CLIMATE CONSCIOUS INHALER PRESCRIBING IN OUTPATIENT CARE

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

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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

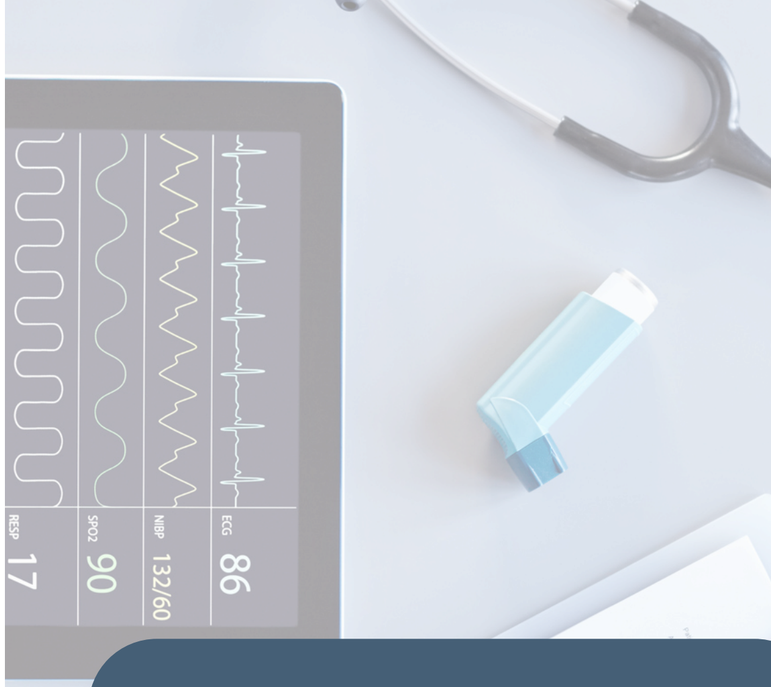
The Playbook provides background information and resources to guide more environmentally sustainable inhaler prescribing in primary care settings.

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.



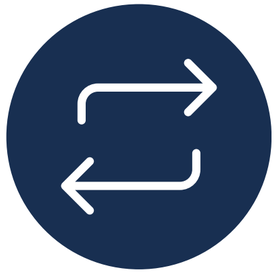
RESOURCES:

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

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/

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

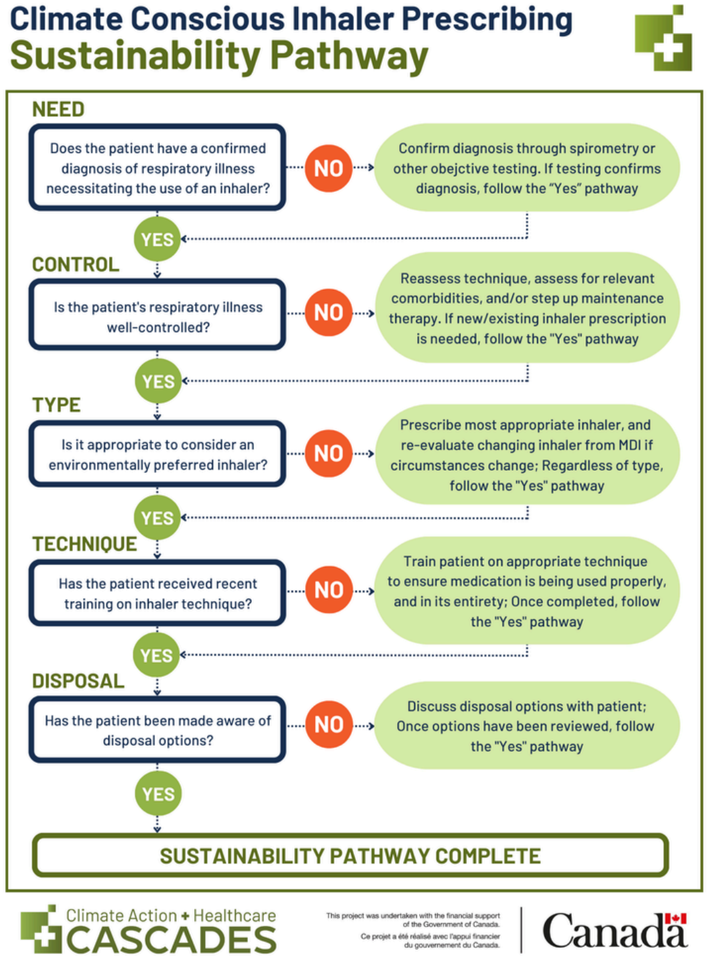
ACTION AREAS: SUSTAINABLE INHALER PATHWAY

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



Sustainability Pathway

Need
Type
Technique
Disposal

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 Resource Catalogue	Ensure patients' asthma and COPD control is optimized and guideline-adherent.	Consider a switch to a more sustainable inhaler where appropriate Resource Catalogue	Ensure the patient receives training on inhaler technique, regardless of inhaler type Resource Catalogue	Ensure the patient is aware of inhaler disposal options, regardless of inhaler type Resource Catalogue
Intervention	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	NEW & EXISTING prescriptions: • Reduce excessive short acting inhaler use • Improve adherence to guideline-based disease management • Assess for relevant comorbidities	NEW prescriptions: • Default to non-pMDIs for eligible new patients when appropriate EXISTING prescriptions: • Engage in shared decision making with the patient about the opportunity to change to a lower GWP inhaler alternative. • Consider alternatives at renewal. • Consider allternatives during unrelated visit. If a switch is inappropriate, continue current prescription (re-evaluate opportunities to switch inhalers if circumstances change)	NEW & EXISTING prescriptions: • Offer digital resources on inhaler technique • Demonstrate proper technique in related and unrelated visits • Offer in-house training	NEW & EXISTING prescriptions: • Educate patients on disposal options

Need
Type
Technique
Disposal

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
Patient Education & Communication	Patient-facing infographic
Provider Education	Background material: Primer
	Background material: Infographic
	Background material: Webinar
	Sustainable inhaler pathway considerations
Prescribing Tools	EMR search string – Patient with inhaler prescriptions

