LOW CARBON
HIGH QUALITY CARE

Change & Measurement Strategy

Climate-Conscious Inhaler Practices

HQBC
HEALTH QUALITY BC

Vancouver CoastalHealth

CASCADES

Territorial Acknowledgements

In doing work throughout the province, we at Health Quality BC (HQBC) would like to acknowledge that we are living and working with humility and respect on the traditional territories of the First Nations Peoples of British Columbia. We specifically acknowledge and express our gratitude to the keepers of the lands of the ancestral and unceded territory of the xʷməθkʷəy̓əm (Musqueam), Skwxwú7mesh (Squamish), and səl̓ilwətaʔɬ (Tsleil-Waututh) Nations, where our head office is located on what is now colonially known as Vancouver. HQBC also recognizes Métis People and Métis Chartered Communities, as well as the Inuit and urban Indigenous Peoples living across the province on various traditional territories.

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Overview

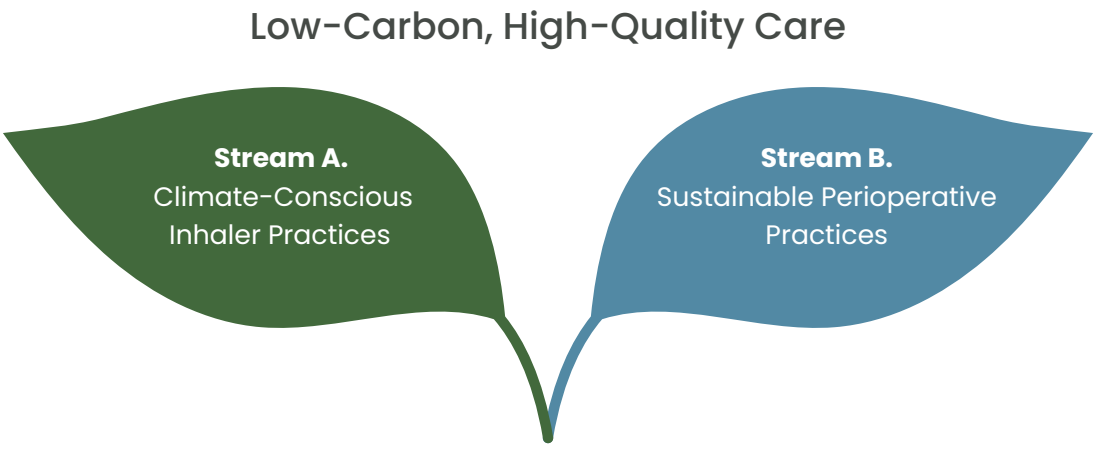
The Low-Carbon, High-Quality Care Collaborative (LCHQ) is a provincial quality improvement initiative, led by Health Quality BC (HQBC) in partnership with CASCADES Canada and Vancouver Coastal Health (VCH). The aim of the collaborative is to spread and scale up efforts across the province and share knowledge of low-carbon practices that improve the quality of care. We are very excited to have your team involved! Please refer to the Welcome Package you were sent for the information and resources you will need to get started on this journey.

The purpose of this document is to provide guidance for your LCHQ improvement journey through the **Change & Measurement Strategy**. This document is a core tool to help accelerate your work throughout the collaborative and outlines many of the low-carbon practices while providing useful tools to monitor their effectiveness in your care setting. It contains the:

- **Change Ideas** which are a collection actions your team can test, based on evidence and experiences of others in similar clinical settings; and
- **Measurement Strategy** to help identify and inform progress in the areas towards your aim.

While this document is comprehensive, it is not exhaustive. Teams are encouraged to tailor the change ideas and measurement strategy to their specific clinical setting and use the ideas that best align with their needs.

The LCHQ Collaborative features two streams which both contribute to the overall aim of reducing carbon emissions from clinical care of participating teams:



Please make sure you have the correct package as there are differences across the two streams. This document has been prepared for:

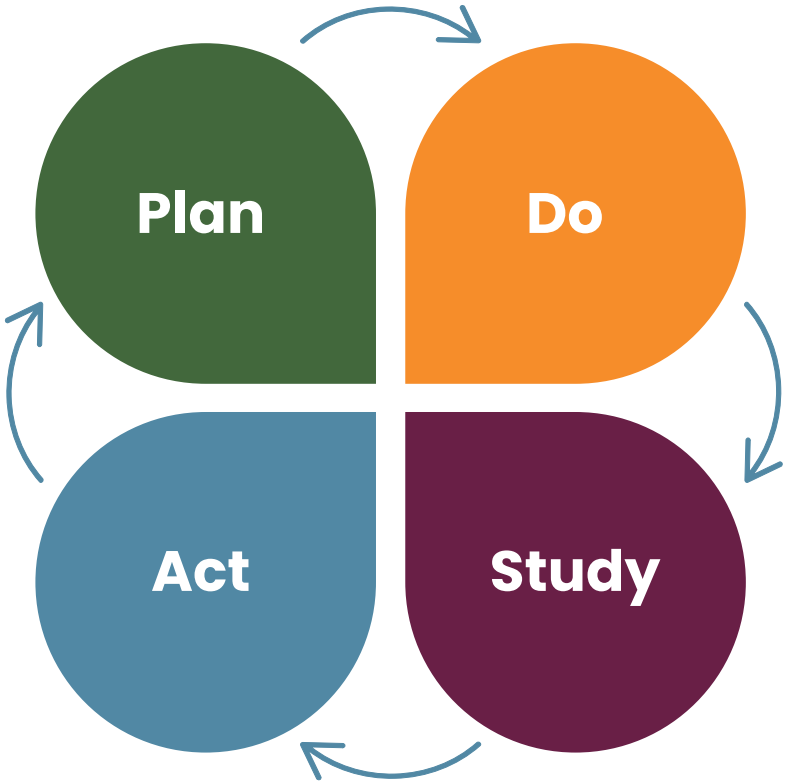
Stream A. Climate-Conscious Inhaler Practices

