

# CLIMATE CONSCIOUS INHALER PRESCRIBING IN OUTPATIENT CARE

Why • The Case for Change  
What • The Tools for Change  
How • Strategy and Partnerships

This project was undertaken with the financial support  
of the Government of Canada.

Ce projet a été réalisé avec l'appui financier  
du gouvernement du Canada.

Canada

CASCADES

SUSTAINABLE HEALTH SYSTEM  
COMMUNITY of PRACTICE

TAHSN



# NAVIGATION



Click on a topic on the table found on the right to navigate the document

Introduction 3

---

Why: The Case for Change 5

- The Environmental Impacts of Inhalers
  - Environmentally Preferable Inhaler Options
  - Incentives for Action
- 

What: The Tools for Change 9

- Action Area: Need
  - Action Area: Type
  - Action Area: Technique
  - Action Area: Disposal
- 

How: Strategy & Partnerships 43

- Capacity Building
  - QI Mobilization
  - Measurement & Reporting
  - Spread & Scale
-



# INTRODUCTION

**The Playbook provides background information and resources to guide more environmentally sustainable inhaler prescribing in primary care settings.**

This playbook was initially developed through an initiative of the Sustainable Health System Community of Practice (CoP), with support from CASCADES

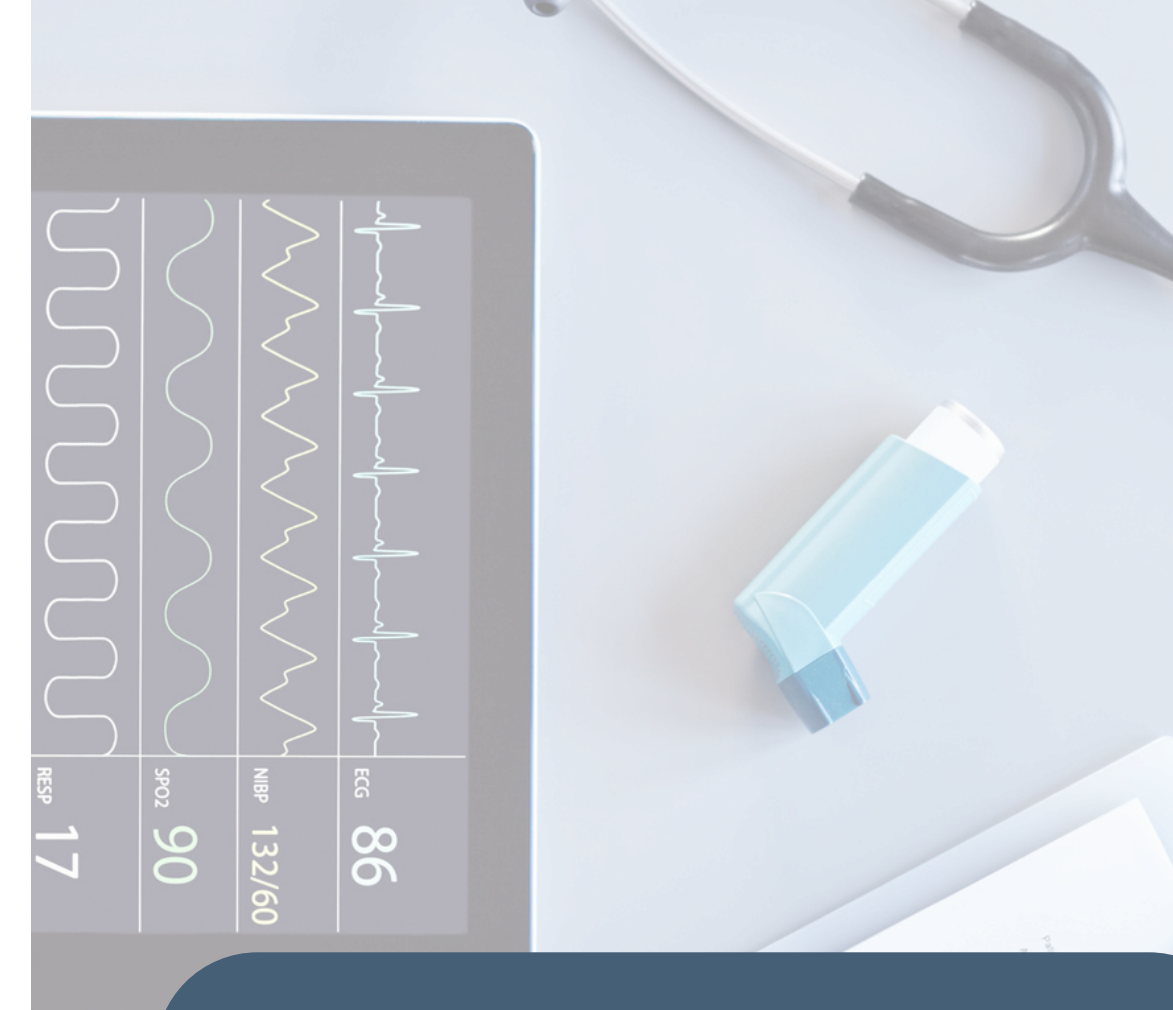
- The CoP is a collaboration between the Toronto Academic Health Science Network (TAHSN) of 14 hospital systems, and the seven health science faculties of the Council of Health Sciences (CHS) at the University of Toronto, supported by the Centre for Sustainable Health Systems at the University of Toronto
- The Sustainable Inhalers Initiative, which is supported by the Lawrence S. Bloomberg Faculty of Nursing, Leslie Dan Faculty of Pharmacy, and the University of Toronto Department of Family and Community Medicine, is one of several CoP initiatives aimed at reducing the carbon impacts of care

This is the third version of the Climate Conscious Inhaler Prescribing in Primary Care Playbook.

- The first version of the Playbook had resources that were used in the Sustainable Inhalers Initiative of the Sustainable Health System Community of Practice.
- Resources have undergone expert review from the Sustainable Inhalers National Advisory Committee, and new tools have been created where gaps had been identified. Some materials had been amended in consultation with patient-partners through a series of focus groups.
- CASCADES ran the Climate Conscious Inhaler Prescribing Collaborative between September 2022 and March 2023 – a learning opportunity based on an established spread model for Quality Improvement innovation. CASCADES engaged primary care teams across Canada, who received support from CASCADES as they test and adapt the tools, generating updates in this version.

## Suggested citation

Green S, Bursque G, Chang B, Khan N, Miller FA, Wilson J, Wintemute K. Climate Conscious Inhaler Prescribing in Outpatient Care version 3.1 (2024) [Internet]. CASCADES (Creating a Sustainable Canadian Health System in a Climate Crisis). [Cited DATE]. Available from <https://cascadescanada.ca/resources/sustainable-inhaler-prescribing-in-primary-care-playbook/>



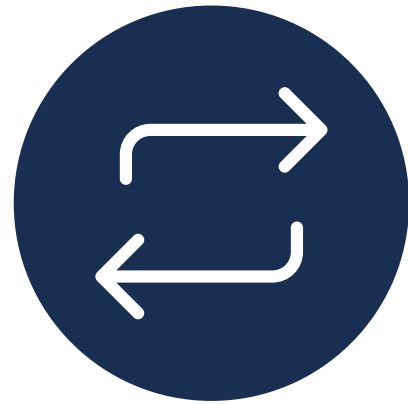
## RESOURCES:

- The Climate Conscious Inhaler Prescribing in Inpatient Care Playbook provides specific resources and examples for sustainable inhaler prescribing and management in hospital settings.





# PLAYBOOK STRUCTURE



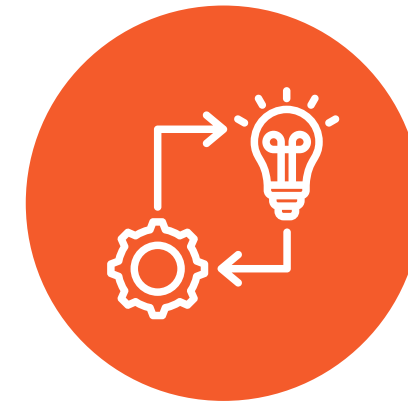
## WHY

The Case for Change



## WHAT

The Tools for Change



## HOW

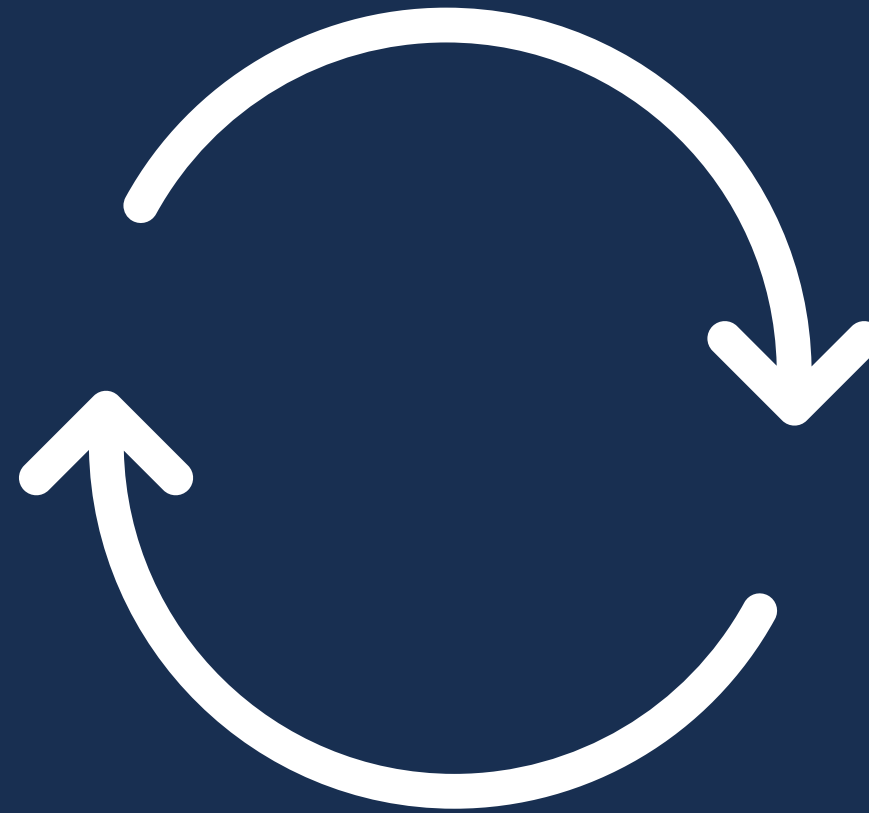
Strategy and Partnerships





# WHY

## The Case for Change



- 1 The Environmental Impacts of Inhalers
- 2 Environmentally Preferable Inhaler Options
- 3 Incentives for Action

Metered dose inhalers produce significant carbon emissions



Carbon emissions contribute to changes to the climate that can exacerbate respiratory conditions, necessitating further inhaler prescribing



More environmentally sustainable inhaler alternatives are available that can help disrupt this cycle and lessen the health sector's contributions to climate change





# The Environmental Impact of Inhalers



## METERED DOSE INHALERS (MDIS) PRODUCE SIGNIFICANT CARBON EMISSIONS

Currently, metered dose inhalers (MDIs) are the most widely prescribed treatment option for respiratory conditions such as asthma and COPD; however, these devices, which are pressurized and rely on liquefied-gas propellants to atomize medication for inhalation delivery, emit hydrofluorocarbons (HFCs) with significant global warming potential (GWP). (1)

- According to a 2014 report published by the United Nations Environment Programme, HFC emissions from MDIs represent roughly 0.03% of annual global GHG emissions. (2)
- Paradoxically, while MDIs are prescribed for respiratory conditions, the GHG emissions from MDIs can promote or exacerbate existing respiratory diseases. (3)

**These emissions can be minimized in several ways that go hand-in-hand with improving patient care and outcomes:**

1. Reducing unnecessary inhaler prescribing will reduce the associated environmental impact.

2. Dry powder inhalers (DPIs) and soft-mist inhalers (SMIs) are alternatives that have a lower carbon footprint than MDIs

3. Even when MDIs are necessary, optimizing disease control and inhaler technique can result in lower propellant emissions.





# Environmentally Preferable Inhaler Options

## ENVIRONMENTALLY PREFERABLE ALTERNATIVES CAN BE CONSIDERED FOR PATIENTS

- This is aligned with Choosing Wisely Canada’s guidance on the importance of confirming diagnoses.
- A Canadian study showed that 33% of patients diagnosed with asthma by a physician in the last 5 years did not have objective evidence of asthma on lung function testing. (4)
- The carbon footprint of DPIs is 10 times smaller than that of MDIs, considering their use and end-of-life stages. (5) Whenever appropriate, primary care providers should seek to prescribe DPIs to patients presenting with new respiratory symptoms and consider whether an alternative lower GWP inhaler such as an SMI or DPI may be suitable. Such a switch will reduce environmental impacts, and also has the potential to reduce costs to patients and improve clinical outcomes.

**This playbook features a variety of patient and provider focused assets that can be used to facilitate more sustainable inhaler prescribing.**





# Incentives for Action



## TIMELY INCENTIVES TO CONSIDER AND ADVOCATE FOR MORE SUSTAINABLE INHALER PRESCRIBING

### GROWING FOCUS ON THE HEALTH SECTOR'S CLIMATE FOOTPRINT

- The health sector contributes significantly to global emissions; if it were a country, it would be the fifth largest emitter on the planet. (6) It is becoming increasingly accepted that the health sector, with its mission to help and heal, should be front and center in the fight to safeguard the planet and human health from climate change. At the recent COP26, for example, the Government of Canada signed on to a commitment with 49 other countries to address health sector emissions. There is therefore both a moral and reputational incentive to improve the sustainability of healthcare activities, including prescribing.
- Recent surveys indicate that the majority of Canadian patients care about climate change and would be willing to opt for less carbon-intensive treatment and care delivery options where available. (7)
- The demand for MDIs has been increasing (between 2016-2017, for example, MDI sales increased at a rate of 4% in the Global North, and 18% in the Global South), and as it does, the HFC emissions associated with their use will also increase, leading to further respiratory conditions requiring treatment. (2)

### NEW CLINICAL EVIDENCE SUPPORTING DPI PRESCRIBING

- Recent evidence indicates DPIs are associated with equal or better health outcomes than MDIs for many patients. (8,9)

### POTENTIAL COST SAVINGS

- While the cost of inhalers varies from province to province based on coverage, there is potential for a switch to DPIs to produce cost savings for patients and health systems. Wilkinson et al. estimate that for every 10% of MDIs switched to the cheapest equivalent DPIs, the total drug costs of England's health system would be reduced by roughly £8.2 million per year. (10) However, these savings depend on both the use of more affordable DPIs, as well as inclusion of DPIs on publicly funded drug coverage formularies for patients who may not be able to afford the switch.
- In the longer term, the health sector will be confronted with the health impacts of climate change; working to mitigate its climate footprint now will result in less of a financial burden down the road.