PATIENT EDUCATION & COMMUNICATION

PATIENT-FACING INFOGRAPHIC

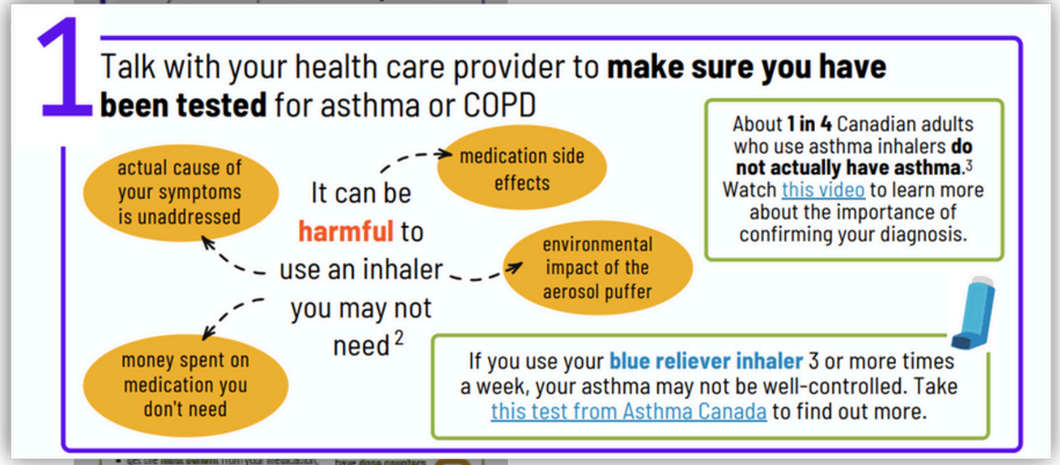
PURPOSE

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

ELEMENTS

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

Developed by Naba Khan, CASCADES.



Infographic

Need
Type
Technique
Disposal

PATIENT EDUCATION & COMMUNICATION

PATIENT-FACING INFOGRAPHIC (PRINTABLE)

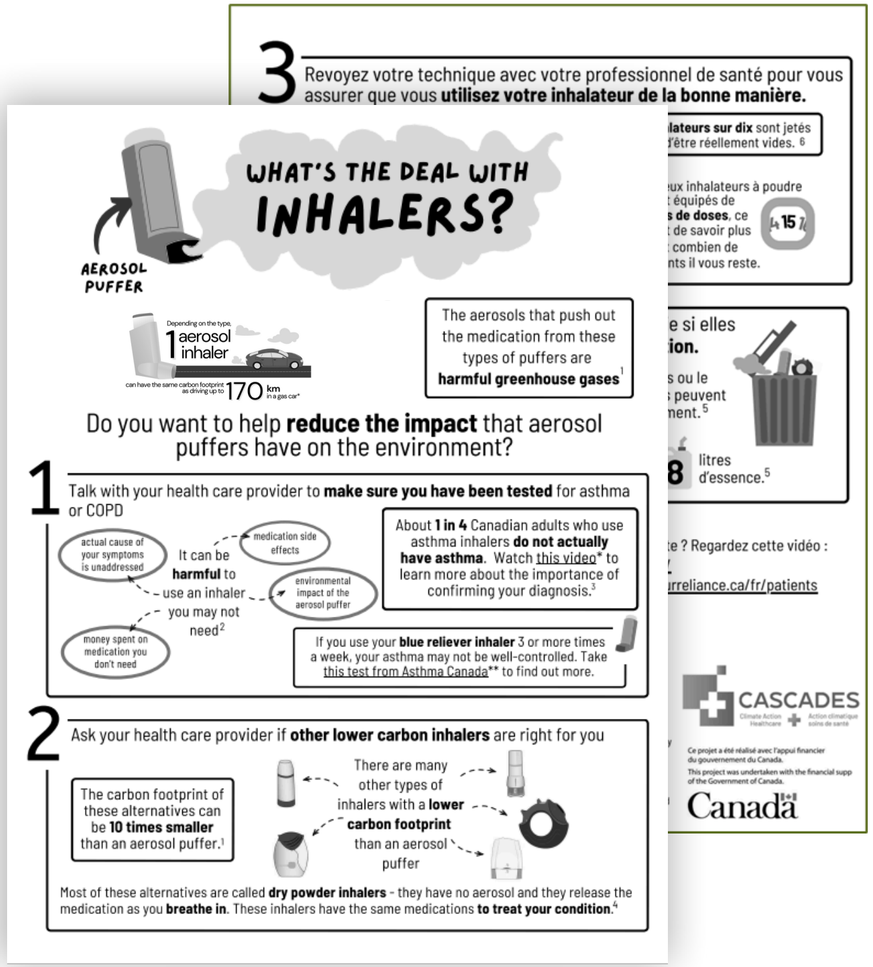
PURPOSE

- 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.



Patient-facing Infographic (Printable)

Need
Type
Technique
Disposal

PROVIDER EDUCATION

SUSTAINABLE INHALERS PRIMER AND INFOGRAPHIC

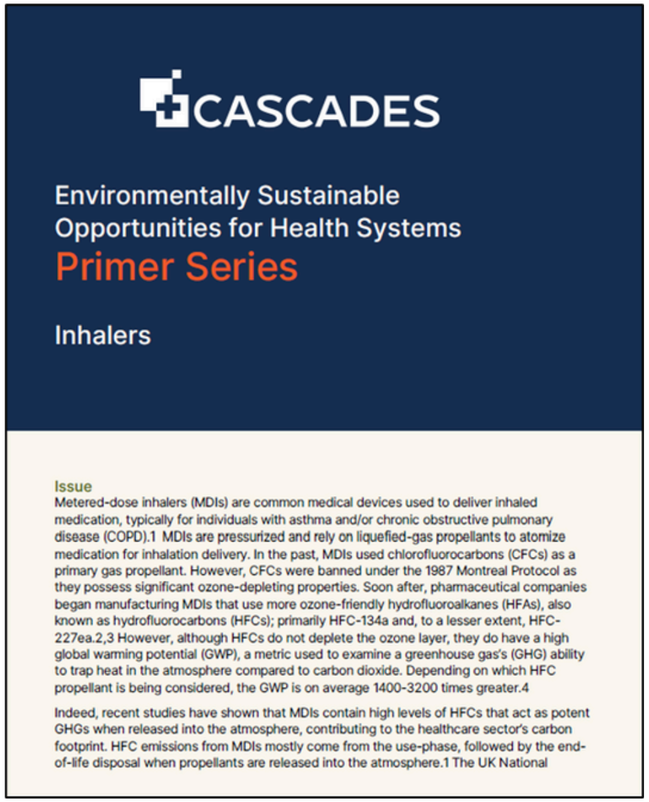
PURPOSE

- 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.