How to Improve?

There are many approaches to drive quality improvement to achieve better quality of care. For the LCHQ Collaborative, we will use the Model for Improvement as the framework to guide improvement.

THE MODEL FOR IMPROVEMENT

The Model for Improvement is a framework used to guide and accelerate improvement work.[1] This model is used because it works well with other change models that your organization may already be using. It is designed to accelerate improvement work through incremental testing of small-scale change using Plan-Do-Study-Act (PDSA) Cycles.[2]



The Model for Improvement asks three basic questions:

1. What are we trying to accomplish?
2. How will we know that a change is an improvement?
3. What change can we make that will result in improvement?

STEP 1: WHAT ARE WE TRYING TO ACCOMPLISH?

Understanding your current state, defining the problem you seek to address, and developing your aim are the first steps in making positive changes. We will document this quality improvement journey through the development of an **Improvement Charter**. The Improvement Charter is a documented plan to guide the work of an improvement team. It outlines all the elements of the improvement process, including the overall purpose, expected outcomes, initial ideas for change, and team members' roles and responsibilities. Charters are an important tool at the beginning of a project.

Each team will be supported to create an Improvement Charter for their project. This is best done collaboratively with project team members.

What does this look like in practice?

Start by considering the focus of the work that your team would like to do. As a team, begin to define this work by completing the sections of the charter:

- Project name, sponsor, team leader and members
- Problem Statement - What is the gap in quality this work is addressing?
- Aim Statement - What will improve? By how much? By when? Where?
- Scope and Boundaries - What will the project include?
- How will you manage the project? (e.g., key dates, roles and responsibilities, engaging others)

The process of completing a charter brings awareness to everyone involved and confirms their commitment to participate and support the project. The dialogue in this process is as important as the charter itself.

The Problem Statement

The why. A brief description of the issue or problem the collaborative is seeking to address.

> Clinical service delivery within the health system is a large consumer of energy and resources and a major producer of emissions and waste. These environmental impacts of care are substantial with up to 5% of global greenhouse gas emissions coming from health care systems.[3] There are strong linkages between the carbon-impact of clinical activities and health care quality, as defined by the BC Health Quality Matrix.[4]

Teams are encouraged to expand on this problem statement based on their setting and specific area of focus.

The Aim Statement

A clear, explicit summary of what will be accomplished over the course of an improvement project.

This is the overall aim of the LCHQ Collaborative:

> Decrease the carbon emissions by 10% from clinical practices of participating teams by November 1, 2024.

Each team will develop their own aim statement for their specific project - that includes what they will improve, where, by how much, and by when. *'How to develop an effective aim statement'* will be introduced at the first learning session and teams will be supported with this process by the HQBC team.

STEP 2: HOW WILL WE KNOW THAT A CHANGE IS AN IMPROVEMENT?

Measurement is essential to understand and improve the quality of care. Measurement for improvement helps us to:

- understand current performance;
- observe if the changes we are implementing are leading to the desired outcome;
- understand if the changes implemented have unintended consequences (positive, negative, or neutral);
- compare to similar sites to foster learning;
- communicate clearly about improvement efforts and outcomes; and
- know if we have reached our aims.[5]

To understand if changes have resulted in improvement, a few key indicators need to be selected to track progress over time. A team should choose 3 – 8 indicators that are useful, manageable, and provide a view of improvements being made relative to the aim of the project. Indicators can be classified as either outcome, process or balancing measures:

1. **Outcome Measures**: Measures that are tied closely to the aim statement and will be improved after the project is complete. (e.g., carbon emissions from inhalers)
2. **Process Measures**: Measures the factors that directly impact the aim (usually tied to primary or secondary drivers - see pages 9-10). These measures are the voice of the system and often show change more quickly than the outcome measure they are connected to. (e.g., # of low-carbon inhalers dispensed)
3. **Balancing Measures**: Measures unintended consequences, both positive and negative, that may result from the changes being made. (e.g., provider experience)

The HQBC team will help you create a **Measurement Plan** for your project, including determining appropriate indicators, data collection and tracking strategies.