# WHAT

## The Tools for Change

- 1 Action Area 1: Need
- 2 Action Area 2: Type
- 3 Action Area 3: Technique
- 4 Action Area 4: Disposal

Inform Patients



Inform Providers



Facilitate Sustainable  
Prescribing





# ACTION AREAS: SUSTAINABLE INHALER PATHWAY

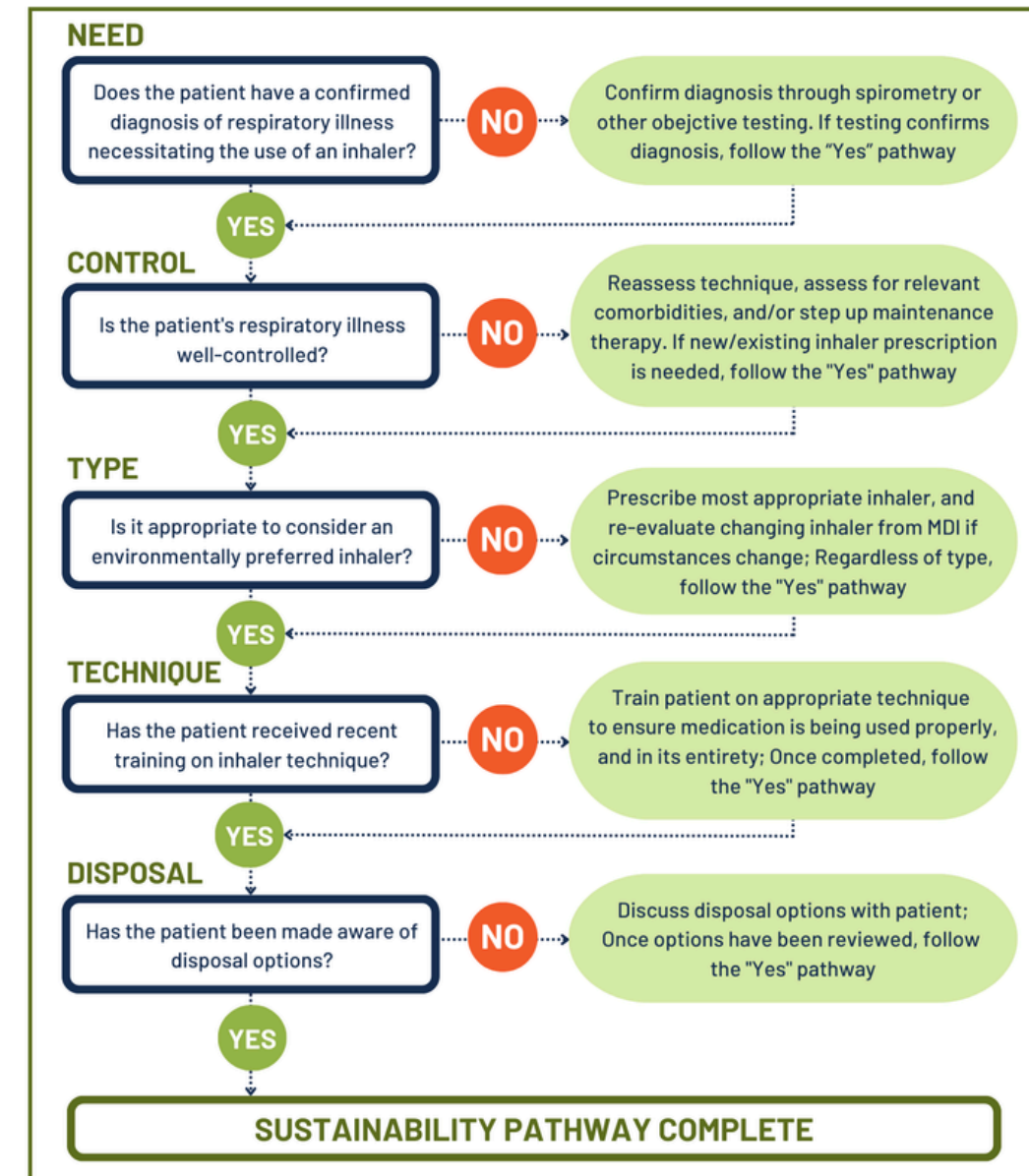
Sustainable inhaler prescribing involves applying a sustainability lens along the care pathway; various interventions can be made to establish/improve on:

1. Need
2. Type
3. Technique
4. Disposal

General background resources to inform the sustainable inhaler prescribing pathway include:

- Primer
- Sustainable inhalers infographic
- Webinar
- Sustainability pathway considerations

## Climate Conscious Inhaler Prescribing Sustainability Pathway



Need

Type

Technique

Disposal



This project was undertaken with the financial support of the Government of Canada. Ce projet a été réalisé avec l'appui financier du gouvernement du Canada.



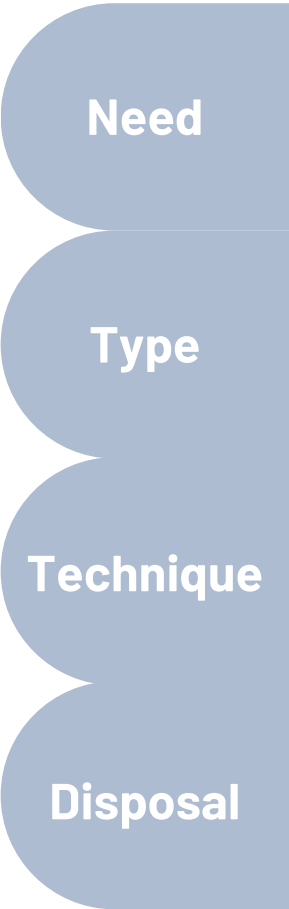
Sustainability Pathway





# OVERVIEW OF ACTION AREAS

Action Area	NEED Prescribe Appropriately	CONTROL Optimize Disease Management	TYPE Consider Sustainable Alternatives	TECHNIQUE Review Technique	DISPOSAL Encourage Proper Disposal
Description	Do not prescribe inhalers if they are not clinically indicated  <a href="#">Resource Catalogue</a>	Ensure patients' asthma and COPD control is optimized and guideline-adherent.	Consider a switch to a more sustainable inhaler where appropriate  <a href="#">Resource Catalogue</a>	Ensure the patient receives training on inhaler technique, regardless of inhaler type  <a href="#">Resource Catalogue</a>	Ensure the patient is aware of inhaler disposal options, regardless of inhaler type  <a href="#">Resource Catalogue</a>
Intervention	<p><b>NEW</b> prescriptions:</p> <ul style="list-style-type: none"> <li>Do not prescribe inhalers if they are not clinically indicated (i.e. diagnosis of asthma or COPD)</li> </ul> <p><b>EXISTING</b> prescriptions:</p> <ul style="list-style-type: none"> <li>Confirm diagnosis through spirometry or other testing in-house</li> <li>Refer patients for diagnostic testing</li> </ul>	<p><b>NEW &amp; EXISTING</b> prescriptions:</p> <ul style="list-style-type: none"> <li>Reduce excessive short acting inhaler use</li> <li>Improve adherence to guideline-based disease management</li> <li>Assess for relevant comorbidities</li> </ul>	<p><b>NEW</b> prescriptions:</p> <ul style="list-style-type: none"> <li>Default to non-pMDIs for eligible new patients when appropriate</li> </ul> <p><b>EXISTING</b> prescriptions:</p> <ul style="list-style-type: none"> <li>Engage in shared decision making with the patient about the opportunity to change to a lower GWP inhaler alternative.</li> <li>Consider alternatives at renewal.</li> <li>Consider all alternatives during unrelated visit.</li> </ul> <p>If a switch is inappropriate, continue current prescription (re-evaluate opportunities to switch inhalers if circumstances change)</p>	<p><b>NEW &amp; EXISTING</b> prescriptions:</p> <ul style="list-style-type: none"> <li>Offer digital resources on inhaler technique</li> <li>Demonstrate proper technique in related and unrelated visits</li> <li>Offer in-house training</li> </ul>	<p><b>NEW &amp; EXISTING</b> prescriptions:</p> <ul style="list-style-type: none"> <li>Educate patients on disposal options</li> </ul>





# OVERVIEW OF RESOURCE CATEGORIES



Category Information	Category Type		
	Patient Education and Communication	Provider Education	Prescribing Tools
Description	Resources designed to improve patient understanding of the environmental impacts of inhalers and more sustainable alternatives	Resources designed to improve provider understanding of the environmental impacts of inhalers and more sustainable alternatives through evidence synthesis	Resources to assist providers in assessing the appropriateness of more sustainable inhalers for patients based on clinical, cost, and carbon considerations

- Need
- Type
- Technique
- Disposal





# Action Area: Need

## ACTION AREA 1: NEED PRESCRIBE APPROPRIATELY

### INTERVENTIONS

#### NEW prescriptions:

- Do not prescribe inhalers if they are not clinically indicated (i.e. diagnosis of asthma or COPD).

#### EXISTING prescriptions:

- Confirm diagnosis through spirometry or other testing in-house.
- Refer patients for diagnostic testing.

Resource Category	Resources
<b>Patient Education &amp; Communication</b>	Patient-facing infographic
<b>Provider Education</b>	Background material: Primer
	Background material: Infographic
	Background material: Webinar
	Sustainable inhaler pathway considerations
<b>Prescribing Tools</b>	EMR search string – Patient with inhaler prescriptions

- Need
- Type
- Technique
- Disposal





# PATIENT EDUCATION & COMMUNICATION

## PATIENT-FACING INFOGRAPHIC

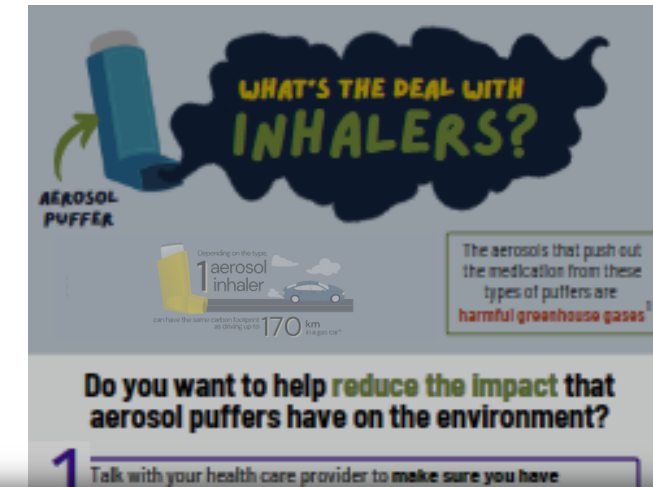
### PURPOSE

- Inform patients about confirming their diagnosis and ensuring the need of their inhaler.
- Poster links to this infographic; providers can email infographic to patients who are seeking further information.

### ELEMENTS

- Lay language.
- Action-oriented.
- Visually appealing.

Developed by Naba Khan, CASCADES.



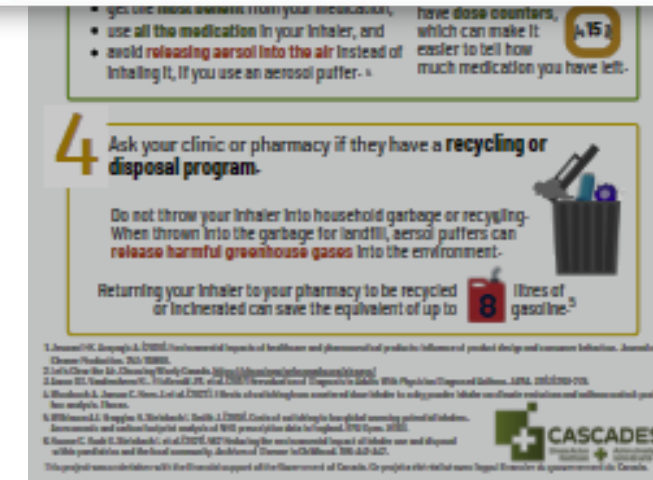
**1** Talk with your health care provider to **make sure you have been tested** for asthma or COPD

It can be **harmful** to use an inhaler you may not need<sup>2</sup>

- actual cause of your symptoms is unaddressed
- medication side effects
- environmental impact of the aerosol puffer
- money spent on medication you don't need

About **1 in 4** Canadian adults who use asthma inhalers **do not actually have asthma**.<sup>3</sup> Watch [this video](#) to learn more about the importance of confirming your diagnosis.

If you use your **blue reliever inhaler** **3** or more times a week, your asthma may not be well-controlled. Take [this test from Asthma Canada](#) to find out more.



Infographic

- Need
- Type
- Technique
- Disposal





# PATIENT EDUCATION & COMMUNICATION

## PATIENT-FACING INFOGRAPHIC (PRINTABLE)

### PURPOSE

- Inform patients about confirming their diagnosis and ensuring the need of their inhaler.

### ELEMENTS

- Lay language.
- Action-oriented.
- Visually appealing.
- Links to further information from Choosing Wisely Canada and Asthma Canada.

Developed by Naba Khan, CASCADES.

**WHAT'S THE DEAL WITH INHALERS?**

**AEROSOL PUFFER**

Depending on the type, **1 aerosol inhaler** can have the same carbon footprint as driving up to **170 km** in a gas car\*.