CASCADES

Environmentally Sustainable Opportunities for Health Systems

Primer Series

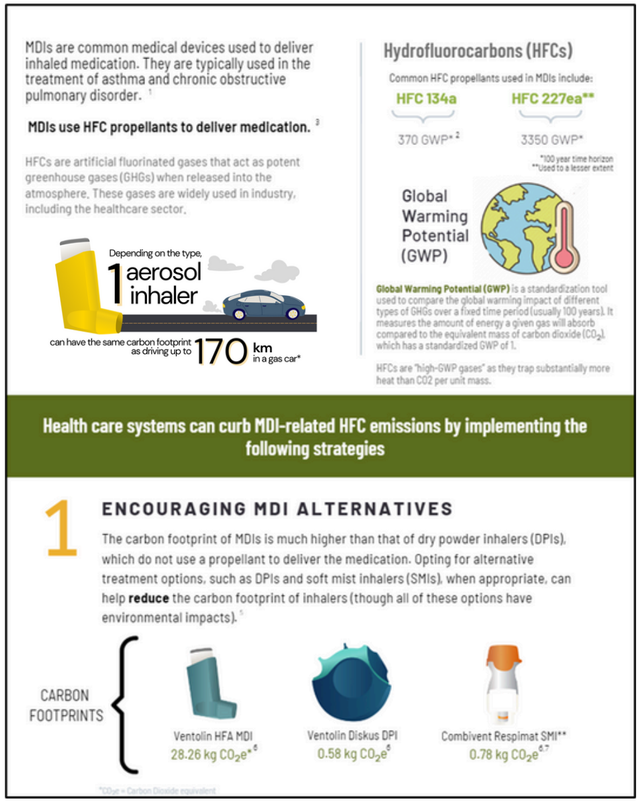
Inhalers

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).1 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.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.1 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.

MDIs use HFC propellants to deliver medication.

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*

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_2), which has a standardized GWP of 1.

HFCs are "high-GWP gases" as they trap substantially more heat than CO2 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).

CARBON FOOTPRINTS

Ventolin HFA MDI — 28.26 kg CO_2e*

Ventolin Diskus DPI — 0.58 kg CO_2e

Combivent Respimat SMI** — 0.78 kg CO_2e

*CO_2e = 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.

Webinar Video
Webinar Slides

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.

Considerations for Climate Conscious Prescribing

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

MDI EMR Queries

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

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

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.

Infographic
Printable Infographic

Need
Type
Technique
Disposal

PATIENT EDUCATION & COMMUNICATION

PRESCRIPTION RENEWAL LETTER

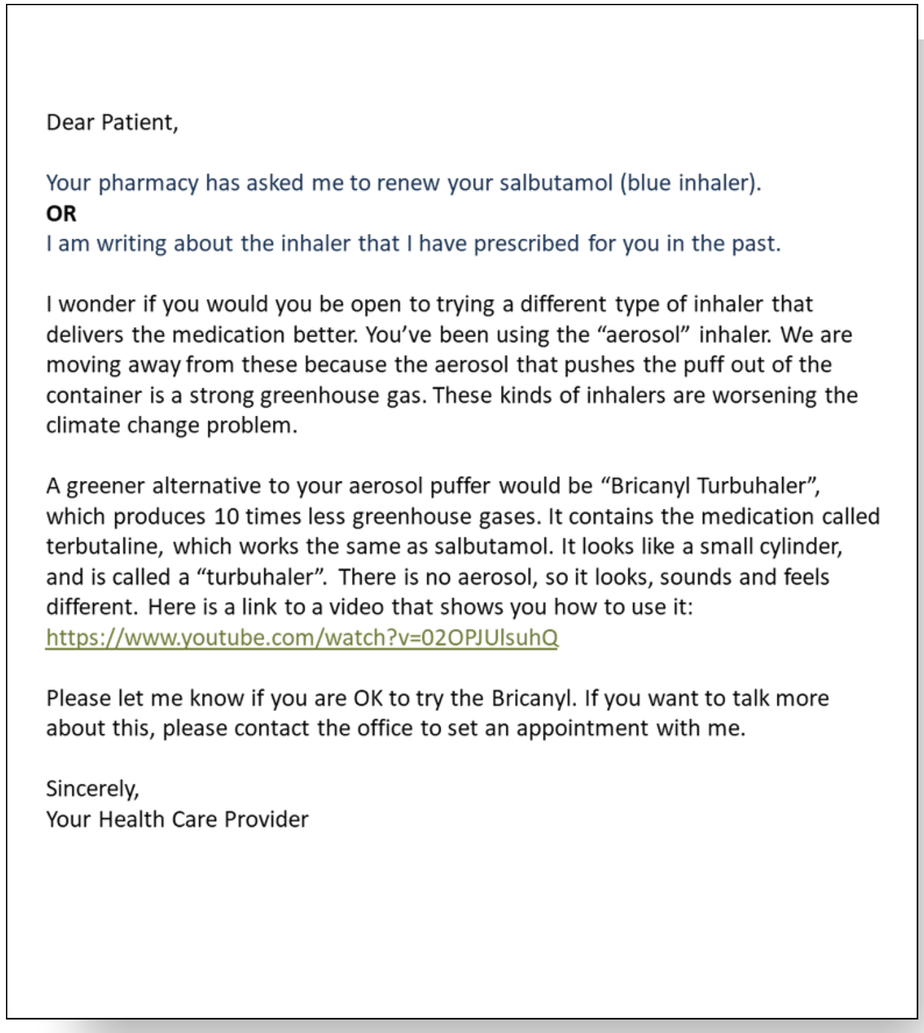
PURPOSE

- 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 patents 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=02OPJUlsuhQ

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

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.

Inhaler Usage Graphic

Need
Type
Technique
Disposal

PATIENT EDUCATION & COMMUNICATION

ENVIRONMENTAL IMPACT VIDEO (FRENCH)

PURPOSE

- Overview of environmental impact of metered close inhalers.

ELEMENTS

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

Developed by Alexis Riopel for Le Devoir.

Video

PROVIDER EDUCATION

SUSTAINABLE INHALERS BACKGROUND RESOURCES

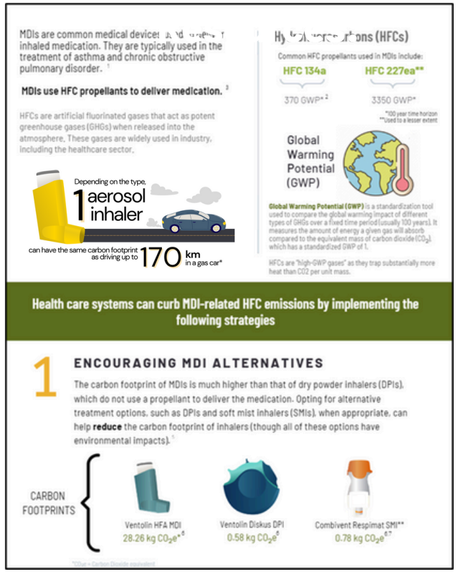
PURPOSE

- 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.



