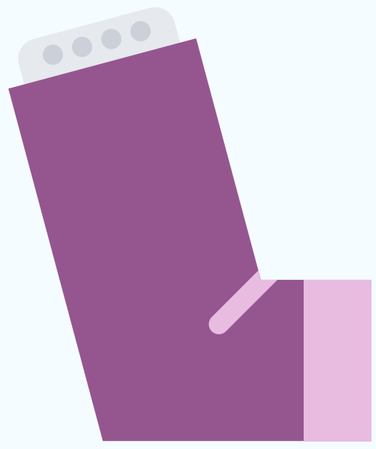
Green Initiative



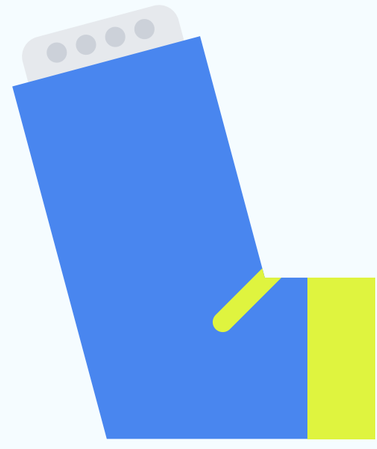
Ventolin



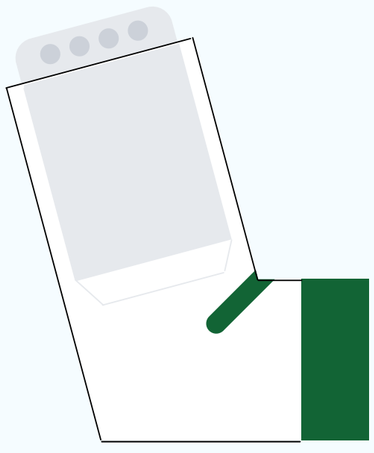
FloVent



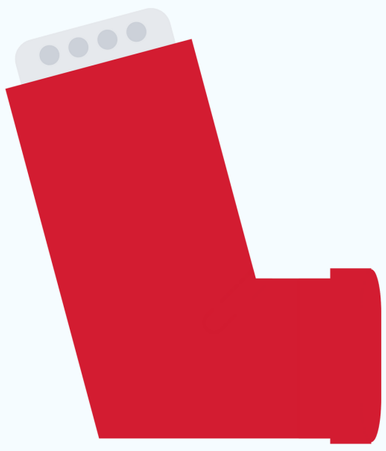
Advair



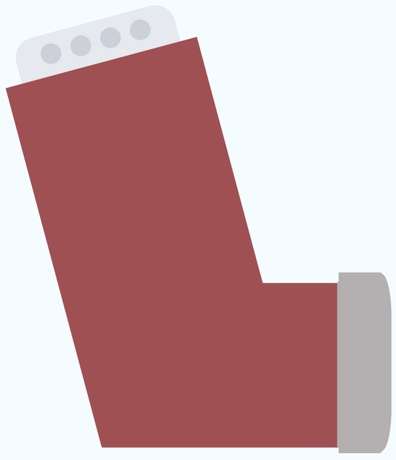
Zenhale



Atrovent



Alvesco



QVar

Airomir

Does your inhaler look like this?

If you are over 12 years old, it might be time for a change. Let's talk!