The aerosols that push out the medication from these types of puffers are **harmful greenhouse gases**!

Do you want to help **reduce the impact** that aerosol puffers have on the environment?

**1** Talk with your health care provider to **make sure you have been tested** for asthma or COPD

actual cause of your symptoms is unaddressed  
It can be **harmful** to use an inhaler you may not need<sup>2</sup>  
medication side effects  
environmental impact of the aerosol puffer  
money spent on medication you don't need

About **1 in 4** Canadian adults who use asthma inhalers **do not actually have asthma**. Watch [this video](#)\* to learn more about the importance of confirming your diagnosis.<sup>3</sup>

If you use your **blue reliever inhaler** 3 or more times a week, your asthma may not be well-controlled. Take [this test from Asthma Canada](#)\*\* to find out more.

**2** Ask your health care provider if **other lower carbon inhalers** are right for you

The carbon footprint of these alternatives can be **10 times smaller** than an aerosol puffer.<sup>1</sup>

There are many other types of inhalers with a **lower carbon footprint** than an aerosol puffer.

Most of these alternatives are called **dry powder inhalers** - they have no aerosol and they release the medication as you **breathe in**. These inhalers have the same medications to **treat your condition**.<sup>4</sup>

**3** Revoyez votre technique avec votre professionnel de santé pour vous assurer que vous **utilisez votre inhalateur de la bonne manière**.

**4** Les inhalateurs sur dix sont jetés et ne sont pas réellement vides.<sup>6</sup>

Les inhalateurs à poudre sont équipés de **15% de doses**, ce qui signifie que vous pouvez en avoir plus et savoir plus combien de doses il vous reste.

Si elles sont jetées, elles peuvent polluer l'environnement.<sup>5</sup>

8 litres d'essence.<sup>5</sup>

Regardez cette vidéo : <https://www.choosingwisely.ca/fr/patients>

**CASCADES**  
Climate Action Healthcare / Action climatique soins de santé

Ce projet a été réalisé avec l'appui financier du gouvernement du Canada.  
This project was undertaken with the financial support of the Government of Canada.

**Canada**

Patient-facing Infographic (Printable)

- Need
- Type
- Technique
- Disposal





# PROVIDER EDUCATION

## SUSTAINABLE INHALERS PRIMER AND INFOGRAPHIC

### PURPOSE

- Inform health care providers about sustainable inhaler prescribing.

### ELEMENTS

- Longer, in-depth primer.
- Infographic for quick reference.

Centre for Sustainable Health Systems  
 Clinical Reviewers: Dr. Kimberly Wintemute,  
 Brenda Chang.

**CASCADERS**  
 Environmentally Sustainable Opportunities for Health Systems  
**Primer Series**  
 Inhalers

**Issue**  
 Metered-dose inhalers (MDIs) are common medical devices used to deliver inhaled medication, typically for individuals with asthma and/or chronic obstructive pulmonary disease (COPD).<sup>1</sup> MDIs are pressurized and rely on liquefied-gas propellants to atomize medication for inhalation delivery. In the past, MDIs used chlorofluorocarbons (CFCs) as a primary gas propellant. However, CFCs were banned under the 1987 Montreal Protocol as they possess significant ozone-depleting properties. Soon after, pharmaceutical companies began manufacturing MDIs that use more ozone-friendly hydrofluoroalkanes (HFAs), also known as hydrofluorocarbons (HFCs); primarily HFC-134a and, to a lesser extent, HFC-227ea.<sup>2,3</sup> However, although HFCs do not deplete the ozone layer, they do have a high global warming potential (GWP), a metric used to examine a greenhouse gas's (GHG) ability to trap heat in the atmosphere compared to carbon dioxide. Depending on which HFC propellant is being considered, the GWP is on average 1400-3200 times greater.<sup>4</sup>

Indeed, recent studies have shown that MDIs contain high levels of HFCs that act as potent GHGs when released into the atmosphere, contributing to the healthcare sector's carbon footprint. HFC emissions from MDIs mostly come from the use-phase, followed by the end-of-life disposal when propellants are released into the atmosphere.<sup>1</sup> The UK National

Primer

MDIs are common medical devices used to deliver inhaled medication. They are typically used in the treatment of asthma and chronic obstructive pulmonary disorder.<sup>1</sup>

**MDIs use HFC propellants to deliver medication.**<sup>3</sup>

HFCs are artificial fluorinated gases that act as potent greenhouse gases (GHGs) when released into the atmosphere. These gases are widely used in industry, including the healthcare sector.

Depending on the type, **1 aerosol inhaler** can have the same carbon footprint as driving up to **170 km** in a gas car\*.

**Hydrofluorocarbons (HFCs)**  
 Common HFC propellants used in MDIs include:  
**HFC 134a** 370 GWP\*<sup>2</sup>  
**HFC 227ea\*\*** 3350 GWP\*  
\*100 year time horizon  
 \*\*Used to a lesser extent

**Global Warming Potential (GWP)**

**Global Warming Potential (GWP)** is a standardization tool used to compare the global warming impact of different types of GHGs over a fixed time period (usually 100 years). It measures the amount of energy a given gas will absorb compared to the equivalent mass of carbon dioxide (CO<sub>2</sub>), which has a standardized GWP of 1.

HFCs are "high-GWP gases" as they trap substantially more heat than CO<sub>2</sub> per unit mass.

**Health care systems can curb MDI-related HFC emissions by implementing the following strategies**

**1 ENCOURAGING MDI ALTERNATIVES**

The carbon footprint of MDIs is much higher than that of dry powder inhalers (DPIs), which do not use a propellant to deliver the medication. Opting for alternative treatment options, such as DPIs and soft mist inhalers (SMIs), when appropriate, can help **reduce** the carbon footprint of inhalers (though all of these options have environmental impacts).<sup>1</sup>

**CARBON FOOTPRINTS**

Ventolin HFA MDI 28.26 kg CO <sub>2</sub> e* <sup>6</sup>	Ventolin Diskus DPI 0.58 kg CO <sub>2</sub> e <sup>6</sup>	Combivent Respimat SMI** 0.78 kg CO <sub>2</sub> e <sup>6,7</sup>

\*CO<sub>2</sub>e = Carbon Dioxide equivalent

Infographic

- Need
- Type
- Technique
- Disposal



# PROVIDER EDUCATION

## SUSTAINABLE INHALERS WEBINAR

### PURPOSE

- Educate on the issue of sustainability in primary care.
- Explain the various tools and practice changes that can address the environmental impact of inhalers.

### ELEMENTS

- Recorded webinar video with available slides.

TAHSN-CHS CoP Sustainable Inhaler Initiative Working Group.

Climate Impact of Inhalers: A call for professional prac... Copy link

Climate change • Climate change refers to long-term shifts in...

# Climate Impact of Inhalers:

## A call for professional practice change

Watch on YouTube

- Need
- Type
- Technique
- Disposal





# PROVIDER EDUCATION

## SUSTAINABLE INHALER PATHWAY CONSIDERATIONS

### PURPOSE

- Review of clinical considerations along the sustainability pathway.

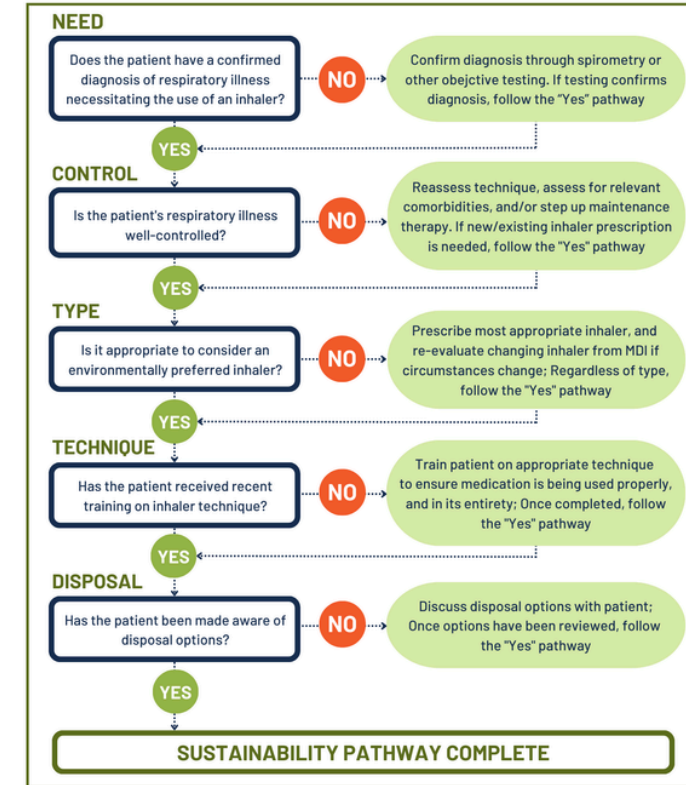
### ELEMENTS

Sustainable inhaler prescribing involves applying a sustainability lens along the care pathway; various interventions can be made to establish/improve on:

- Need
- Type
- Technique
- Disposal

Adapted from The C.A.R.E. Project at the Hamilton Family Health Team Green Initiative, developed by Dr. Meghan Davis & Tatiana Gayowsky with contributions from Mark Malek, Samantha Moberly, Lucy Feng, & Mary Dunn. Reviewed by Dr. Kimberly Wintemute and Dr. Alan Kaplan.

### Climate Conscious Inhaler Prescribing Sustainability Pathway



### for Climate Conscious Prescribing

Patients' expectations for duration of cough do not match the reality: the average duration of cough from a viral upper respiratory illness is 18 days, though patients only expect it to last 5 to 7 days.<sup>19</sup>

**Diagnosing Asthma**

- > Guidelines uniformly recommend objective testing to establish asthma diagnosis. Cough, wheeze, or dyspnea can be caused by other conditions.<sup>11,13</sup>
- > The best time to perform spirometry is when the patient is symptomatic. Spirometry can generally be performed in children 6+ years of age.<sup>1,2,13,14</sup>
- > "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."<sup>1</sup>
- > "Choosing Wisely Canada Recommendation"<sup>2</sup>
- > Other lung function tests, such as plethymography (i.e. lung volumes) and diffusion capacity testing are not required when asthma is suspected.<sup>1</sup>

**Diagnosing COPD**

- > Not all shortness of breath, chronic cough, and sputum are COPD. Guidelines uniformly recommend objective testing to establish a COPD diagnosis.<sup>1,2,15</sup>
- > 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. Spirometry demonstrating a postbronchodilator FEV1/FVC < 70% (or less than the lower limit of normal, if available) is required to make a definitive diagnosis.<sup>1</sup> "Choosing Wisely Canada Recommendation"<sup>2</sup>

**Questions to consider**

- Under what initial circumstances was this inhaler prescribed?
- Does my patient have a confirmed diagnosis? If not, can I refer my patient for objective testing?
- Is my patient's current medication working for them?
- Is my patient experiencing an acute airways exacerbation?

- > 44% of Canadians who receive a diagnostic label of asthma have never had spirometry testing. Up to 67% of Canadians with COPD, chronic bronchitis, and emphysema have had no spirometry.<sup>14</sup>
- > When the diagnosis is not confirmed, there is potential patient harm due to missed alternative diagnoses, unnecessary medication costs and side effects, and patients believing they have a chronic illness.<sup>14</sup>
- > 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. However, 79% of these non-asthmatic patients were in fact using asthma medications.<sup>4</sup>
- > There is no evidence of benefit for SABA, ICS, or ICS/LABA in "post-viral cough" for adults.<sup>20</sup>

This document is not intended to provide or take the place of clinical guidance. Providers are encouraged to seek, appraise, and apply best available evidence related to prescribing.

Adapted from The C.A.R.E. Project at the Hamilton Family Health Team Green Initiative, developed by Dr. Meghan Davis & Tatiana Gayowsky with contributions from Mark Malek, Samantha Moberly, Lucy Feng, & Mary Dunn. Reviewed by Dr. Kimberly Wintemute, Dr. Alan Kaplan and Dr. Samantha Green.

- Need
- Type
- Technique
- Disposal

### Considerations for Climate Conscious Prescribing





# PRESCRIBING TOOLS

## EMR SEARCH STRING

### PURPOSE

- Track inhaler prescriptions within EMR system to measure prescribing changes.

### ELEMENTS

- Search string for PS Suite (Telus) EMR, OSCAR.
- Could be used to identify patients currently using inhalers.

Tools developed by Clean Air, Respiratory Excellence (C.A.R.E.) Project from the Hamilton FHT Green Initiative.

- [MDI Queries, Telus PS and OSCAR](#)

Tools developed at Unity Health by Dr. Mo Alhaj, Clinical Pharmacist Brenda Chang, Dr. Shima Shakory-Bakhtiar, and Dr. Samantha Green.

- [ALL INHALERS Telus Search Parameters](#)
- [Inhaler Categorization Sheet](#)

Tools developed at GMF Sud-Ouest and GMF Jardins-Roussillon by Pharmacist Léa Prince-Duthel and QI Lead Katherine Déry.