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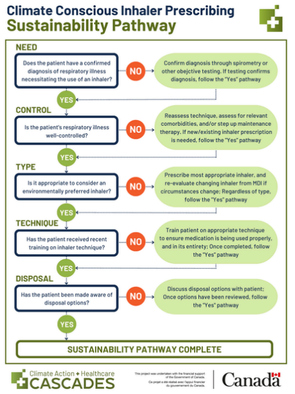
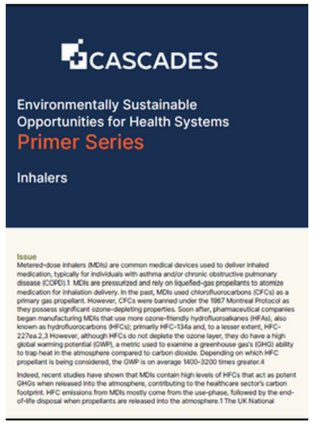


c.

d.



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

Need
Type
Technique
Disposal

DETAILED REFERENCE CHART: INHALER COST COMPARISON

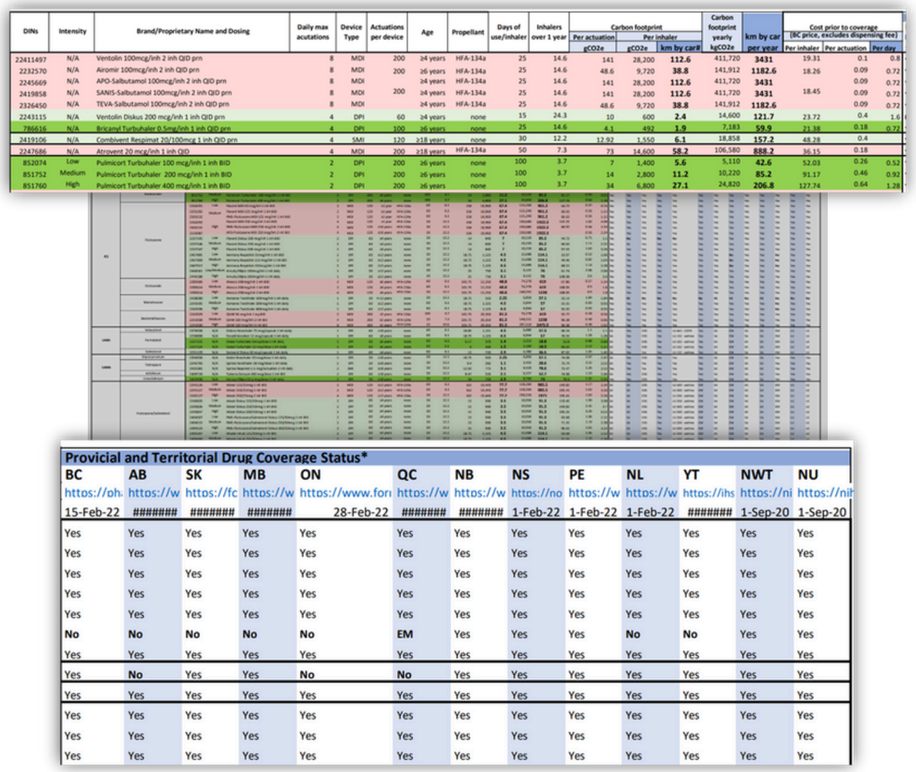
PURPOSE

- 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 Stoynova, 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 acutations	Device Type	Actuations per device	Age	Propellant	Days of use/inhaler	Inhalers over 1 year	Carbon footprint			Carbon footprint yearly kgCO2e	km by car per year	Cost prior to coverage (BC price, excludes dispensing fee)		
										Per actuation	Per inhaler						
										gCO2e	gCO2e	km by car			Per inhaler	Per actuation	Per day
22411497	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	Airomir 100mcg/inh 2 inh QID prn	8	MDI	200	≥6 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	APO-Salbutamol 100mcg/inh 2 inh QID prn	8	MDI		≥4 years	HFA-134a	25	14.6	141	28,200	112.6	411,720	3431		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	141	28,200	112.6	411,720	3431	18.45	0.09	0.72
2326450	N/A	TEVA-Salbutamol 100mcg/inh 2 inh QID prn	8	MDI		≥4 years	HFA-134a	25	14.6	48.6	9,720	38.8	141,912	1182.6		0.09	0.72
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	23.72	0.4	1.6
786616	N/A	Bricanyl Turbuhaler 0.5mg/inh 1 inh QID prn	4	DPI	100	≥6 years	none	25	14.6	4.1	492	1.9	7,183	59.9	21.38	0.18	0.72
2419106	N/A	Combivent Respimat 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	48.78	0.4	1.6
2247686	N/A	Atrovent 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	
852074	Low	Pulmicort Turbuhaler 100 mcg/inh 1 inh BID	2	DPI	200	≥6 years	none	100	3.7	7	1,400	5.6	5,110	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

Provicial and Territorial Drug Coverage Status*												
BC	AB	SK	MB	ON	QC	NB	NS	PE	NL	YT	NWT	NU
https://oh	https://w	https://fc	https://w	https://www.for	https://w	https://w	https://no	https://w	https://w	https://ihs	https://ni	https://nit
15-Feb-22	########	########	########	28-Feb-22	########	########	1-Feb-22	1-Feb-22	1-Feb-22	########	1-Sep-20	1-Sep-20
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	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	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