What does this look like in practice?

You will find sample measures in the Measurement Strategy on page 13. Take the time to explore what data is available and consider simple manual data collection to start. Remember, data is meant to speed up the improvement process, not slow it down! Measurement tips:[6]

- Start collecting data right away.
- Collect data as close to real time as possible to learn about current performance.
- Display data over time using a run chart to visually see changes in your measures.
- Use data as a communication tool, both within your improvement team and with external parties, so everyone knows how things are going.
- You don't need to measure everything! Sampling can be used as a great strategy to conserve time and resources, while focusing on testing, adapting, and actionable improvements.

STEP 3: WHAT CHANGES CAN WE MAKE THAT WILL RESULT IN AN IMPROVEMENT

Driver Diagram – Inhaler Stream[6,7]

A driver diagram is a tool used during improvement projects to illustrate different theories of change and how they may lead to improvement.[8] Driver diagrams help in answering the question, "What changes can we make that will result in an improvement?" They do this by mapping the logic of potential change ideas to the intended outcome. Change ideas can come from a variety of sources: research, best practices or other organizations that have achieved results. The majority of these change ideas are based off CASCADES Playbooks[6,7] with input from our advisory group on how they apply in the British Columbia context.

Review the driver diagram below with your team and identify which primary and secondary drivers you will focus on. You can then look at the change ideas for suggestions, or come up with your own change ideas, to test in your own environment. The "where" column indicates if the change idea is more applicable to inpatient or outpatient settings, but you may find ideas from both categories that resonate with your team.

- Outpatient
- Inpatient
- Both Outpatient and Inpatient

COLLABORATIVE AIM	PRIMARY DRIVER	SECONDARY DRIVER	WHERE	CHANGE IDEA
Decrease the carbon emissions from clinical practices of participating teams by 10% by November 1, 2024.	**NEED:** Prescribe Appropriately	Confirm diagnosis of COPD or asthma for all inhaler prescriptions	Outpatient	1. Ensure proper diagnosis of asthma or COPD prior to prescribing an inhaler
			Outpatient	2. Confirm diagnosis with spirometry for existing prescriptions
			Outpatient	3. Get a reusable peak flow meter for your clinic
			Inpatient	4. Provide letter to outpatient provider to consider confirming diagnosis following discharge
			Inpatient	5. Order spirometry at discharge
	OPTIMIZE: Ensure High Quality Disease Control	Provide care that is consistent with provincial and national guidelines	Both Outpatient and Inpatient	6. Review asthma and COPD guidelines annually
			Outpatient	7. Ensure patients with asthma who are prescribed SABAs are also prescribed maintenance inhalers
			Outpatient	8. For patients 12 and older, consider prescribing budesonide-formoterol instead of a high-carbon MDI
			Outpatient	9. Reassess asthma control with each visit and consider increasing maintenance inhaler dosing rather than re-prescribing SABAs during refills
			Outpatient	10. Assess and treat co-morbid conditions in patients with poorly controlled asthma (e.g., GERD, post-nasal drip)

COLLABORATIVE AIM	PRIMARY DRIVER	SECONDARY DRIVER	WHERE	CHANGE IDEA
Decrease the carbon emissions from clinical practices of participating teams by 10% by November 1, 2024.	**TYPE:** Encourage Sustainable Alternatives	Start patients on low-carbon inhalers	●	11. Change the default or favourite inhaler in the EMR
			●	12. Default to DPIs and SMIs for eligible new patients
			●	13. Discuss automatic substitution from comparable high-carbon inhalers to lower-carbon alternatives with local pharmacy
			●	14. Recommend a DPI or SMI at discharge
			●	15. Have a cheat sheet available of low-carbon inhaler options
			●	16. Redesign pre-printed order sets to include planetary health lens
		Propose patients switch to a more sustainable inhaler (when appropriate)	●	17. Provide handout to applicable patients to switch to a lower-carbon inhaler
			●	18. Educate patients about the opportunity to switch at visit
			●	19. Have a box of inhaler samples to see what works best for patients
			●	20. Have a Turbuwhistle or comparable device to assess for inspiratory capacity when choosing inhalers
	TECHNIQUE: Review Technique	Ensure patient receives training on inhaler technique (regardless of inhaler type)	●	21. Provide education to patients on how to use their device properly, which includes use of a spacer device for all patients using MDIs
			●	22. Have patients demonstrate proper technique and teach it back
			●	23. Refer patient to a respiratory therapist for assessment and education
		Provide education for staff on how to support patients with proper inhaler technique	●	24. Hold health care professional education for all clinical staff and assess knowledge
	REDUCE: Use, Loss, and Waste	Minimize duplicate inhalers	●	25. Remove non-rescue MDIs from ward stock
			●	26. Introduce a time out box for the automated dispensing cabinet (ADC)
		Minimize inhaler loss	●	27. Provide education on the amount of inhaler loss that occurs during a patient stay
			●	28. Develop a strategy to minimize inhaler loss on transfer
			●	29. Use a tamper seal to allow unused inhalers to be returned to pharmacy
			●	30. Label inhalers right out of the automated dispensing cabinet
		Practice sustainable recovery and disposal of inhalers	●	31. Ensure the patient is aware of inhaler disposal options
			●	32. Connect with local pharmacy to see if they are in the health steward program
			●	33. Collect inhalers on site and then bring them to a participating pharmacy
			●	34. Organize disposal education for inpatient wards
			●	35. Return inhalers left at discharge to pharmacy for appropriate disposal