- [Myle DME Inhalateurs HFA search](#)

```

SELECT
P.PATIENT_ID,
P.DELETED_STATUS,
P.SURNAME,
P.FIRST_NAME,
p_bicr_data,
P.DOCTOR_ID,
TA.TREATMENT_DATE AS LAST_TREATMENT_ACTION,
TA.NAME,
TA.NEW_PRESCRIPTION,
TA.RENEWAL_APPROVED,
TA.PERFORMED,
TA.DISCONTINUED,
TA.ON_HOLD,
TA.CONTAINS_REFILLS,
TA.REFILLS,
TA.REFILL_DURATION,
TA.REFILL_DURATION_TYPE_SPECIFIED,
TA.REFILL_QUANTITY,
TA.REFILL_QUANTITY_TYPE_TEXT,
TA.REFILL_QUANTITY_TYPE_SPECIFIED
FROM
PATIENT_PIECE PP
JOIN PATIENT P ON PP.PATIENT_ID = P.PATIENT_ID
JOIN TREATMENT_ACTION TA ON PP.PATIENT_PIECE_ID = TA.PATIENT_PIECE_ID
WHERE
TA.NAME like 'salbutamol' or TA.NAME like 'Xsalbutamol' or TA.NAME like 'salbutamolX'
or TA.NAME like 'salbutamol' or TA.NAME like 'salbutamol'
or TA.NAME like 'Ventolin' or TA.NAME like 'Xventolin' or TA.NAME like 'ventolin'
or TA.NAME like 'Ventolin' or TA.NAME like 'Ventolin'
or TA.NAME like 'fluticasone' or TA.NAME like 'Xfluticasone' or TA.NAME like 'fluticasoneX'
or TA.NAME like 'fluticasone' or TA.NAME like 'fluticasone'
or TA.NAME like 'terbutaline' or TA.NAME like 'Xterbutaline' or TA.NAME like 'terbutalineX'
or TA.NAME like 'terbutaline' or TA.NAME like 'terbutaline'
or TA.NAME like 'formoterol' or TA.NAME like 'Xformoterol' or TA.NAME like 'formoterolX'
or TA.NAME like 'formoterol' or TA.NAME like 'formoterol'
or TA.NAME like 'indacaterol' or TA.NAME like 'Xindacaterol' or TA.NAME like 'indacaterolX'
or TA.NAME like 'indacaterol' or TA.NAME like 'indacaterol'
or TA.NAME like 'salmeterol' or TA.NAME like 'Xsalmeterol' or TA.NAME like 'salmeterolX'
or TA.NAME like 'salmeterol' or TA.NAME like 'salmeterol'
or TA.NAME like 'olodaterol' or TA.NAME like 'Xolodaterol' or TA.NAME like 'olodaterolX'
or TA.NAME like 'olodaterol' or TA.NAME like 'olodaterol'
or TA.NAME like 'ipratropium' or TA.NAME like 'Xipratropium' or TA.NAME like 'ipratropiumX'
or TA.NAME like 'ipratropium' or TA.NAME like 'ipratropium'
or TA.NAME like 'tiotropium' or TA.NAME like 'Xtiotropium' or TA.NAME like 'tiotropiumX'
or TA.NAME like 'tiotropium' or TA.NAME like 'tiotropium'
or TA.NAME like 'aclidinium' or TA.NAME like 'Xaclidinium' or TA.NAME like 'aclidiniumX'
or TA.NAME like 'aclidinium' or TA.NAME like 'aclidinium'
or TA.NAME like 'glycopyrronium' or TA.NAME like 'Xglycopyrronium' or TA.NAME like 'glycopyrroniumX'
or TA.NAME like 'glycopyrronium' or TA.NAME like 'glycopyrronium'

```



Type	Title	Edited
	OSCAR Metered Dose Inhalers Query.txt A query to look for MDI prescriptions within OSCAR EMR	09/19/2022 4:28 PM
	OSCAR how to add query Report by Template.pdf How to use OSCAR EMR query report templates.	09/19/2022 4:28 PM
	Metered Dose Inhalers MDI (Telus PS).zip A query to look for MDI prescriptions within Telus Practice Solutions	09/19/2022 4:28 PM

MDI EMR Queries

Need

Type

Technique

Disposal



# Action Area: Type



## ACTION AREA 2: CONSIDER SUSTAINABLE ALTERNATIVES INTERVENTIONS

### NEW prescriptions:

- Default to DPIs for eligible new patients.

### EXISTING prescriptions:

- Educate patients about the opportunity to switch.
- Propose switch at renewal.
- Propose switch during unrelated visit.

If a switch is inappropriate, continue current prescription (re-evaluate opportunities to switch inhalers if circumstances change).

Resource Category	Resources
Patient Education & Communication	Poster
	Patient-facing infographic
	Prescription renewal letter
	Correct inhaler usage resources
	Environmental Impact Video (FR)
Provider Education	Background material (primer, infographic, webinar, sustainable pathway)
Prescribing Tools	Inhaler EMR search string & categorization sheet
	Inhaler alternatives charts (carbon and coverage comparisons)
	Prescription Favorites
	EMR Toolbar and SBAR
	Community pharmacy opinion letter

Need

Type

Technique

Disposal





# PATIENT EDUCATION & COMMUNICATION

## PATIENT POSTER

### PURPOSE

- Poster informing patients of the environmental impacts of metered dose inhalers and encouraging them to consult with their provider to explore the appropriateness of more sustainable alternatives.

### ELEMENTS

- Simple message.
- Practical comparison to car journey.
- Positive messaging.
- Action-oriented.
- Visually appealing with nature imagery.
- Links to patient-facing infographic for those seeking further information.

Developed by the TAHSN-CHS CoP Sustainable Inhaler Initiative Working Group and amended based on patient partner feedback.



Inhaler Poster

- Need
- Type
- Technique
- Disposal



# PATIENT EDUCATION & COMMUNICATION

## PATIENT-FACING INFOGRAPHIC

### PURPOSE

- Infographic providing information to patients in the 4 categories of Need, Type, Technique, and Disposal.

### ELEMENTS

- Lay language.
- Practical comparisons.
- Action-oriented.
- Visually appealing.

Developed by Naba Khan, CASCADES.

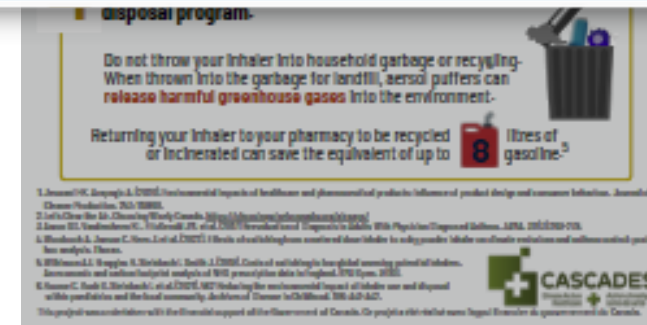


**2** Ask your health care provider if **other lower carbon inhalers** are right for you

The carbon footprint of these alternatives can be **10 times smaller** than an aerosol puffer<sup>1</sup>

There are many other types of inhalers with a **lower carbon footprint** than an aerosol puffer

Most of these alternatives are called **dry powder inhalers** - they have no aerosol and they release the medication as you **breathe in**. These inhalers have the same medications **to treat your condition**.<sup>4</sup>



Infographic  
Printable Infographic

- Need
- Type
- Technique
- Disposal



# PATIENT EDUCATION & COMMUNICATION

## PRESCRIPTION RENEWAL LETTER

### PURPOSE

- Sample letter to patients requiring an MDI prescription renewal outlining the environmental benefits of switching to a DPI.

### ELEMENTS

- Explains differences between inhalers while emphasizing its equivalent effects.
- Provides figures for reference and video explaining technique.
- Allows uncertain patients to opt for discussion and still get a temporary renewal.
- Positive messaging.

Developed by Dr. Kimberly Wintemute and amended based on patient partner feedback.

Dear Patient,

Your pharmacy has asked me to renew your salbutamol (blue inhaler).  
**OR**  
 I am writing about the inhaler that I have prescribed for you in the past.

I wonder if you would you be open to trying a different type of inhaler that delivers the medication better. 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. These kinds of inhalers are worsening the climate change problem.

A greener alternative to your aerosol puffer would be "Bricanyl Turbuhaler", which produces 10 times less greenhouse gases. It contains the medication called terbutaline, which works the same as salbutamol. It looks like a small cylinder, and is called a "turbuhaler". There is no aerosol, so it looks, sounds and feels different. Here is a link to a video that shows you how to use it:  
<https://www.youtube.com/watch?v=02OPJUIsuhQ>

Please let me know if you are OK to try the Bricanyl. If you want to talk more about this, please contact the office to set an appointment with me.

Sincerely,  
 Your Health Care Provider

Renewal Letter

- Need
- Type
- Technique
- Disposal



# PATIENT EDUCATION & COMMUNICATION

## CORRECT INHALER USAGE RESOURCES

### PURPOSE

- Video instructions serve as a reminder on correct inhaler technique for providers.
- Can be used to demonstrate use to patients during discussion of switching and remind them during regular usage.

### ELEMENTS

- Click on device name or image to open link to video resource.
- Would not replace in person counselling.
- Demonstration on how to use the device.
- How to know if you have “successfully” gotten the dose.
- If they don’t switch, info on spacers and MDI usage would also be helpful.

Developed by Naba Khan, CASCADES, with links to Canadian Lung Association.

**Correct Inhaler Usage Resources**

Using your inhaler correctly will ensure that your treatment is the most effective, that you use the inhaler in its entirety, and if you are using an aerosol inhaler, prevent the release of aerosol into the air.

Click on the inhaler category or image to view a video demonstrating the correct technique for usage.

<b>Diskus</b>	<b>Resplick</b>	<b>Inhub</b>
Ventolin Diskus	Aermony Resplick	Wixela Inhub
<b>Turbuhaler</b>	<b>Genuair</b>	
Bricanyl Turbuhaler	Tudorza Genuair	Duaklir Genuair
<b>Ellipta</b>	<b>Twisthaler</b>	
Anoro Ellipta	Asmanex Twisthaler	
<b>Breezhaler</b>	<b>Handihaler</b>	
Atecura Breezhaler	Spiriva Handihaler	
<b>Respimat</b>	<b>Aerolizer</b>	<b>Aerosol Inhaler</b>
Spiriva Respimat	Foradil via Aerolizer	With Spacer (Recommended)
		Without Spacer

To view all inhaler videos, go to:  
 Canadian Lung Association: How to use your inhaler  
<https://www.lung.ca/lung-health/get-help/how-use-your-inhaler>

**CASCADES**  
 Climate Action Healthcare / Action climatique soins de santé

This project was undertaken with the financial support of the Government of Canada. Ce projet a été réalisé avec l'appui financier du gouvernement du Canada.

- Need
- Type
- Technique
- Disposal

Inhaler Usage Graphic



## ENVIRONMENTAL IMPACT VIDEO (FRENCH)

### PURPOSE

- Overview of environmental impact of metered dose inhalers.

### ELEMENTS

- Titled “Ces «pompes» pour l’asthme qui menacent l’environnement”.

Developed by Alexis Riopel for Le Devoir.



Video

Need

Type

Technique

Disposal





# PROVIDER EDUCATION



## SUSTAINABLE INHALERS BACKGROUND RESOURCES

### PURPOSE

- Provide education about sustainable inhaler prescribing for health care providers.

### ELEMENTS

- Longer, in-depth primer.
- Infographic for quick reference.
- Recorded webinar video with available slides.
- Sustainable Pathway Considerations.

**a.**

**b.**

**d.**

**c.**

- a. Primer
- b. Infographic
- c. Webinar
- d. Sustainable Pathway Considerations

Need

Type

Technique

Disposal





# PRESCRIBING TOOLS



## DETAILED REFERENCE CHART: INHALER COST COMPARISON

### PURPOSE

- To compare inhaler devices based on cost, coverage, and carbon footprint.

### ELEMENTS

- Colour coding of low-carbon alternatives.
- Organization by medication class.

Tool adapted from resources created by Dr. Valeria Stoyanova, General Internist, Brenda Chang, Clinical Pharmacy Practitioner (with contributions from Jessica Visentin, RPh; Tate Goodman (MD Candidate), Dr. Kevin Liang (GP), and Darryl Quantz (MFPH, MPH, MSc).

DINs	Intensity	Brand/Proprietary Name and Dosing	Daily max acuitions	Device Type	Actuations per device	Age	Propellant	Days of use/inhaler over 1 year	Carbon footprint			Carbon footprint		Cost prior to coverage (BC price, excludes dispensing fee)			
									Per actuation	Per inhaler	km by car	kgCO2e	per year	Per inhaler	Per actuation	Per day	
2241497	N/A	Ventolin 100mcg/inh 2 inh QID prn	8	MDI	200	≥4 years	HFA-134a	25	14.6	141	28,200	112.6	411,720	3431	19.31	0.1	0.8
2232570	N/A	Airromir 100mcg/inh 2 inh QID prn	8	MDI	200	≥4 years	HFA-134a	25	14.6	48.6	9,720	38.8	141,912	1182.6	18.26	0.09	0.72
2245669	N/A	AP0-Salbutamol 100mcg/inh 2 inh QID prn	8	MDI	200	≥4 years	HFA-134a	25	14.6	141	28,200	112.6	411,720	3431	18.45	0.09	0.72
2419858	N/A	SANIS-Salbutamol 100mcg/inh 2 inh QID prn	8	MDI	200	≥4 years	HFA-134a	25	14.6	48.6	9,720	38.8	141,912	1182.6	0.09	0.72	0.72
2326450	N/A	TEVA-Salbutamol 100mcg/inh 2 inh QID prn	8	MDI	200	≥4 years	HFA-134a	25	14.6	48.6	9,720	38.8	141,912	1182.6	0.4	1.6	1.6
2243115	N/A	Ventolin Diskus 200 mcg/inh 1 inh QID prn	4	DPI	60	≥4 years	none	15	24.3	10	600	2.4	14,600	121.7	21.72	0.18	0.72
786616	N/A	Bricanyl Turbuhaler 0.5mg/inh 1 inh QID prn	4	DPI	100	≥4 years	none	25	14.6	4.1	492	1.9	7,181	59.9	21.38	0.18	0.72
2419106	N/A	Combivent Respiromat 20/100mcg 1 inh QID prn	4	SMI	120	≥18 years	none	30	12.2	12.92	1,550	6.1	18,858	157.2	48.28	0.4	0.4
2247686	N/A	Atrivent 20 mcg/inh 1 inh QID	4	MDI	200	≥18 years	HFA-134a	50	7.3	73	14,600	58.2	106,580	888.2	36.15	0.18	0.18
852074	Low	Pulmicort Turbuhaler 100 mcg/inh 1 inh BID	2	DPI	200	≥6 years	none	100	3.7	7	1,400	5.6	13,110	42.6	52.03	0.26	0.52
851752	Medium	Pulmicort Turbuhaler 200 mcg/inh 1 inh BID	2	DPI	200	≥6 years	none	100	3.7	14	2,800	11.2	10,220	85.2	91.17	0.46	0.92
851760	High	Pulmicort Turbuhaler 400 mcg/inh 1 inh BID	2	DPI	200	≥6 years	none	100	3.7	34	6,800	27.1	24,820	206.8	127.74	0.64	1.28

Provincial and Territorial Drug Coverage Status*													
BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NWT	NU	
<a href="https://oh.15-Feb-22">https://oh.15-Feb-22</a>	<a href="https://w.#####">https://w.#####</a>	<a href="https://fc.#####">https://fc.#####</a>	<a href="https://w.#####">https://w.#####</a>	<a href="https://www.for.28-Feb-22">https://www.for.28-Feb-22</a>	<a href="https://w.#####">https://w.#####</a>	<a href="https://w.#####">https://w.#####</a>	<a href="https://no.1-Feb-22">https://no.1-Feb-22</a>	<a href="https://w.1-Feb-22">https://w.1-Feb-22</a>	<a href="https://w.1-Feb-22">https://w.1-Feb-22</a>	<a href="https://hs.#####">https://hs.#####</a>	<a href="https://ni.1-Sep-20">https://ni.1-Sep-20</a>	<a href="https://ni.1-Sep-20">https://ni.1-Sep-20</a>	
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No	No	No	No	No	EM	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Reference Chart

Need

Type

Technique

Disposal





# PRESCRIBING TOOLS

## SUSTAINABLE INHALER ALTERNATIVES

### PURPOSE

- To compare inhaler devices based on cost, coverage, and carbon footprint.