Reference Chart

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

MDI EMR Queries

PRESCRIBING TOOLS

PRESCRIPTION FAVOURITES

PURPOSE

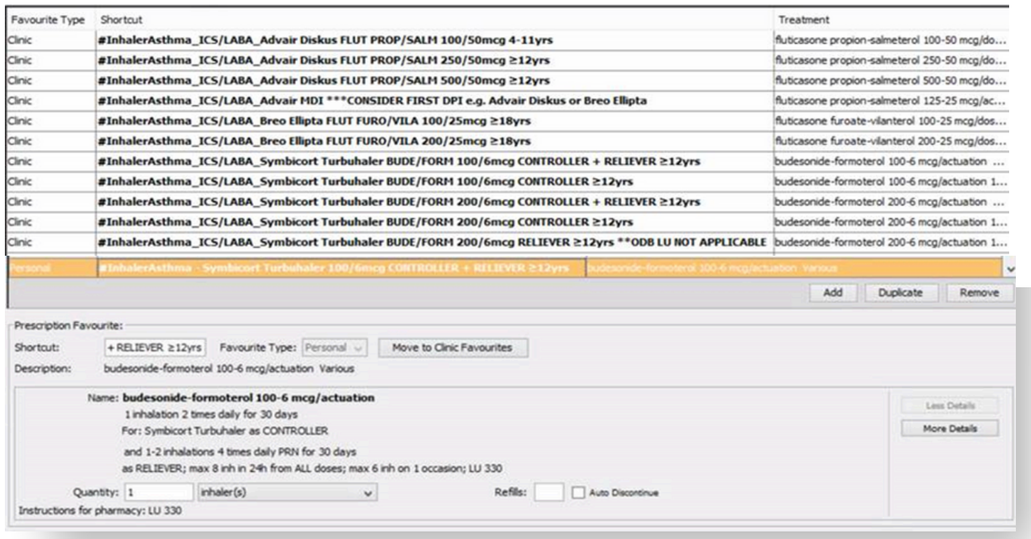
- Make notes for “Prescription Favourites” that will show low carbon alternative at time of new prescription.

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.