Measurement Strategy For This Collaborative

Teams will be supported to create a **Measurement Plan** that will provide data to determine whether the changes you are making are moving you towards achieving your aim. This plan should include measures that cover at least one dimension of quality as defined in the BC Health Quality Matrix. The seven dimensions of quality are: respect, safety, accessibility, appropriateness, effectiveness, equity and efficiency.

Measurement for the purposes of *improvement* is to learn what processes or change ideas are making a difference and to track progress relative to your aim over time. The goal is to gather *just enough* data to make informed decisions and guide your actions.

What will you measure?

A great way to approach your measures is to think about the following three domains and how they relate to a dimension of quality that you are focusing on in this project:

1. **Sustainability**: Are we using resources in an optimal and environmentally sustainable way?
2. **Clinical**: What is important to clinical teams to provide the best possible quality of care?
3. **Experience**: What is important to our patients, families, residents, staff and clinicians?

How will you collect data?

Data collection planning involves determining what will be collected, who will collect it and how often it will be collected. In an ideal world, we would have the time and resources to measure everything! However, this is not necessary for the purposes of improvement.

Here are some tips for determining an appropriate sample size and frequency of data collection for your project:

- **Start measuring something**: The most important thing is to begin measuring. You can start with a small sample of data to gather initial insights and test your data collection strategy.
- **Determine the right indicator**: Look at the information collected from the small sample and assess if you have chosen the right measure. Refine and make adjustments as necessary based on the insights gained. It can be an iterative process, so be open to refining your approach.
- **Constructive sampling strategy**: Once you have identified the right indicators, you can move towards a more constructive sampling strategy. This strategy should balance getting an appropriate measure of information while considering the resources and time required. A good rule of thumb is to collect 10-20% of your overall denominator.

- **Balance data collection with informed decisions**: Collecting smaller, consistent samples can provide meaningful and useful information without overwhelming resources.
- **Frequency of data collection**: Measures should be collected frequently and consistently throughout your improvement project to track changes over time. For key indicators, weekly, bi-weekly or monthly data collection is generally recommended depending on context and volume of patients. However, during quick, time-limited PDSA cycles, you may need to measure daily or even hourly to assess the impact of specific changes.
- **Seek support from the HQBC team**: The HQBC team is available to provide support and guidance in refining your sampling strategy for your metrics. They can help you determine an appropriate sample size and provide additional information and resources.

Where will the data be shared?

Your project team will want to review data throughout the collaborative to help understand how you are performing and to guide your next steps. Are things getting better or worse? Is performance acceptable? Do we have more or less variability? Sharing this information with others in your clinical setting is a good way to build engagement and ownership around the changes you're making.

Each team is also asked to report on key indicators by submitting a **Monthly Team Progress Report** to the HQBC team starting in March 2024. You will be introduced to this template at the second learning session. These reports are designed to help you progress through the collaborative, inform supports provided to teams, and assess the collective impact of our efforts.

Teams will select indicators that are meaningful to their project that they are able to track, review and update on a monthly basis. Other measures will be useful during PDSA cycles and may only be collected for a short period during the duration of the cycle. These measures are typically specific to the changes being tested.

SELECTING INDICATORS

Domain 1: Sustainability Measures
Are we using resources in an optimal and environmentally sustainable way?

All teams must measure **estimated carbon emissions** in CO_2 equivalent (CO_2e) from a clinical practice to help them determine the impact they are having throughout the LCHQ Collaborative. There are many ways to estimate carbon emissions from clinical practice. This table outlines some of the ways to quantify these emissions based on the focuses of this collaborative.

If you would like to look at other areas in addition to those listed, we are open to exploring this through the collaborative. There are additional resources available for any teams interested in exploring a more comprehensive life cycle analysis of their clinical practices.[9]