### ELEMENTS

- Colour coding of low-carbon alternatives.
- Organization by medication class.
- Inhaler images link to video demonstration of inhaler technique.

Tool adapted from The C.A.R.E. Project of the [Hamilton Family Health Team Green Initiative](#), lead by Dr. Meghan Davis.

Alternatives Chart

- Need
- Type
- Technique
- Disposal





# PRESCRIBING TOOLS

## EMR SEARCH STRING

### PURPOSE

- Track inhaler prescriptions within EMR system to measure prescribing changes.

### ELEMENTS

- Search string for PS Suite (Telus) EMR, OSCAR.
- Could be used to identify patients currently using inhalers.

Tools developed by Clean Air, Respiratory Excellence (C.A.R.E.) Project from the Hamilton FHT Green Initiative.

- [MDI Queries, Telus PS and OSCAR](#)

Tools developed at Unity Health by Dr. Mo Alhaj, Clinical Pharmacist Brenda Chang, Dr. Shima Shakory-Bakhtiar, and Dr. Samantha Green.

- [ALL INHALERS Telus Search Parameters](#)
- [Inhaler Categorization Sheet](#)

Tools developed at GMF Sud-Ouest and GMF Jardins-Roussillon by Pharmacist Léa Prince-Duthel and QI Lead Katherine Déry.

- [Myle DME Inhalateurs HFA search](#)

```
SELECT
P.PATIENT_ID,
P.DELETED_STATUS,
P.SURNAME,
P.FIRST_NAME,
P.BIRTH_DATE,
P.DOCTOR_ID,
TA.TREATMENT_DATE AS LAST_TREATMENT_ACTION,
TA.NAME,
TA.NEX_PRESCRIPTION,
TA.RENEWAL_APPROVED,
TA.PERFORMED,
TA.DISCONTINUED,
TA.ON_HOLD,
TA.CONTAINS_REFILLS,
TA.REFILLS,
TA.REFILL_DURATION,
TA.REFILL_DURATION_TYPE_SPECIFIED,
TA.REFILL_QUANTITY,
TA.REFILL_QUANTITY_TYPE_TEXT,
TA.REFILL_QUANTITY_TYPE_SPECIFIED
FROM
PATIENT_PIECE PP
JOIN PATIENT P ON PP.PATIENT_ID = P.PATIENT_ID
JOIN TREATMENT_ACTION TA ON PP.PATIENT_PIECE_ID = TA.PATIENT_PIECE_ID
WHERE
TA.NAME like 'salbutamol' or TA.NAME like 'Xsalbutamol' or TA.NAME like 'salbutamol'
or TA.NAME like 'salbutamol' or TA.NAME like 'salbutamol'
or TA.NAME like 'Ventolin' or TA.NAME like 'Xventolin' or TA.NAME like 'Ventolin'
or TA.NAME like 'Ventolin' or TA.NAME like 'Ventolin'
or TA.NAME like 'fluticasone' or TA.NAME like 'Xfluticasone' or TA.NAME like 'fluticasone'
or TA.NAME like 'fluticasone' or TA.NAME like 'fluticasone'
or TA.NAME like 'terbutaline' or TA.NAME like 'Xterbutaline' or TA.NAME like 'terbutaline'
or TA.NAME like 'terbutaline' or TA.NAME like 'terbutaline'
or TA.NAME like 'formoterol' or TA.NAME like 'Xformoterol' or TA.NAME like 'formoterol'
or TA.NAME like 'formoterol' or TA.NAME like 'formoterol'
or TA.NAME like 'indacaterol' or TA.NAME like 'Xindacaterol' or TA.NAME like 'indacaterol'
or TA.NAME like 'indacaterol' or TA.NAME like 'indacaterol'
or TA.NAME like 'salmeterol' or TA.NAME like 'Xsalmeterol' or TA.NAME like 'salmeterol'
or TA.NAME like 'salmeterol' or TA.NAME like 'salmeterol'
or TA.NAME like 'olodaterol' or TA.NAME like 'Xolodaterol' or TA.NAME like 'olodaterol'
or TA.NAME like 'olodaterol' or TA.NAME like 'olodaterol'
or TA.NAME like 'ipratropium' or TA.NAME like 'Xipratropium' or TA.NAME like 'ipratropium'
or TA.NAME like 'ipratropium' or TA.NAME like 'ipratropium'
or TA.NAME like 'tiotropium' or TA.NAME like 'Xtiotropium' or TA.NAME like 'tiotropium'
or TA.NAME like 'tiotropium' or TA.NAME like 'tiotropium'
or TA.NAME like 'aclidinium' or TA.NAME like 'Xaclidinium' or TA.NAME like 'aclidinium'
or TA.NAME like 'aclidinium' or TA.NAME like 'aclidinium'
or TA.NAME like 'glycopyrronium' or TA.NAME like 'Xglycopyrronium' or TA.NAME like 'glycopyrronium'
or TA.NAME like 'glycopyrronium' or TA.NAME like 'glycopyrronium'
```



- Need
- Type
- Technique
- Disposal

MDI EMR Queries

A query to look for MDI prescriptions within various EMRs.

Type	Title	Edited
	OSCAR Metered Dose Inhalers Query.txt A query to look for MDI prescriptions within OSCAR EMR	09/19/2022 4:28 PM
	OSCAR how to add query Report by Template.pdf How to use OSCAR EMR query report templates.	09/19/2022 4:28 PM
	Metered Dose Inhalers MDI (Telus PS).zip A query to look for MDI prescriptions within Telus Practice Solutions	09/19/2022 4:28 PM

### MDI EMR Queries





# PRESCRIBING TOOLS

## PRESCRIPTION FAVOURITES

### PURPOSE

- Make notes for “Prescription Favourites” that will show low carbon alternative at time of new prescription.

### ELEMENTS

- Easy reminder to prescribe low-carbon alternative inhalers.

Tool created by Brenda Chang, Clinical Pharmacy Practitioner at St. Michael’s Hospital Academic Family Health Team.



Favourite Type	Shortcut	Treatment
Clinic	#InhalerAsthma_ICSLABA_Advair Diskus FLUT PROP/SALM 100/50mcg 4-11yrs	fluticasone propion-salmeterol 100-50 mcg/do...
Clinic	#InhalerAsthma_ICSLABA_Advair Diskus FLUT PROP/SALM 250/50mcg ≥12yrs	fluticasone propion-salmeterol 250-50 mcg/do...
Clinic	#InhalerAsthma_ICSLABA_Advair Diskus FLUT PROP/SALM 500/50mcg ≥12yrs	fluticasone propion-salmeterol 500-50 mcg/do...
Clinic	#InhalerAsthma_ICSLABA_Advair MDI *** CONSIDER FIRST DPI e.g. Advair Diskus or Breo Ellipta	fluticasone propion-salmeterol 125-25 mcg/ac...
Clinic	#InhalerAsthma_ICSLABA_Breo Ellipta FLUT FURO/VILA 100/25mcg ≥18yrs	fluticasone furoate-vilanterol 100-25 mcg/dos...
Clinic	#InhalerAsthma_ICSLABA_Breo Ellipta FLUT FURO/VILA 200/25mcg ≥18yrs	fluticasone furoate-vilanterol 200-25 mcg/dos...
Clinic	#InhalerAsthma_ICSLABA_Symbicort Turbuhaler BUDE/FORM 100/6mcg CONTROLLER + RELIEVER ≥12yrs	budesonide-formoterol 100-6 mcg/actuation ...
Clinic	#InhalerAsthma_ICSLABA_Symbicort Turbuhaler BUDE/FORM 100/6mcg CONTROLLER ≥12yrs	budesonide-formoterol 100-6 mcg/actuation 1...
Clinic	#InhalerAsthma_ICSLABA_Symbicort Turbuhaler BUDE/FORM 200/6mcg CONTROLLER + RELIEVER ≥12yrs	budesonide-formoterol 200-6 mcg/actuation ...
Clinic	#InhalerAsthma_ICSLABA_Symbicort Turbuhaler BUDE/FORM 200/6mcg CONTROLLER ≥12yrs	budesonide-formoterol 200-6 mcg/actuation 1...
Clinic	#InhalerAsthma_ICSLABA_Symbicort Turbuhaler BUDE/FORM 200/6mcg RELIEVER ≥12yrs **ODB LU NOT APPLICABLE	budesonide-formoterol 200-6 mcg/actuation 1...

Personal	#InhalerAsthma_Symbicort Turbuhaler 100/6mcg CONTROLLER + RELIEVER ≥12yrs	budesonide-formoterol 100-6 mcg/actuation Various
----------	---	---

Add Duplicate Remove

Prescription Favourite:  
 Shortcut: +RELIEVER ≥12yrs Favourite Type: Personal Move to Clinic Favourites  
 Description: budesonide-formoterol 100-6 mcg/actuation Various

Name: **budesonide-formoterol 100-6 mcg/actuation**  
 1 inhalation 2 times daily for 30 days  
 For: Symbicort Turbuhaler as CONTROLLER  
 and 1-2 inhalations 4 times daily PRN for 30 days  
 as RELIEVER; max 8 inh in 24h from ALL doses; max 6 inh on 1 occasion; LU 330

Quantity: 1 inhaler(s) Refills:  Auto Discontinue

Instructions for pharmacy: LU 330

Less Details More Details

EMR Strategies

- Need
- Type
- Technique
- Disposal



# PRESCRIBING TOOLS

## EMR TOOLBAR AND SBAR

### PURPOSE

- Make reminders for prescribers when they open a patient's chart.

### ELEMENTS

- Easy reminder to prescribe low-carbon alternative inhalers.

Tool created by Lillian Ferreira and Jadie Lo, Toronto Western Family Health Team

Use technology to enhance the patient and provider experience

**What**

**Did you know?**

Depending on the type, **1 aerosol inhaler** can have the same carbon footprint as driving up to **170 km** in a gas car\*

Prev Care      Substitute Decision Maker

Last Checked:      Update:  never smoked  current smoker  ex-smoker      Ask & Advise      Nov 11, 2022      (Init Visit E079:)

cean      Import      SOAP      BP      WI      HI      COVID-19 Assessment      Bathurst -HP Referral      IBM Micromedex eCPS      LU Codes      ODB      EAP      Inhalers & Alternatives      Fibrosis-4 (FIB-4) Calculat

Medication Safety Project      SOAP -Virtual      Garrison Creek -HP Referra      Rx Refill -Provider Away Alert      CPP Coding      Uninsured Service Fee List      Paxlovid Drug Interactio

**Make the Switch - consider switching to Flovent Diskus, Arnuity Ellipta or Pulmicort Turbuhaler**

If Flovent MDI device is most appropriate inhaler, ensure to review inhaler technique.

cean      View in Ocean      Email      Attach      Form      Import      Portal      ON eConsult      Refer

OTHER

Prev RXJA Msg      RXJA: 11 messages      Next RXJA Msg

	2. Limit refills to ensure appropriate use of inhaler therapy and ongoing follow-up.
<b>Why</b>	As part of our <a href="#">CASCADES Climate Conscious Inhaler Prescribing Collaborative</a> with the University of Toronto, we are on target to reduce the number of MDI use among our patients.
<b>How it will affect you</b>	Change in prescribing practice to reflect our climate conscious prescribing goals.

EMR Strategies

- Need
- Type
- Technique
- Disposal





# PRESCRIBING TOOLS

## COMMUNITY PHARMACY OPINION LETTER

### PURPOSE

- Community pharmacists can recommend low-carbon alternative inhalers to prescribers at time of renewal.

### ELEMENTS

- Template letter can be modified depending on patient's inhaler.
- Potential for compensation from government for ODB patients.

Tool created by Jessica Visentin, Team Pharmacist at South East Toronto Family Health Team (SETFHT).

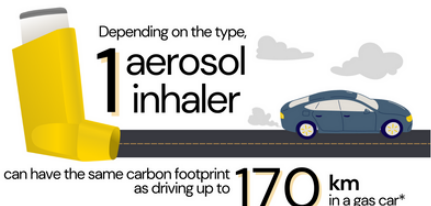
**Pharmaceutical Opinion Template**

Dear Dr. \_\_\_\_\_ *{prescriber name}*,

RE: \_\_\_\_\_ *{patient name}* DOB: \_\_\_\_\_

This patient requested a refill of their \_\_\_\_\_ *{inhaler name}*. We have filled this prescription for the time being, but would like to suggest a switch to \_\_\_\_\_ *{new inhaler name or "an appropriate dry powder inhaler"}* in advance of future refills.