PS SUITE EMR



EMR Strategies

PRESCRIBING TOOLS

EMR TOOLBAR AND SBAR

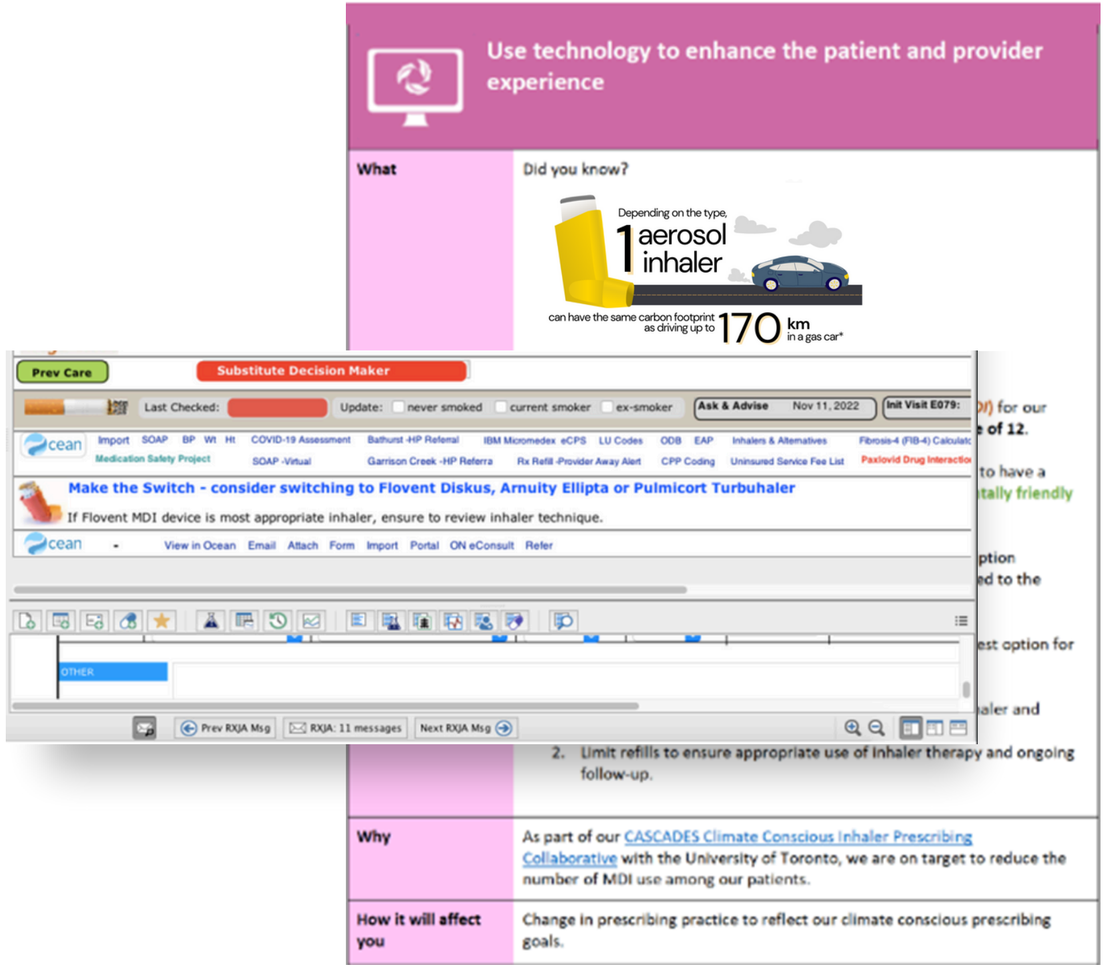
PURPOSE

- 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



EMR Strategies

PRESCRIBING TOOLS

COMMUNITY PHARMACY OPINION LETTER

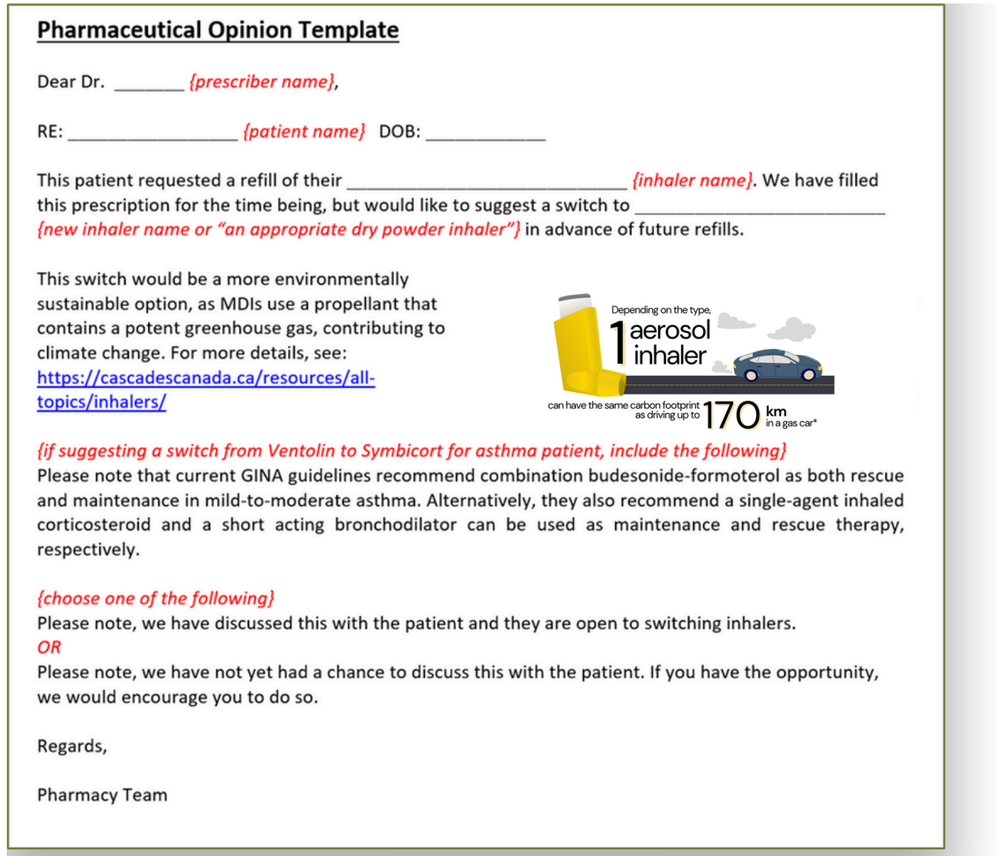
PURPOSE

- 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

PRESCRIBING TOOLS

LETTRE D'INFORMATION POUR LES PHARMACIENS

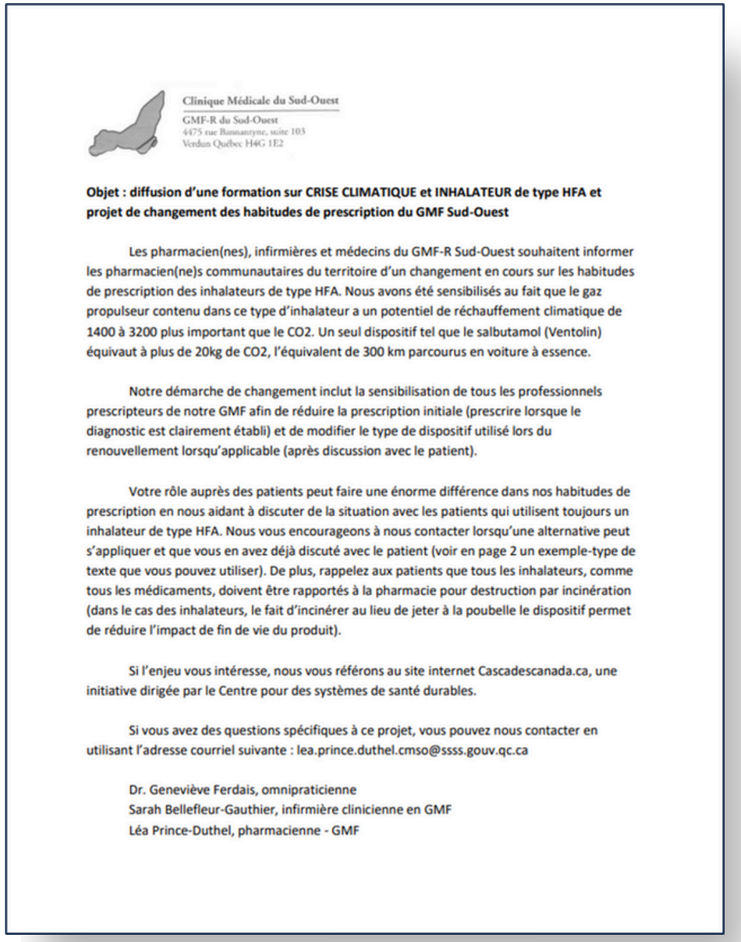
PURPOSE

- Letter to inform commuinty 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.



Clinique Médicale du Sud-Ouest
GMF-R du Sud-Ouest
4475 rue Bannantyne, suite 103
Verdun Québec H4G 1E2

Objet : diffusion d'une formation sur CRISE CLIMATIQUE et INHALATEUR de type HFA et projet de changement des habitudes de prescription du GMF Sud-Ouest

Les pharmacien(nes), infirmières et médecins du GMF-R Sud-Ouest souhaitent informer les pharmacien(ne)s communautaires du territoire d'un changement en cours sur les habitudes de prescription des inhalateurs de type HFA. Nous avons été sensibilisés au fait que le gaz propulseur contenu dans ce type d'inhalateur a un potentiel de réchauffement climatique de 1400 à 3200 plus important que le CO2. Un seul dispositif tel que le salbutamol (Ventolin) équivaut à plus de 20kg de CO2, l'équivalent de 300 km parcourus en voiture à essence.

Notre démarche de changement inclut la sensibilisation de tous les professionnels prescripteurs de notre GMF afin de réduire la prescription initiale (prescrire lorsque le diagnostic est clairement établi) et de modifier le type de dispositif utilisé lors du renouvellement lorsqu'applicable (après discussion avec le patient).

Votre rôle auprès des patients peut faire une énorme différence dans nos habitudes de prescription en nous aidant à discuter de la situation avec les patients qui utilisent toujours un inhalateur de type HFA. Nous vous encourageons à nous contacter lorsqu'une alternative peut s'appliquer et que vous en avez déjà discuté avec le patient (voir en page 2 un exemple-type de texte que vous pouvez utiliser). De plus, rappelez aux patients que tous les inhalateurs, comme tous les médicaments, doivent être rapportés à la pharmacie pour destruction par incinération (dans le cas des inhalateurs, le fait d'incinérer au lieu de jeter à la poubelle le dispositif permet de réduire l'impact de fin de vie du produit).

Si l'enjeu vous intéresse, nous vous référons au site internet Cascadescanada.ca, une initiative dirigée par le Centre pour des systèmes de santé durables.

Si vous avez des questions spécifiques à ce projet, vous pouvez nous contacter en utilisant l'adresse courriel suivante : lea.prince.duthel.cmso@ssss.gouv.qc.ca

Dr. Geneviève Ferdais, omnipraticienne
Sarah Bellefleur-Gauthier, infirmière clinicienne en GMF
Léa Prince-Duthel, pharmacienne - GMF

Lettre d'information

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)

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.