TYPE OF MEASURE	MEASURE	DIMENSION OF QUALITY	OPERATIONAL DEFINITION	CALCULATION	POTENTIAL DATA SOURCES
Outcome	**O.1.** Estimated Carbon Emissions	Efficiency	Estimated carbon emission from clinical practices, including: • Type of inhaler prescribed and/or dispensed • Inhalers lost during inpatient stay and/or transfer	Monthly Team Progress Report provided by HQBC will include formulas to calculate estimated emissions from common inhalers. Data to inform emission calculations can be found in Appendix 2.	See process measures 1-3.
Process	**P.1.** Lower Carbon Inhalers	Efficiency	The percentage of inhalers prescribed that are low carbon. Teams to use BCinhalers.ca[10] to review low-carbon inhaler types.	# of low-carbon inhalers prescribed / # of inhalers prescribed	• EMR / EHR • Dispensing data
Process	**P.2.** Lower Carbon Inhalers	Efficiency	The percentage of inhalers dispensed that are low carbon. Teams to use BCinhalers.ca[10] to review low-carbon inhaler types.	# of low-carbon inhalers dispensed / # of inhalers dispensed	• EMR / EHR • Dispensing data
Process	**P.3.** Duplicate Inhalers	Efficiency	A count of duplicate reliever inhalers dispensed to the same person during one stay on the ward.	# of duplicate reliever inhalers dispensed / # of patients with asthma or COPD	• Dispensing data
Process	**P.4.** Inhalers Lost on Transfer	Efficiency	A count of inhalers lost during transfer estimated by any inhalers dispensed within the first 24 hours on the ward.	# of inhaler dispensations in the first 24 hours on the ward / # of patients transferred to the ward who have been dispensed at least one inhaler	• Dispensing data

Domain 2: Clinical Measures
What is important to clinical teams to provide the best possible quality of care?

Teams should have at least one clinical measure focused on how care is being delivered. Depending on the specific aim of your project, choose from the measures below:

TYPE OF MEASURE	MEASURE	DIMENSION OF QUALITY	OPERATIONAL DEFINITION	CALCULATION	POTENTIAL DATA SOURCES
Outcome	**O.2.** Appropriate Prescribing of Inhalers	Appropriateness	The percentage of patients prescribed an inhaler who have an objective diagnosis of asthma or COPD.	# of patients prescribed an inhaler that have a diagnosis of asthma or COPD / # of patients prescribed an inhaler	• Chart review • Test results
Outcome	**O.3.** Controlled Asthma	Effectiveness	The percentage of patients with asthma that have been prescribed 3 or more reliever inhalers in the past year.	# of patients prescribed ≥ 3 reliever inhalers in the past year / # of patients with an active inhaler prescription	• Chart review
Process	**P.5.** Patient Technique	Effectiveness	The percentage of patients who are able to demonstrate good inhaler technique.	# of patients who demonstrate good technique / # of patients who have technique assessed	• Observation
Balancing	**B.1.** Emergency Department Visits	Effectiveness, Safety	The percentage of emergency department visits from asthma and COPD exacerbations.	# of ED visits for asthma and COPD exacerbations / # of ED visits for any reason	• Chart review

Domain 3: Experience Measures
What is important to our patients, families, residents, staff and clinicians?

Teams should have at least one experience measure focused on how people are experiencing care. Depending on the specific aim of your project, choose from the measures below:

TYPE OF MEASURE	MEASURE	DIMENSION OF QUALITY	OPERATIONAL DEFINITION	CALCULATION	POTENTIAL DATA SOURCES
Balancing	**B.2.** Patient Experience	Respect	The percentage of patients that indicate they experienced a high level of care.	# of patients who report a 9 or 10 with their overall experience / Total number of patients surveyed	• Provincial Experience Survey • Survey administered by project team
Balancing	**B.3.** Health Care Professional Experience	Respect	The percentage of providers and/or staff in your setting that are satisfied with the level of care they are able to provide.	# of HCPs that indicate positive perceptions of care / # of HCPs surveyed	• Health and Wellness Survey results at facility

What does this look like in practice?

Here is an example of how indicator selection might look for a project aimed at encouraging sustainable alternatives:

Starting patients off on lower carbon inhalers is an effective strategy to reduce the use of high-carbon inhalers at the beginning of a patient's new asthma or COPD diagnosis. Keep the bcinhalers.ca website saved as a favourite, so you have easy access to information on the types of low-carbon inhalers.

You can measure this by considering the dimensions of quality most likely to be impacted.

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HEALTH QUALITY MATRIX

	DIMENSIONS OF QUALITY						
	RESPECT Honouring a person's choices, needs and values	**SAFETY** Avoiding harm and fostering security	**ACCESSIBILITY** Ease with which health and wellness services are reached	**APPROPRIATENESS** Care that is specific to a person's or community's context	**EFFECTIVENESS** Care that is known to achieve intended outcomes	**EQUITY** Fair distribution of services and benefits according to population need	**EFFICIENCY** Optimal and sustainable use of resources to yield maximum value
	INDIVIDUAL PERSPECTIVE					SYSTEM PERSPECTIVE	
AREAS OF CARE **RETURNING TO HEALTH & WELLNESS** Getting better when faced with acute illness or injury	Percentage of providers and/or staff in your setting that are satisfied with the level of care they are able to provide (e.g., balancing measure B.3)			Percentage of patients prescribed an inhaler who have an objective diagnosis of asthma or COPD (e.g., outcome measure O.2)	Percentage of patients who are able to demonstrate good inhaler technique (e.g., process measure P.5)		Estimated amount of carbon emissions saved from prescribing a low versus high-carbon inhaler (e.g., outcome measure O.1)