This switch would be a more environmentally sustainable option, as MDIs use a propellant that contains a potent greenhouse gas, contributing to climate change. For more details, see: <https://cascadescanada.ca/resources/all-topics/inhalers/>



*{if suggesting a switch from Ventolin to Symbicort for asthma patient, include the following}*  
Please note that current GINA guidelines recommend combination budesonide-formoterol as both rescue and maintenance in mild-to-moderate asthma. Alternatively, they also recommend a single-agent inhaled corticosteroid and a short acting bronchodilator can be used as maintenance and rescue therapy, respectively.

*{choose one of the following}*  
Please note, we have discussed this with the patient and they are open to switching inhalers.  
**OR**  
Please note, we have not yet had a chance to discuss this with the patient. If you have the opportunity, we would encourage you to do so.

Regards,

Pharmacy Team

Opinion Letter

- Need
- Type
- Technique
- Disposal





# PRESCRIBING TOOLS

## LETTRE D'INFORMATION POUR LES PHARMACIENS

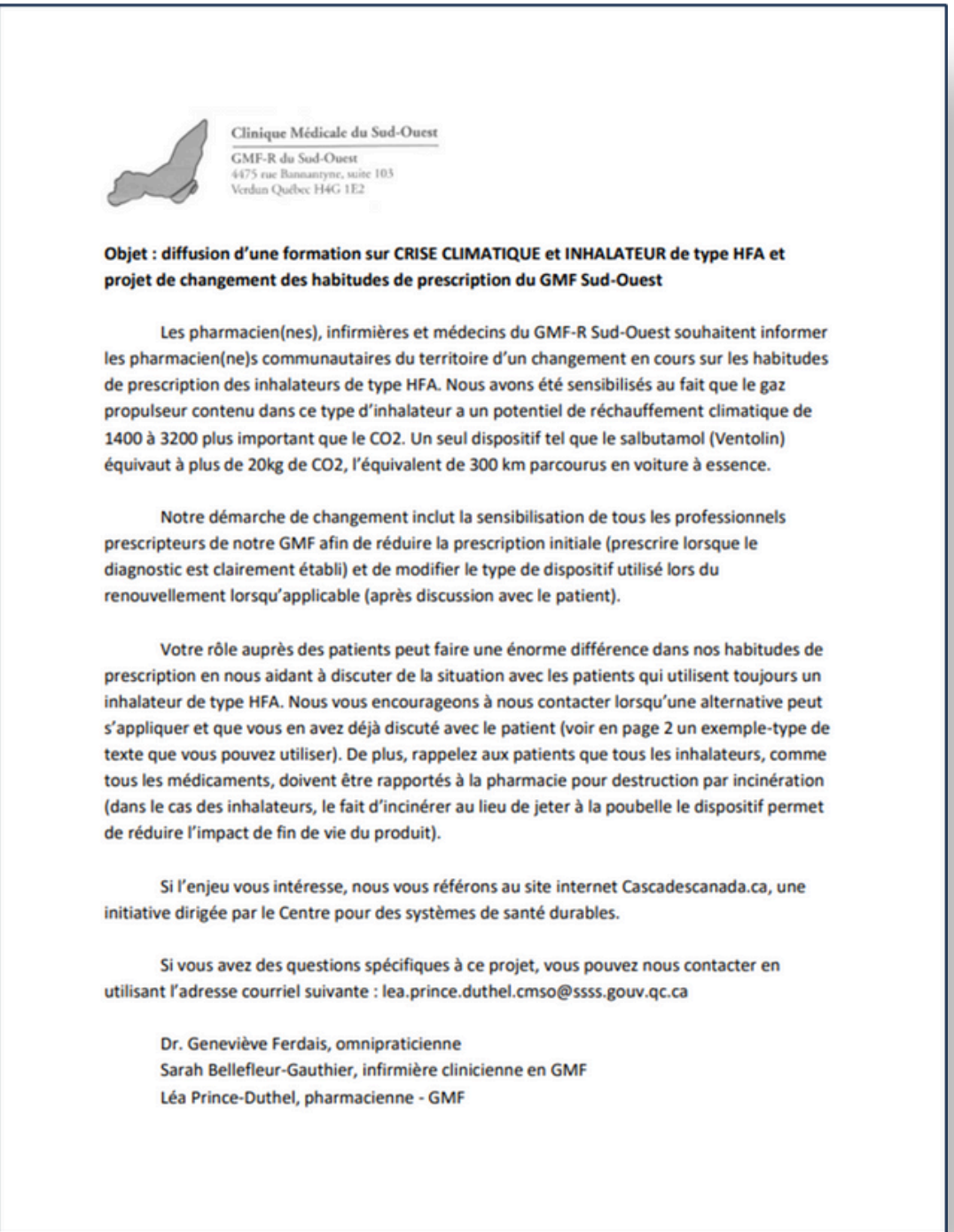
### PURPOSE

- Letter to inform community pharmacists.

### ELEMENTS

- Template letter can be modified depending on patient's inhaler.

Tool created by: GMF-R Sud-Ouest: Dr. Geneviève Ferdais, General Practitioner; Sarah Bellefleur-Gauthier, Nurse Clinician; Léa Prince-Duthel, Pharmacist.



Lettre d'information

- Need
- Type
- Technique
- Disposal



# Action Area: Technique



## ACTION AREA 3: TECHNIQUE REVIEW TECHNIQUE

### INTERVENTIONS

NEW & EXISTING prescriptions:

- Offer digital resources on inhaler technique.
- Demonstrate proper technique in related and unrelated visits/Offer in-house training.

Resource Category	Resources
Patient Education & Communication	Patient-facing infographic
	Correct Inhaler Usage Resources
Provider Education	Background material (primer, infographic, webinar, sustainable pathway)

Need

Type

**Technique**

Disposal





# PATIENT EDUCATION & COMMUNICATION

## PATIENT-FACING INFOGRAPHIC

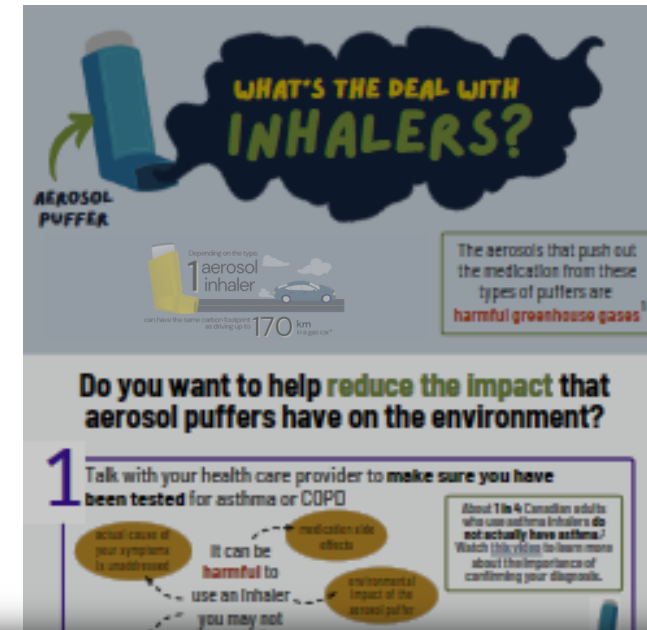
### PURPOSE

- Inform patients about using their inhaler correctly.


### ELEMENTS

- Lay language.
- Action-oriented.
- Visually appealing.
- Links to inhaler technique videos.

Developed by Naba Khan, CASCADES.




**3** Review your technique with your health care provider to make sure you are **using your inhaler the right way**

[Click here](#) to view videos showing the correct technique for your inhaler 

**7 out of 10** inhalers are thrown away before they are actually empty.<sup>6</sup>

Use your inhaler **correctly** to make sure you:

- get the **most benefit** from your medication,
- use **all the medication** in your inhaler, and
- avoid **releasing aerosol into the air** instead of inhaling it, if you use an aerosol puffer.<sup>5</sup>

Many dry powder inhalers have **dose counters**, which can make it easier to tell how much medication you have left. 



Infographic  
Printable Infographic

- Need
- Type
- Technique
- Disposal





# PATIENT EDUCATION & COMMUNICATION

## CORRECT INHALER USAGE RESOURCES

### PURPOSE

- Video instructions serve as a reminder on correct inhaler technique for providers.
- Can be used to demonstrate use to patients during discussion of switching and remind them during regular usage.

### ELEMENTS

- Click on device name or image to open link to video resource.
- Would not replace in person counselling.
- Demonstration on how to use the device.
- How to know if you have “successfully” gotten the dose.
- If they don’t switch, info on spacers and MDI usage would also be helpful.

Developed by Naba Khan, CASCADES, with links to Canadian Lung Association.

**Correct Inhaler Usage Resources**

Using your inhaler correctly will ensure that your treatment is the most effective, that you use the inhaler in its entirety, and if you are using an aerosol inhaler, prevent the release of aerosol into the air.

Click on the inhaler category or image to view a video demonstrating the correct technique for usage.

<b>Diskus</b>	<b>Respiclick</b>	<b>Inhub</b>
<b>Turbuhaler</b>	<b>Genuair</b>	
<b>Ellipta</b>	<b>Twisthaler</b>	
<b>Breezhaler</b>	<b>Handihaler</b>	
<b>Respimat</b>	<b>Aerolizer</b>	<b>Aerosol Inhaler</b>

To view all inhaler videos, go to:  
 Canadian Lung Association: How to use your inhaler  
<https://www.lung.ca/lung-health/get-help/how-use-your-inhaler>

**CASCADES**  
 Climate Action Healthcare / Action climatique soins de santé

This project was undertaken with the financial support of the Government of Canada. Ce projet a été réalisé avec l'appui financier du gouvernement du Canada.

- Need
- Type
- Technique
- Disposal

Inhaler Usage Graphic



# PROVIDER EDUCATION



## SUSTAINABLE INHALERS BACKGROUND RESOURCES

### PURPOSE

- Provide education about sustainable inhaler prescribing for health care providers.

### ELEMENTS

- Longer, in-depth primer.
- Infographic for quick reference.
- Recorded webinar video with available slides.
- Sustainable Pathway Considerations.

a.

MDIs are common medical devices used to deliver inhaled medication. They are typically used in the treatment of asthma and chronic obstructive pulmonary disorder.<sup>1</sup>

MDIs use HFC propellants to deliver medication.<sup>2</sup>

HFCs are artificial fluorinated gases that act as potent greenhouse gases (GHGs) when released into the atmosphere. These gases are widely used in industry, including the healthcare sector.

Depending on the type, 1 aerosol inhaler can have the same carbon footprint as driving up to 170 km in a gas car.\*

Common HFC propellants used in MDIs include:  
 HFC 134a: 370 GWP\*\*  
 HFC 227ea\*\*: 3350 GWP\*\*

Global Warming Potential (GWP) is a standardization tool used to compare the global warming impact of different types of GHGs over a fixed time period (usually 100 years). It measures the amount of energy a given gas will absorb compared to the equivalent mass of carbon dioxide (CO<sub>2</sub>), which has a standardized GWP of 1.

HFCs are "high-GWP gases" as they trap substantially more heat than CO<sub>2</sub> per unit mass.

**Health care systems can curb MDI-related HFC emissions by implementing the following strategies**

**1 ENCOURAGING MDI ALTERNATIVES**

The carbon footprint of MDIs is much higher than that of dry powder inhalers (DPIs), which do not use a propellant to deliver the medication. Opting for alternative treatment options, such as DPIs and soft mist inhalers (SMIs), when appropriate, can help reduce the carbon footprint of inhalers (though all of these options have environmental impacts).<sup>3</sup>

Device	Carbon Footprint (kg CO <sub>2</sub> e)
Ventolin HFA MDI	28.26
Ventolin Diskus DPI	0.58
Combivent Respimat SMI**	0.78

b.

**Climate Conscious Inhaler Prescribing Sustainability Pathway**

**NEED**  
 Does the patient have a confirmed diagnosis of respiratory illness necessitating the use of an inhaler?  
 YES: Confirm diagnosis through spirometry or other objective testing. If testing confirms diagnosis, follow the "Yes" pathway.  
 NO: Confirm diagnosis through spirometry or other objective testing. If testing confirms diagnosis, follow the "Yes" pathway.

**CONTROL**  
 Is the patient's respiratory illness well-controlled?  
 YES: Reassess technique, assess for relevant comorbidities, and/or step up maintenance therapy. If new/existing inhaler prescription is needed, follow the "Yes" pathway.  
 NO: Reassess technique, assess for relevant comorbidities, and/or step up maintenance therapy. If new/existing inhaler prescription is needed, follow the "Yes" pathway.

**TYPE**  
 Is it appropriate to consider an environmentally preferred inhaler?  
 YES: Prescribe most appropriate inhaler, and re-evaluate changing inhaler from MDI if circumstances change. Regardless of type, follow the "Yes" pathway.  
 NO: Prescribe most appropriate inhaler, and re-evaluate changing inhaler from MDI if circumstances change. Regardless of type, follow the "Yes" pathway.

**TECHNIQUE**  
 Has the patient received recent training on inhaler technique?  
 YES: Train patient on appropriate technique to ensure medication is being used properly, and in its entirety. Once completed, follow the "Yes" pathway.  
 NO: Train patient on appropriate technique to ensure medication is being used properly, and in its entirety. Once completed, follow the "Yes" pathway.

**DISPOSAL**  
 Has the patient been made aware of disposal options?  
 YES: Discuss disposal options with patient. Once options have been reviewed, follow the "Yes" pathway.  
 NO: Discuss disposal options with patient. Once options have been reviewed, follow the "Yes" pathway.

**SUSTAINABILITY PATHWAY COMPLETE**

Climate Action + Healthcare | CASCADES | Canada

d.