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.

Inhaler Usage Graphic

PROVIDER EDUCATION

SUSTAINABLE INHALERS BACKGROUND RESOURCES

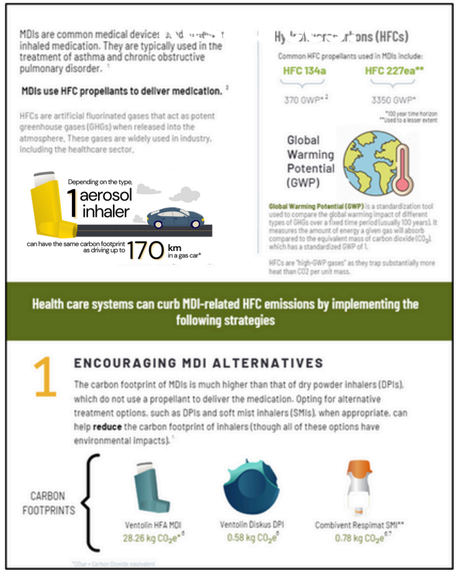
PURPOSE

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

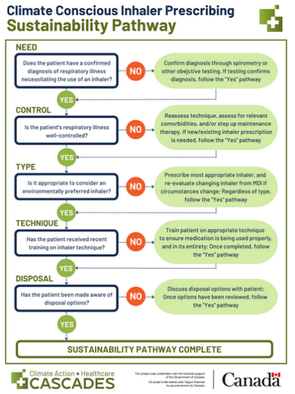
ELEMENTS

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

a.

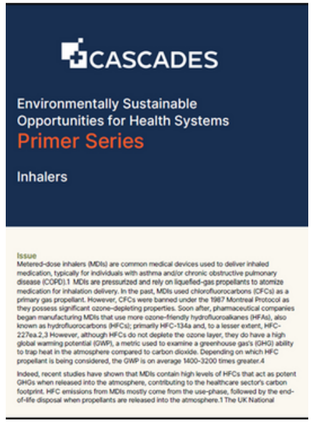


b.



c.

d.



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

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)

PATIENT EDUCATION & COMMUNICATION

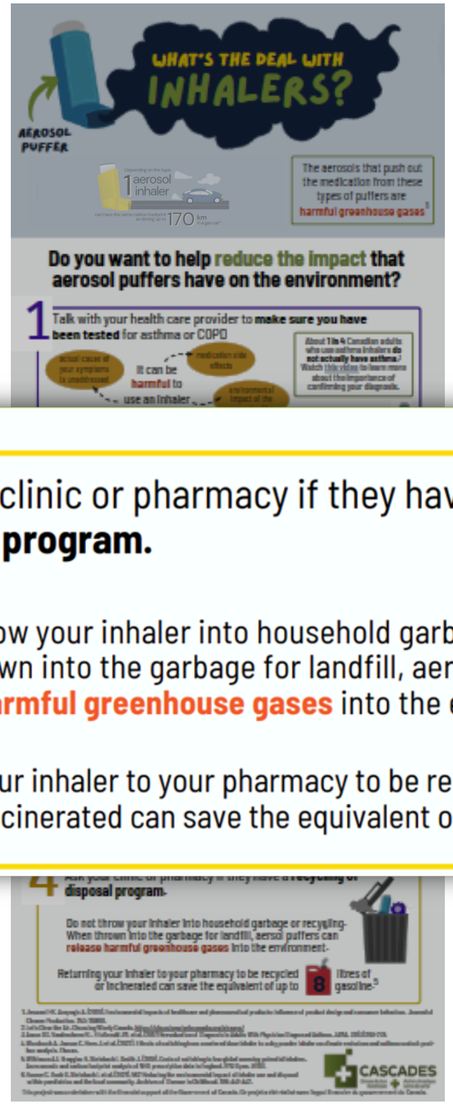
PATIENT-FACING INFOGRAPHIC

PURPOSE

- Inform patients about disposing of their inhaler correctly.

ELEMENTS

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



Infographic
Printable Infographic

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

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.

FAQ

PROVIDER EDUCATION

SUSTAINABLE INHALERS BACKGROUND RESOURCES

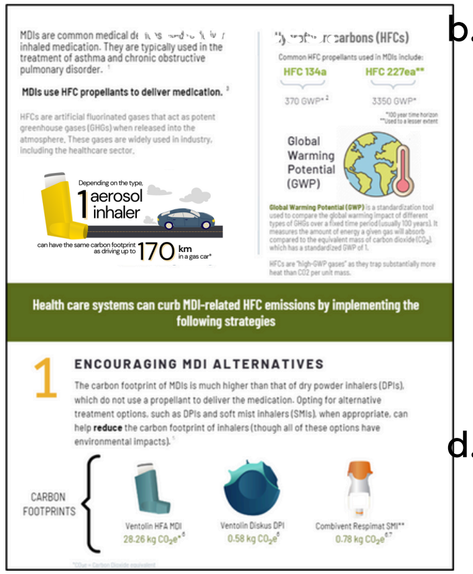
PURPOSE

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

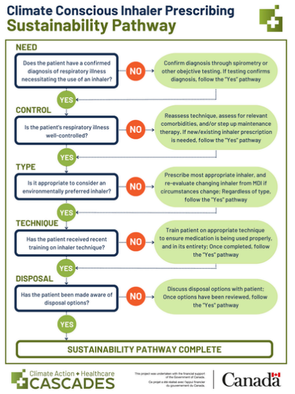
ELEMENTS

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

a.

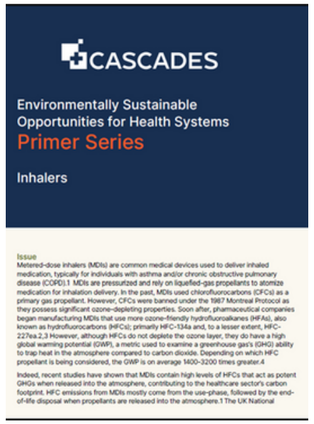


b.

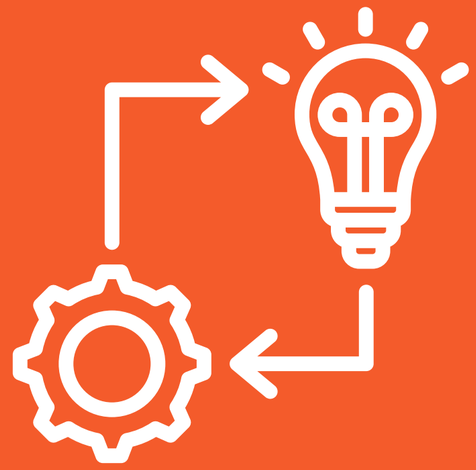


c.

d.