Appendices

APPENDIX 1: ABBREVIATIONS

ADC: Automated Dispensing Cabinet

COPD: Chronic Obstructive Pulmonary Disease

GERD: Gastroesophageal Reflux Disease

HCP: Health Care Professional

HQBC: Health Quality BC

ICS: Inhaled Corticosteroid

LABA: Long-Acting Beta-Agonist

LAMA: Long-Acting Muscarinic Antagonist

LCHQ: Low-Carbon High-Quality

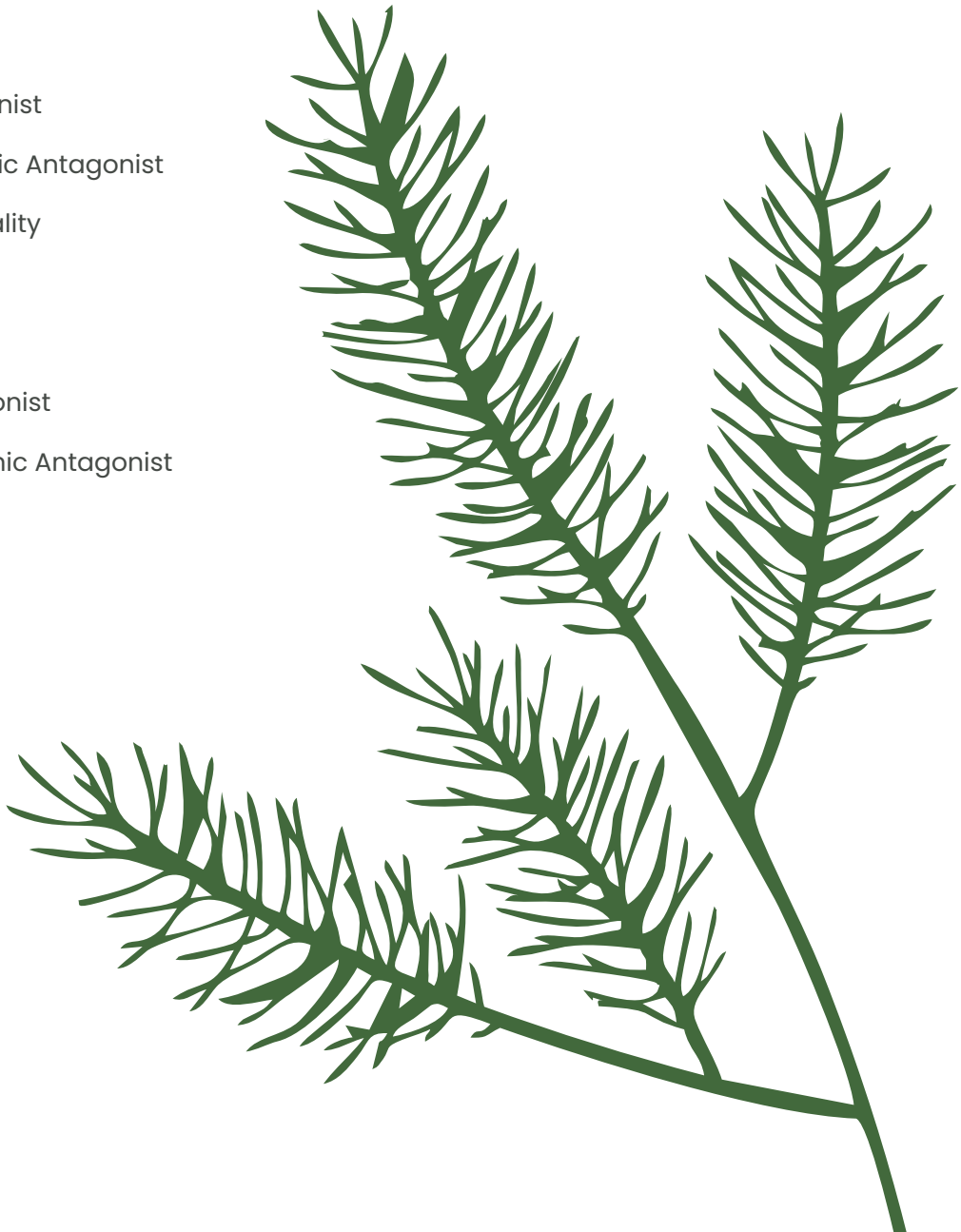
MDI: Metered-Dose Inhaler

PDSA: Plan-Do-Study-Act

SABA: Short-Acting Beta-Agonist

SAMA: Short-Acting Muscarinic Antagonist

SMI: Soft Mist Inhaler



APPENDIX 2: ESTIMATED CARBON EMISSIONS FROM COMMON INHALERS

This table was adapted from BCInhalers.ca and CASCADES Canada's Detailed Inhaler Comparison Chart.[10-14]