**CASCADES**

Environmentally Sustainable Opportunities for Health Systems  
 Primer Series  
 Inhalers

**Issue**  
 Metered-dose inhalers (MDIs) are common medical devices used to deliver inhaled medication, typically for individuals with asthma and/or chronic obstructive pulmonary disease (COPD). MDIs are pressurized and rely on liquefied-gas propellants to atomize medication for inhalation delivery. In the past, MDIs used chlorofluorocarbons (CFCs) as a primary gas propellant. However, CFCs were banned under the 1987 Montreal Protocol as they possess significant ozone-depleting properties. Soon after, pharmaceutical companies began manufacturing MDIs that use more ozone-friendly hydrofluorocarbons (HFCs), also known as hydrofluoroalkanes (HFAs), primarily HFC-134a and, to a lesser extent, HFC-227ea.2,3 However, although HFCs do not deplete the ozone layer, they do have a high global warming potential (GWP), a metric used to examine a greenhouse gas's (GHG) ability to trap heat in the atmosphere compared to carbon dioxide. Depending on which HFC propellant is being considered, the GWP is on average 1400-3200 times greater.4 Indeed, recent studies have shown that MDIs contain high levels of HFCs that act as potent GHGs when released into the atmosphere, contributing to the healthcare sector's carbon footprint. HFC emissions from MDIs mostly come from the use-phase, followed by the end-of-life disposal when propellants are released into the atmosphere.5 The UK National

c.

Climate Impact of Inhalers: A call for professional practice change

Climate change + Climate change refers to long-term shifts in...

Centre for Sustainable Health Systems | Sustainable Health System Community of Practice | Dalla Lana School of Public Health | University of Toronto Pharmacy | Bloomberg Institute of Health | Family & Community Medicine University of Toronto

Watch on YouTube

- a. Primer
- b. Infographic
- c. Webinar
- d. Sustainable Pathway Considerations

Need

Type

Technique

Disposal





# Action Area: Disposal



## ACTION AREA 4: DISPOSAL ENCOURAGE PROPER DISPOSAL

### INTERVENTIONS

NEW & EXISTING prescriptions:

- Educate patients on disposal options.

Resource Category	Resources
Patient Education & Communication	Disposal Poster
	Patient-facing infographic
Provider Education	Inhaler Disposal FAQ
	Background material (primer, infographic, webinar, sustainable pathway)

Need

Type

Technique

Disposal





# PATIENT EDUCATION & COMMUNICATION

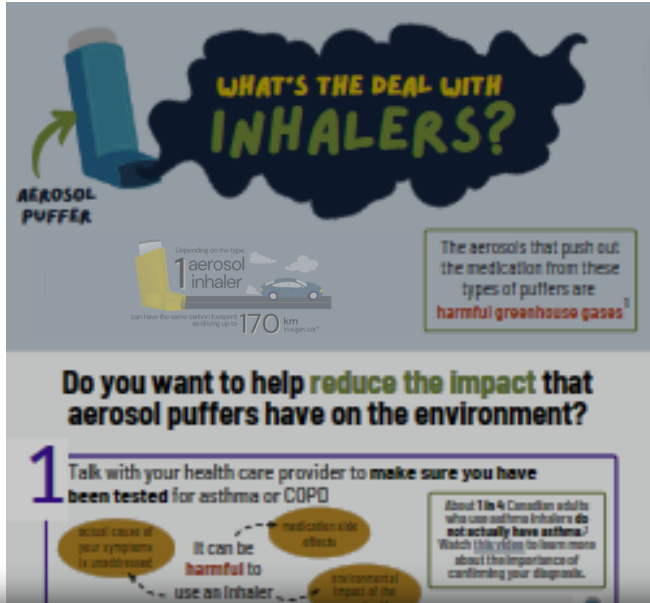
## PATIENT-FACING INFOGRAPHIC

### PURPOSE

- Inform patients about disposing of their inhaler correctly.


### ELEMENTS


- Lay language.
- Action-oriented.
- Visually appealing.



**4** Ask your clinic or pharmacy if they have a **recycling or disposal program.**

Do not throw your inhaler into household garbage or recycling. When thrown into the garbage for landfill, aerosol puffers can **release harmful greenhouse gases** into the environment.

Returning your inhaler to your pharmacy to be recycled or incinerated can save the equivalent of up to  litres of gasoline.<sup>5</sup>




Infographic  
Printable Infographic

- Need
- Type
- Technique
- Disposal**





# PATIENT EDUCATION & COMMUNICATION

## PATIENT DISPOSAL POSTER

### PURPOSE

- Increase patient awareness of the environmental impact of MDIs and encourage proper disposal.

### ELEMENTS

- Simple message.
- Action-oriented.
- Visual depiction of impact.

Tool developed by Justin O'Connor-Cook, PharmD student, and Brenda Chang, Clinical Pharmacy Coordinator (adapted by Naba Khan).



Disposal Poster

- Need
- Type
- Technique
- Disposal**



# PROVIDER EDUCATION

## INHALER DISPOSAL FAQ

### PURPOSE

- Answer commonly asked questions about inhaler disposal in Canada.

### ELEMENTS

- Covers various topics
- Links to external information and resources

Tool developed by Naba Khan, CASCADES.



**What's the environmentally preferred way to dispose of inhalers?**

- Recycling the materials and recapturing the propellant would be the most environmentally preferred
- Incineration is the currently available environmentally preferred option of disposing of inhalers
  - Incineration is preferred over landfill for MDIs since HFC gases undergo thermal degradation to decrease their global warming potential.<sup>1</sup>
  - We have not yet determined the exact temperature needed to incinerate HFCs in MDIs, however incineration at temperatures over 1000°C has been widely accepted for the destruction of ozone-depleting gases such as CFCs and HCFCs.<sup>3</sup> This is within usual temperatures for biomedical waste incineration.
- DPIs should also be incinerated to avoid medication discharge into the environment.

1. Wilkinson AJK, Braggins R, Steinbach I, et al. Costs of switching to low global warming potential inhalers. An economic and carbon footprint analysis of NHS prescription data in England. *BMJ Open* 2019.

3. Castro, P.J., Araújo, J.M.M., Martinho, G., Pereiro, A.B. Waste Management Strategies to Mitigate the Effects of Fluorinated Greenhouse Gases on Climate Change. *Appl. Sci.* 2021, 11, 4367.

- Need
- Type
- Technique
- Disposal**

FAQ



# PROVIDER EDUCATION



## SUSTAINABLE INHALERS BACKGROUND RESOURCES

### PURPOSE

- Provide education about sustainable inhaler prescribing for health care providers.

### ELEMENTS

- Longer, in-depth primer.
- Infographic for quick reference.
- Recorded webinar video with available slides.
- Sustainable Pathway Considerations.

a.

b.

d.

c.

- a. Primer
- b. Infographic
- c. Webinar
- d. Sustainable Pathway Considerations

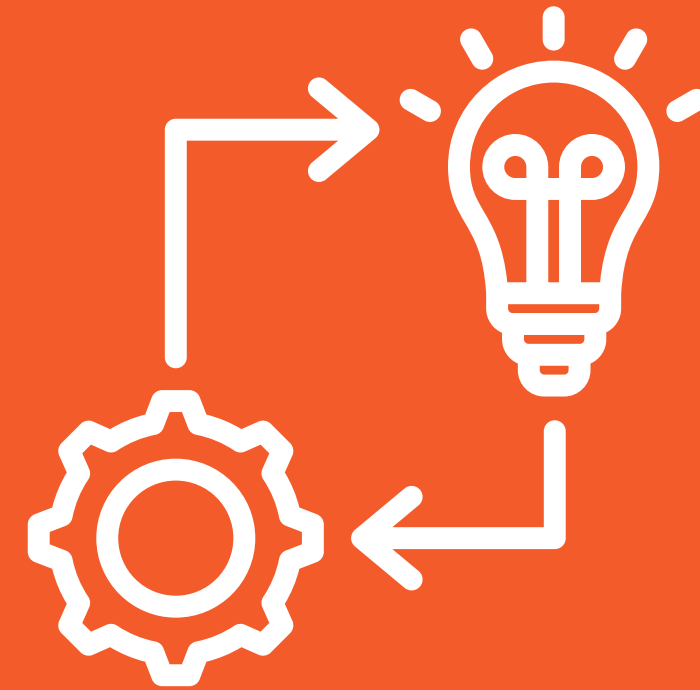
Need

Type

Technique

Disposal





# HOW

## Strategy & Partnerships

- 1 Capacity Building
- 2 QI Mobilization
- 3 Measurement & Reporting
- 4 Spread and Scale





# Capacity Building



## PURUSE PARTNERSHIPS FOR IMPACT

### INVOLVE MULTIPLE HEALTH PROFESSIONALS

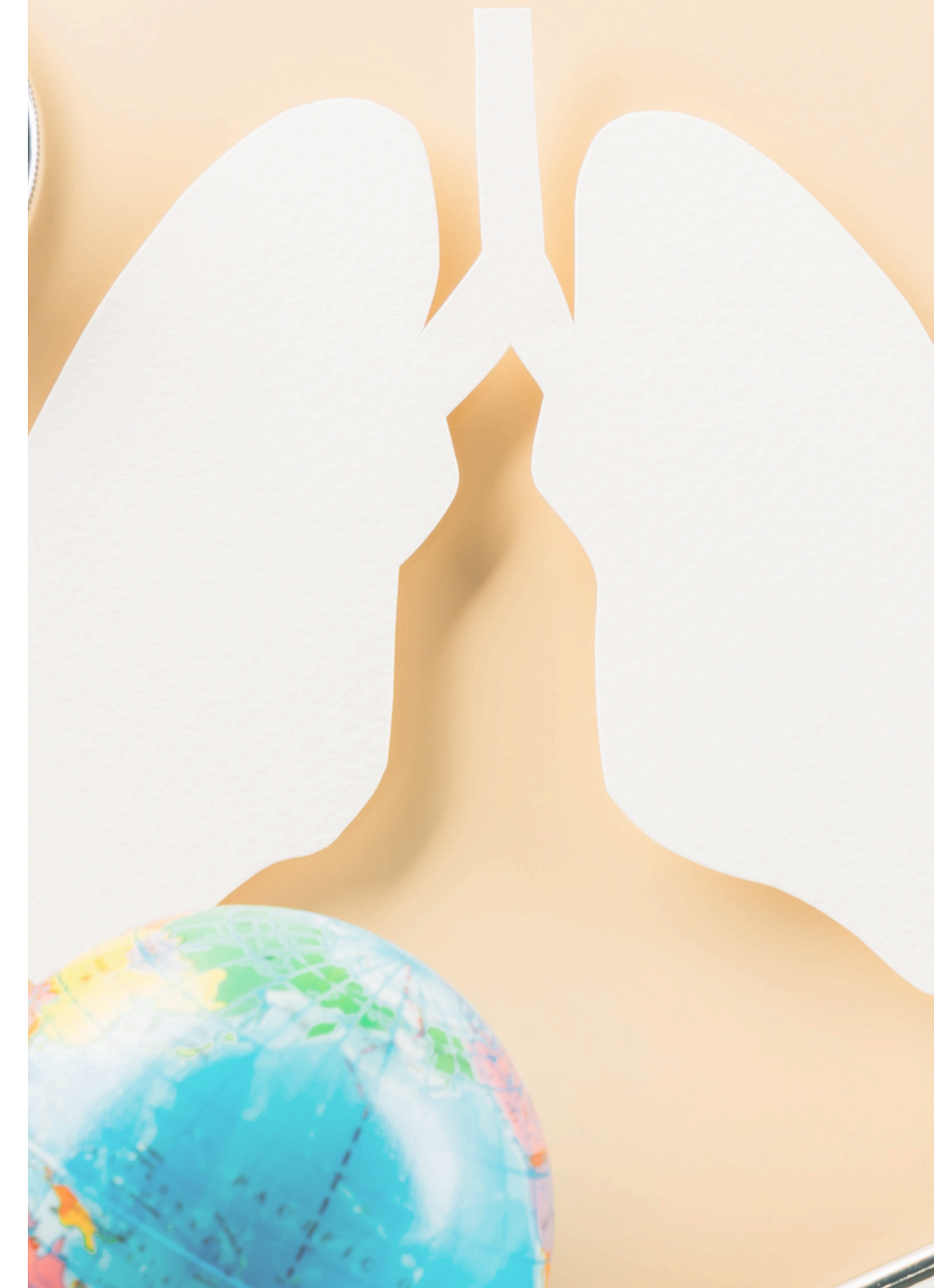
- Primary care prescribers (family & general physicians, nurse practitioners): Work with patients to diagnose inhaler need, and assess type and technique; can advise on disposal
- Specialist physicians (respirologists): Work with patients to diagnose inhaler need, and assess type and technique
- Respiratory Therapists and Educators: Support diagnostic testing and work with patients to determine appropriate inhaler alternatives
- Nurses (advance practice, registered, and registered practical): Leverage opportunities to connect with patients on appropriate inhaler use, type, and disposal
- Pharmacists (primary care & community): Educate on inhaler technique and disposal, and make recommendations to providers and patients on inhaler alternatives
- IT staff: Can assist with data management and EMR modification
- Clinic staff and leadership: Can support efforts toward sustainable inhaler prescribing at various organizational levels
- QI staff: Can assist in developing a QI framework within which to administer tests of change

### ENGAGE WITH RELEVANT ORGANIZATIONS

- Make connections with local and national respiratory and prescriber networks
- Initiate discussions on formulary inclusions and guideline changes

### ENGAGE PATIENTS

- Making decisions about inhaler use and type with patients is crucial for determining viability of alternatives and continued adherence if a switch is made. (11)





## PATIENT PARTNER ENGAGEMENT

### PATIENT PARTNER FOCUS GROUPS

- CASCADES held focus groups with two sets of patient partners to review the patient-facing resources
- The resources included in this playbook reflect modifications made based on patient feedback

### Valuable lessons for implementation that emerged from the focus groups include the following:

Many patients would welcome a confirmation of diagnosis & technique review

- Would be happy to know they no longer need a medication
- Would appreciate more check-ins/medication reviews with training as well
- Technique should be reviewed at every visit

Some patients do not feel like they have a choice in their medications; they want clear information and need time to consider options

- Improve patient confidence by providing enough information (i.e. through an infographic)
- If posters are put up in doctor's offices/waiting rooms, providers should be prepared to answer questions/be receptive
- Be sure to discuss clinical efficacy and make clear comparisons between inhaler options
- Make sure patients have time to consider options and feel comfortable with any decisions

Not everyone has a primary care provider

- Need to consider how these people might be reached to discuss alternatives





# QI Mobilization



## QUALITY IMPROVEMENT: EXAMPLES FROM THE FIELD

### AIM

Pursue sustainable inhaler prescribing as a Quality Improvement initiative.