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



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

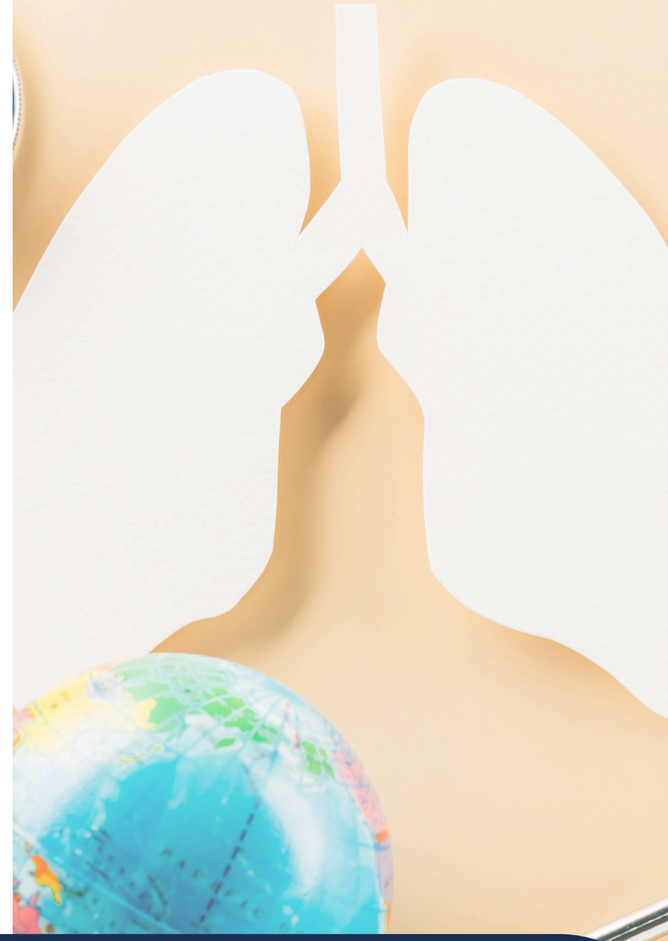
- Primary care prescribers (family & general physicians, nurse practitioners): Work with patients to diagnose inhaler need, and assess type and technique; can advise on disposal
- Specialist physicians (respirologists): Work with patients to diagnose inhaler need, and assess type and technique
- Respiratory 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

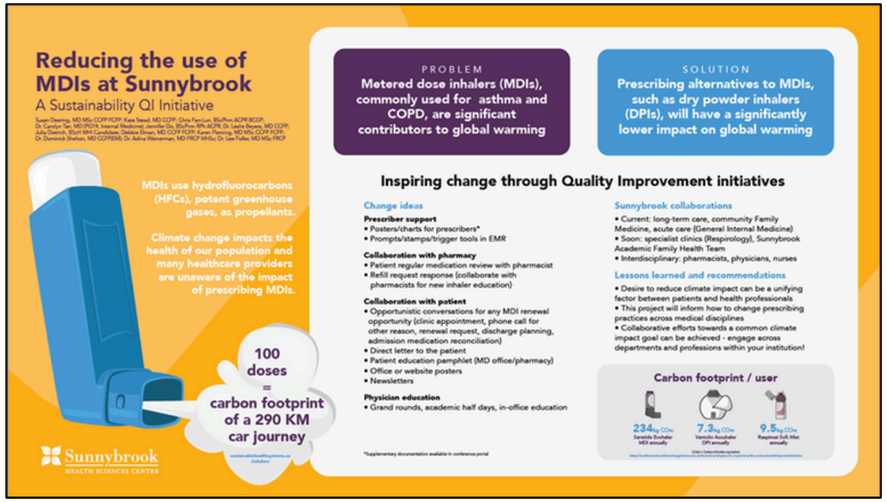
QUALITY IMPROVEMENT: EXAMPLES FROM THE FIELD

AIM

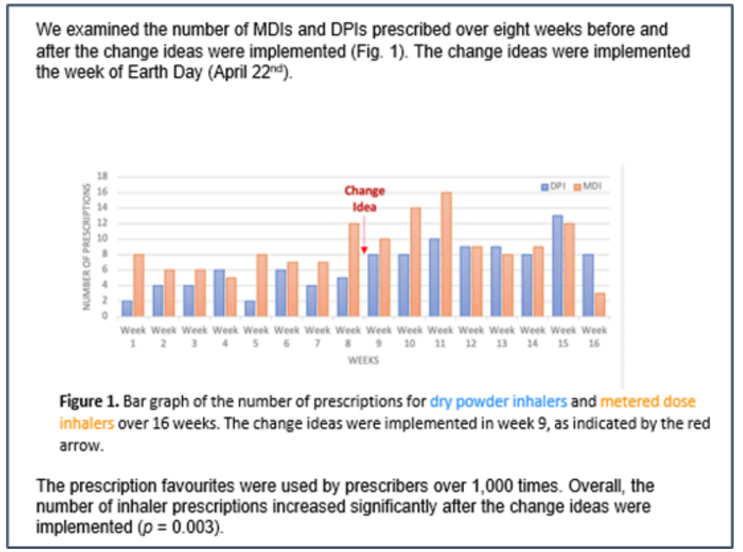
Pursue sustainable inhaler prescribing as a Quality Improvement initiative.

- The CASCADES charter can assist in planning.

Sunnybrook Health Science Centre



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 CO2(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	• #/% patients referred for diagnostic testing • #/% patients who undergo diagnostic testing	EMR search, 1x/month • #/% patients with inhaler prescriptions X Emissions factors for MDIs + DPIs
Encourage switch	• # posters put up • # visits to infographic • # times use samples • # emails sent • # times discussed during unrelated visit	EMR search, 1x/month • #/% patients with inhaler prescriptions; of these: • #/% patients using MDI (specify type, if possible) • #/% patients using DPI (specify type, if possible) X Emissions factors for MDIs + DPIs

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.

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About this playbook

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- Gabrielle Busque, BSc, PharmD

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- Naba Khan, Project Assistant, CASCADES

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- Meghan Davis, Family Physician (ON)
- Jean-Phillipe Michel, Family Physician (QC)
- Ann Loewen, Family and Emergency Physician (MB)
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