Low: under 7,000
Moderate: 7,000 - 10,000
High: 10,000 - 30,000
Very High: Over 30,000

CATEGORY	ACTIVE INGREDIENT	TYPE	BRAND NAME	DOSE (MCG)	CARBON FOOTPRINT PER INHALER (GCO_2E)[B]
SABA	Salbutamol	DPI	Ventolin Diskus	200	600
		MDI	Ventolin, APO-Salbutamol, or Sanis-Salbutamol	100	28,200
		MDI	Airomir or Teva-salbutamol	100	9,720
	Terbutaline	DPI	Bricanyl Turbuhaler	0.5 mg	492
SAMA	Ipratropium	MDI	Atrovent	20	14,600
SABA/ SAMA	Salbutamol + Ipratropium	SMI	Combivent Respimat	100/20	1,550
ICS	Budesonide	DPI	Pulmicort Turbuhaler	100	1,400
				200	2,800
				400	6,800
	Fluticasone	MDI	Flovent, PMS-Fluticasone, or APO-Fluticasone	50, 125, 250	18,960
		DPI	Flovent Diskus	100, 250, 500	840
		DPI	Aermony Respiclick	55, 113, 232	1,125
		DPI	Arnuity Ellipta	100, 200	750
	Ciclesonide	MDI	Alvesco HFA	100, 200	12,210
	Mometasone	DPI	Asmanex Twisthaler	100	563
				200, 400	1,125
	Beclomethasone	MDI	QVAR HFA	50, 100	20,350
LABA	Indacaterol	DPI	Onbrez Breezhaler	75	1,131
	Formoterol	DPI	Oxeze Turbhaler	6	370
				12	360
	Salmeterol	DPI	Serevent Diskus	50	720
LAMA	Glycopyrronium Bromide	DPI	Seebri Breezhaler	50	563
	Tiotropium Bromide	DPI	Spiriva Respimat	2.5	775
		SMI	Spiriva Handihaler	18	282
	Aclidinium Bromide	DPI	Tudorza Genuair	400	520
	Umeclidinium Bromide	DPI	Incruse Ellipta	62.5	720

LABA/ LAMA	Umeclidinium Bromide + Vilanterol Trifenatate	DPI	Anoro Ellipta	62.5/25	720
	Glycopyrronium Bromide + Indacaterol	DPI	Ultibro Breezhaler	50/110	563
	Aclidinium Bromide + Formoterol Fumarate	DPI	Duaklir Genuair	400/12	550
	Tiotropium + Olodaterol	SMI	Inspiolto Respimat	2.5/2.5	775
ICS/LABA	Fluticasone Propionate + Salmeterol	MDI	Advair	125/25, 250/25	19,440
		DPI	Advair Diskus or PMS-Fluticasone/ Salmeterol Diskus	100/50, 250/50, 500/50	900
		DPI	Wixela Inhub	100/50, 250/50, 500/50	1,125
	Fluticasone Furoate + Vilanterol	DPI	Breo Ellipta	100/25, 200/25	780
	Budesonide + Formoterol Fumurate	DPI	Symbicort Turbuhaler	100/6	580
				200/6	800
	Mometasone + Formoterol Fumurate	MDI	Zenhale	100/5, 200/5	34,800
	Mometasone + Indacterol	DPI	Atectura Breezhaler	80/150, 160/150, 320/150	390
ICS/LAMA/ LABA	Fluticasone Furoate + Umeclidinium + Vilanterol	DPI	Trelegy Ellipta	100/62.5/25, 200/62.5/25	780
	Budesonide + Glycopyrronium + Formoterol Fumarate	MDI	Breztri Aerosphere	182/8.2/5.8	13,500
	Mometasone + Glycopyrronium + Indacaterol	DPI	Enerzair Breezhaler	160/50/150	450