- The **CASCADES charter** can assist in planning.

### Sunnybrook Health Science Centre

**Reducing the use of MDIs at Sunnybrook**  
A Sustainability QI Initiative

**PROBLEM**  
Metered dose inhalers (MDIs), commonly used for asthma and COPD, are significant contributors to global warming

**SOLUTION**  
Prescribing alternatives to MDIs, such as dry powder inhalers (DPIs), will have a significantly lower impact on global warming

**Inspiring change through Quality Improvement initiatives**

**Change ideas**

- Prescriber support**
  - Posters/charts for prescribers\*
  - Prompts/stamps/trigger tools in EMR
- Collaboration with pharmacy**
  - Patient regular medication review with pharmacist
  - Refill request response (collaborate with pharmacists for new inhaler education)
- Collaboration with patient**
  - Opportunistic conversations for any MDI renewal opportunity (clinic appointment, phone call for other reason, renewal request, discharge planning, admission medication reconciliation)
  - Direct letter to the patient
  - Patient education pamphlet (MD office/pharmacy)
  - Office or website posters
  - Newsletters
- Physician education**
  - Grand rounds, academic half days, in-office education

**Sunnybrook collaborations**

- Current: long-term care, community Family Medicine, acute care (General Internal Medicine)
- Soon: specialist clinics (Respirology), Sunnybrook Academic Family Health Team
- Interdisciplinary: pharmacists, physicians, nurses

**Lessons learned and recommendations**

- Desire to reduce climate impact can be a unifying factor between patients and health professionals
- This project will inform how to change prescribing practices across medical disciplines
- Collaborative efforts towards a common climate impact goal can be achieved - engage across departments and professions within your institution!

**Carbon footprint / user**

- 234g CO<sub>2</sub>e / user annually (Sensibelin Inhaler MDI annually)
- 7.3g CO<sub>2</sub>e / user annually (Spiracort Inhaler DPI annually)
- 9.5g CO<sub>2</sub>e / user annually (Respiromax MDI annually)

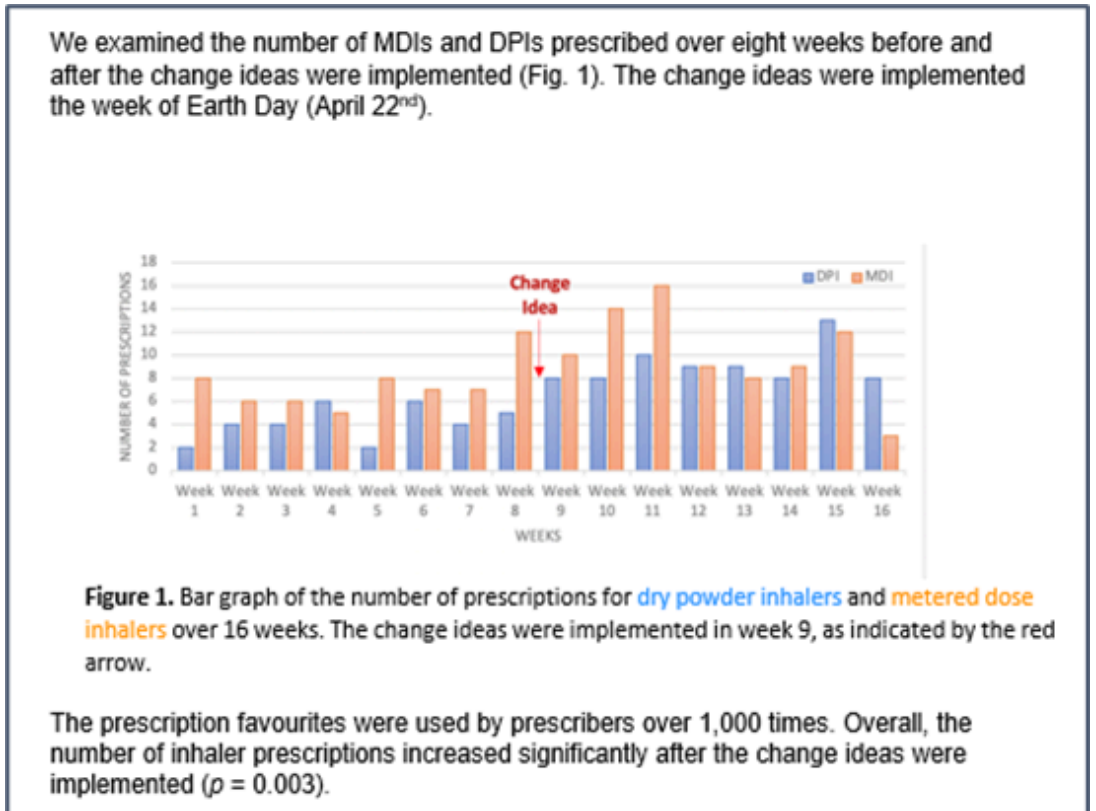
100 doses = carbon footprint of a 290 KM car journey

**MDIs use hydrofluorocarbons (HFCs), potent greenhouse gases, as propellants.**

Climate change impacts the health of our population and many healthcare providers are unaware of the impact of prescribing MDIs.

**Sunnybrook HEALTH SCIENCES CENTRE**

### St. Michael's Hospital



- QI project (lead by Dr. Shima Shakory) using EMR “Prescription Favourites” and poster communication interventions to encourage prescribing DPIs rather than MDIs
  - Resulted in increase in DPI prescriptions, and “Prescription Favourites” were used over 1,000 times

### Hamilton Family Health Team (HFHT): Clean Air Respiratory Excellence (C.A.R.E) Project

At HFHT, the MDI team did primary care practice audits to investigate the extent of MDI prescription in Hamilton:

- 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<sub>2</sub>(eq) emissions/site/year
- Check out HFHT’s Green Initiative resources [here](#).





# Measurement and Reporting

## KEEPING TRACK OF GAINS

### AIM

Develop an integrated measurement strategy, recognizing the importance and limitations of metrics.

Intervention	Process Measures	Outcome measures
Prescribe appropriately	<ul style="list-style-type: none"> <li>• #/% patients referred for diagnostic testing</li> <li>• #/% patients who undergo diagnostic testing</li> </ul>	EMR search, 1x/month <ul style="list-style-type: none"> <li>• #/% patients with inhaler prescriptions</li> </ul> X Emissions factors for MDIs + DPIs
Encourage switch	<ul style="list-style-type: none"> <li>• # posters put up</li> <li>• # visits to infographic</li> <li>• # times use samples</li> <li>• # emails sent</li> <li>• # times discussed during unrelated visit</li> </ul>	EMR search, 1x/month <ul style="list-style-type: none"> <li>• #/% patients with inhaler prescriptions; of these:</li> <li>• #/% patients using MDI (specify type, if possible)</li> <li>• #/% patients using DPI (specify type, if possible)</li> </ul> X Emissions factors for MDIs + DPIs

## Strategy & Partnerships



### EXAMPLES

- Pursue a measurement strategy to track process and outcome measures
  - Simple process and outcome measures include those outlined in the adjacent table
- Consider GHG emissions estimation
  - Prescribing data X emissions factors = carbon impact
- Share your progress with colleagues and patients
  - In conversation
  - At professional events
  - In newsletters
  - Use equivalencies to demonstrate significance ([Natural Resources Canada GHG Equivalencies Calculator](#))





# Spread & Scale



## CONSIDERATIONS FOR BROADENING SUSTAINABLE INHALER PRESCRIBING

### ENABLERS

- Wide range of assets – providers and patients can select the ones that are most relevant/easiest to implement.
- Alignment with Choosing Wisely’s new Let’s Clear the Air Campaign.
- Aligned with clinical guidance (GINA, CTS).
- Activities could be eligible for self-learning credits through CFPC.
- Patients keen to explore lower carbon care alternatives. (7)

### LIMITATIONS

- Slow pace of change.
- Pandemic has slowed improvement efforts.
- Providers have limited capacity to engage patients and track changes – changes may be slow and go unrecorded (hard to know if improvements are happening).
- Diagnostic testing can involve lengthy wait times.
- Relevant national organizations are being engaged but have not yet formally endorsed sustainable inhaler efforts.
- Challenge to reach patients without primary care providers.
- Lack of care continuity across settings can undermine efforts.

#### Variable capacity across settings/jurisdictions

- Discrepancies in data availability.
- Provincial resource limits.
- Potential coverage issues for some medications – may require advocacy.





# References

1. Intergovernmental Panel on Climate Change. Climate change 2007: The physical science basis contribution of working group to the fourth assessment report of the Intergovernmental Panel on Climate Change [Internet]. Cambridge, United Kingdom and New York, NY, USA. 2007 September.
2. United Nations Environment Programme (UNEP). Montreal Protocol on Substances that Deplete the Ozone Layer: 2018 Report of the medical technical options committee [Internet]. Nairobi, Kenya.
3. D'Amato G, Cecchi L, D'Amato M, Annesi-Maesano I. Climate change and respiratory diseases. *European Respiratory Review*, 2014, 23: 161-169.
4. Aaron SD, Vandemheen KL, FitzGerald JM, Ainslie M, Gupta S, Lemiere C, et al. Reevaluation of Diagnosis in Adults With Physician Diagnosed Asthma. *JAMA*. 2017;1(3):269-79.
5. Jeswani, HK, Azapagic, A. Environmental impacts of healthcare and pharmaceutical products: Influence of product design and consumer behaviour. *Journal of Cleaner Production*. 2020; 253: 119860
6. Healthcare Without Harm. Climate footprint report: Executive Summary. 2021 [Internet].
7. Canada Health Infoway. Sustainable health care: Canadian Digital Health Survey. 2021.
8. Woodcock A, Janson C, Rees J, et al. Effects of switching from a metered dose inhaler to a dry powder inhaler on climate emissions and asthma control: post-hoc analysis. *Thorax* 2022.
9. Gálffy G, Szilasi M, Tamási. LP227 Clinical effectiveness, health-related quality of life and patient satisfaction after switch from metered dose inhaler to easyhaler dry powder inhaler in patients with asthma and COPD; a real-life study. *Thorax* 2019;74:A212-A213.
10. Wilkinson AJ, Braggins R, Steinbach I, Smith J. Costs of switching to low global warming potential inhalers. An economic and carbon footprint analysis of NHS prescription data in England. *BMJ open*. 2019 Oct 1;9(10).
11. Kaplan A, Price D. Matching Inhaler Devices with Patients: The Role of the Primary Care Physician. *Can Respir J*. 2018 May 23; 2018: 9473051.



# About this playbook

## LEAD AUTHORS

- Kimberly Wintemute, Family Physician, Department of Family and Community Medicine; Assistant Professor, University of Toronto (Working Group Lead)
- Jean Wilson, Assistant Professor, Bloomberg Faculty of Nursing; Primary Health Care Nurse Practitioner
- Lisa Dolovich, Dean, Leslie Dan Faculty of Pharmacy, UT
- Samantha Green, Family Physician, Assistant Professor, and Lead in Climate Change and Health, Department of Family and Community Medicine, University of Toronto
- Brenda Chang, Clinical Pharmacy Practitioner, St. Michael's Hospital Academic Family Health Team
- Gabrielle Busque, BSc, PharmD

## CASCADES CONTRIBUTORS

- Fiona Miller, PhD, Director, CASCADES; Director, Collaborative Centre for Climate, Health & Sustainable Care; Professor
- Naba Khan, Project Assistant, CASCADES



## WORKING GROUP MEMBERS

Sustainable Inhalers National Advisory Committee members:

- Samantha Green (Chair), Family Physician, Assistant Professor, and Lead in Climate Change and Health, Department of Family and Community Medicine, University of Toronto
- Kimberly Wintemute, Family Physician (ON)
- Meghan Davis, Family Physician (ON)
- Jean-Phillipe Michel, Family Physician (QC)
- Ann Loewen, Family and Emergency Physician (MB)
- Helen Boyd, Nurse Practitioner (BC)
- Valeria Stoyanova, General Internist (BC)
- Celia Culley, Clinical Pharmacy Coordinator (BC)
- Celina Dharamshi, Resident (AB)
- Sonja Wicklum, Family Medicine Clerkship Director (AB)
- Myriam Gagné, Postdoctoral Research Fellow (ON)
- Samuel Campbell, Research Director, Emergency Medicine Clinical Chief (NS)
- Kent Cadogan Loftsgard, Patient partner (BC)
- Debra Hartmann, Patient partner (ON)

**GRAPHIC DESIGN** by Luz A. Paczka Giorgi with the support from Derek Nguyen



**Disclaimer:** CASCADES does not endorse any suppliers, services or products mentioned in this playbook or its associated resources. CASCADES recommends that readers research the service and product offerings available through a wider range of suppliers for comparison purposes and in keeping with public sector purchasing guidelines.

Version 3.1. Published Oct 1, 2024.

This document will be reviewed for future updates and we welcome your feedback. Please send any comments or recommendations to [cascades@utoronto.ca](mailto:cascades@utoronto.ca) or opt-in to our knowledge product surveys.

Materials created by CASCADES are shared under a Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International Public License (CC BY-NC-SA 4.0) and you may use these materials according to the terms and conditions of the CC BY-NC-SA 4.0 license. Read more about CASCADES' intellectual property policies.

While it is not a requirement under the license, we would be grateful if you would let us know where and how you share or adapt our materials so we can see and learn from how they are used.

This playbook, or the associated resources, may reference services and/or product offerings from specific suppliers. The inclusion of such mentions or links should not be interpreted as an endorsement by CASCADES of any product or service.