References

1. How to improve: Model for improvement [Internet]. [Place unknown]: Institute for Healthcare Improvement; [date unknown]. [Cited 2024 Jan 18]. Available from: https://www.ihi.org/resources/how-to-improve
2. Langley GJ, Moen RD, Nolan KM, Nolan TW, Norman CL, Provost LP. The improvement guide: A practical approach to enhancing organizational performance. 2nd ed. San Francisco: Jossey-Bass; 2009.
3. Lenzen, M, Malik A, L, M, Fr, J, Weisz H, Pichler P-P, Suveges Moereira Chaves L, Capon A, Pencheon D. The environmental footprint of health care: a global assessment. Lancet. Planet. Health [Internet]. 2020 Jul [cited 2023 Dec 28];4(7):E271-E279. Available from: https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30121-2/fulltext
4. BC health quality matrix [Internet]. Vancouver: Health Quality BC; 2020. [Cited 2023 Dec 28]. Available from: https://healthqualitybc.ca/bc-health-quality-matrix/
5. Engaging people in improving quality (EPIQ) teaching toolkit [Internet]. Vancouver: Health Quality BC; [date unknown]. [Cited 2024 Jan 4] Available from: https://healthqualitybc.ca/wp-content/uploads/TeachingToolkit-Full-revised.pdf
6. Green S, Bursque G, Chang B, Khan N, Miller FA, Wilson J, Wintemute K. Climate conscious inhaler prescribing in outpatient care [Internet]. [Place unknown]: CASCADES; [date unknown]. [Cited 2023 January 4]. Available from: https://cascadescanada.ca/resources/sustainable-inhaler-prescribing-in-primary-care-playbook/
7. Stoynova V, Culley C. Climate conscious inhaler practices in inpatient care [Internet]. [Place unknown]: CASCADES [cited 2023 January 4]. Available from https://cascadescanada.ca/resources/climate-conscious-inhaler-practices-in-inpatient-care-playbook/
8. Driver diagram [Internet]. [Place unknown]: Institute for Healthcare Improvement; [date unknown]. [Cited 2024 Jan 18]. Available from: https://www.ihi.org/resources/tools/driver-diagram
9. Eckelman MJ, Sherman JD, MacNeill AJ. Life cycle environmental emissions and health damages from the Canadian healthcare system: An economic-environmental-epidemiological analysis. PLoS Med [Internet]. 2018 Jul [cited 2024 Jan 8];15(7): e1002623. Available from: https://pubmed.ncbi.nlm.nih.gov/30063712/
10. BC inhalers [Internet]. Vancouver: Fraser Health Planetary Health Steering Committee; 2023 [cited 2023 December 21]. Available from: http://bcinhalers.ca
11. Stoynova V, Liang K, Chang B. Detailed inhaler comparison chart [Internet]. [Place unknown]: CASCADES; [date unknown]. [Cited 2023 December 22]. Available from: https://view.publitas.com/5231e51e-4654-42c2-accd-b722e21f3093/detailed-inhaler-comparison-chart-preview/page/1?_gl=1*od3l5p*_ga*Nzk0OTY2NjM4LjE3MDIwNzUxMTE.*_ga_TRM5NF4JFC*MTcwMzI4OTA5NC4xMS4xLjE3MDMyODkwOTguMC4wLjA.
12. Janson C, Henderson R, Löfdahl M, Hedberg M, Sharma R, Wilkinson AJ. Carbon footprint impact of the choice of inhaler for asthma and COPD. Thorax [Internet]. 2020 [cited 2024 Jan 8];75: 82-84. Available from: https://pubmed.ncbi.nlm.nih.gov/31699805/
13. Inhaler carbon footprint [Internet]. [Place unknown]: PrescQIPP. Bulletin 295: 2022 [cited 2023 December 22]. Available from: https://www.prescqipp.info/our-resources/bulletins/bulletin-295-inhaler-carbon-footprint/.
14. WIlkinson AJK, 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 [Internet]. 2019 Oct [cited 2023 Dec 22];9(10): e028763. Available from: https://pubmed.ncbi.nlm.nih.gov/31662306/

About Health Quality BC

We are health quality leaders in BC.

For the last 15 years, Health Quality BC (HQBC) has delivered the latest knowledge from home and abroad to champion and support high-quality care for every person in BC. This system-wide impact requires creativity, innovative thinking, and evidence-informed strategies to shift culture, improve clinical practice and accelerate health care partners' improvement efforts.

We are uniquely positioned to build strong partnerships with patients and communities, care providers, health leaders, policymakers, senior executives, academics and others. These connections enable us to nurture networks, recognize the needs of BC's health care system and build capacity where it is needed the most. We provide advice and make recommendations to the health system, including the Minister of Health, on matters related to quality of care across the province.

Our work is to build a foundation of quality, and our impact means better health care for British Columbians. If you want to improve BC's health care system, visit www.healthqualitybc.ca access programs and resources that can help you start today.

Our Partners in Low-Carbon, High-Quality Care

CASCADES

CASCADES empowers the implementation of sustainable health care practices and policies in Canada. We leverage and strengthen capacity across the health care community. CASCADES is an initiative of four founding partners: the University of Toronto Collaborative Centre for Climate, Health & Sustainable Care, the Healthy Populations Institute at Dalhousie University, the Planetary Healthcare Lab at the University of British Columbia, and the Canadian Coalition for Green Health Care. In Quebec, CASCADES is a partner in the Réseau d'action pour la santé durable du Québec.

We work with and learn from many other organizations and individuals across the country. We are funded by Environment and Climate Change Canada.

Vancouver Coastal Health

Embedding planetary health principles in all that we do.

Vancouver Coastal Health (VCH) is committed to embedding planetary health principles of environmental sustainability and climate resilience in all that we do, from changing business practices, to managing our facilities and the medical supplies we use, to moving to low-carbon care delivery. Bringing together stakeholders and teams from sustainable clinical services, Public Health, and energy and environmental sustainability, we are facing these challenges head on and are committed to delivering resilient and environmentally sustainable care for the health of people, places and planet.

LOW CARBON
HIGH QUALITY CARE

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