REPORT ON PROCEEDINGS:

Greenhouse Gas Emissions Estimates in Healthcare (Workshop of February 8, 2024): What we heard and opportunities for future work

CASCADES
Climate Action Healthcare + Action climatique soins de santé

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Canada

This report was developed by CASCADES in collaboration with the Canadian Medical Association.

Executive Summary

On February 8, 2024, CASCADES and the Canadian Medical Association hosted a virtual workshop on health system greenhouse gas (GHG) emissions estimation. The goals of this workshop were to increase understanding of GHG emissions estimation efforts underway in Canadian healthcare, to identify opportunities and challenges in progressing this work, to make links between GHG emissions estimation and broader sustainability work, and to identify ways to maximize impact.

Recent global commitments, like those made at COP26 as part of the Health Programme, have put focus on health system GHG emissions. Countries that signed on to the low carbon sustainable health system goal at COP 26, including Canada, committed to deliver a baseline assessment of health system GHG emissions including those from the supply chain. Estimating GHG emissions from a country's entire health system or at an organizational level can help to

- Increase awareness of healthcare's climate accountabilities,
- Identify opportunities for action,
- Track progress, and
- Support decarbonisation goals.

However, it is important to understand the strengths and limitations of GHG emissions estimates. These efforts should fit into overall sustainability goals and the data provided should be actionable. Other sustainability efforts can, and should, be pursued in parallel.

Work to understand health system GHG emissions is progressing, with regular reporting of national health system GHG emissions (1) and some countries creating decarbonization plans for their health care systems. In Canada, GHG emissions tracking, estimating, and reporting at an organizational level has been focused on energy-related emissions. However, more organizations are undertaking GHG emissions estimations that include emissions from more sources.

This workshop included presentations on methodological approaches to GHG emissions estimation, examples of current and planned GHG emissions estimation work in Canada, and discussions of ways to advance this work to support standardization and comparability across jurisdictions. Opportunities and challenges are presented at the end of this report, along with suggestions for action or investment.

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Introduction

On February 8, 2024, CASCADES and the Canadian Medical Association hosted a virtual workshop on health system greenhouse gas (GHG) emissions. The goals were to:

- Explore current or planned work underway on GHG emissions estimation
- Surface challenges or gaps in information and opportunities for enhancing consistency, standardization and coordinated progress
- Identify future initiatives for alignment and establish linkages to broader work
- Build momentum for continued progress and opportunities to identify shared goals, engage, broaden perspectives and maximize impact

A list of attendees is included in Appendix A.

Previous work in this area

In 2022, CASCADES gathered information on the current state of GHG emissions estimation in Canadian health care organizations through compiling publicly available information, consultation with experts responsible for estimating GHG emissions in health care facilities (ranging from single hospitals to multiple facilities owned and operated by health authorities and integrated health and social service centres) and informed by discussions and deliberations held throughout a series of workshops with expert participants. This work resulted in the creation of:

- Greenhouse Gas Emissions Estimation in Canadian Healthcare Playbook to support health care organizations with key considerations for starting, continuing, or expanding GHG emissions' estimation.
- Greenhouse Gas Emissions Estimation in Canadian Healthcare Systems: Report providing an overview of how GHG emissions are estimated in healthcare and the current state of GHG estimation in healthcare organizations in Canada.
- The creation of the Greenhouse Gas Emissions Estimation in Canadian Healthcare Organizations Community of Practice, supported by CASCADES and the Canadian Coalition for Green Health Care to support learning and sharing of best practices.

The Canadian Medical Association includes addressing climate change as a challenge to the health system and a key driver of population health as one of their strategic goals in their Impact 2040 strategy (2). The CMA has also included net-zero targets in their Environmentally Sustainable Health Systems in Canada policy document, calling on governments to commit to measuring the carbon footprint of Canada's health systems, developing metrics to establish baseline measures, providing targeted actions to reduce emissions and modelling the health care system's pathway in all national sectoral pathways to net zero (3).

Understanding Healthcare GHG Emissions

Why estimate emissions?

Healthcare is a significant contributor to climate change. An estimated 4.6% of global greenhouse gas emissions are attributable to healthcare systems (1). In Canada, healthcare accounts for 4.6% of national GHG emissions (4), with some of the highest per capita health care emissions in the world (1). Estimating the GHG emissions of a country's health system or at an organizational level (e.g. hospital, integrated health and social care system, health authority) can help to:

- Increase awareness of healthcare's climate accountabilities
- Identify opportunities for action
- Track progress
- Support decarbonisation goals

Estimates of GHG emissions for some healthcare activities are very robust and can readily guide action, as is the case for most directly controlled and energy-related emissions (i.e., scopes 1 and 2). Evidence related to the GHG emissions associated with many other types of healthcare activities (e.g., healthcare services, procedures and products) is available to a more variable degree. And while the evidence base regarding the environmental impacts of such activities is growing (see HealthcareLCA produced in collaboration with CASCADES), limitations in these data remain (5). Importantly, there are ways to generate high level estimates of emissions using financial data, and action can often be taken even when it is difficult to estimate the GHG emissions associated with specific activities.[1]

While the global warming potential of GHG emissions are a major contributor to the climate crisis, there are other environmental impact categories that are important to monitor (6). Reducing GHG emissions does not necessarily reduce other environmental impacts; considering multiple impact categories can help to reduce negative trade-offs (5).

The Greenhouse Gas Protocol

The Greenhouse Gas Protocol (GHGP) is a commonly used standard for categorizing, reporting, and estimating organizational GHG emissions.

The GHGP categorizes emissions into three scopes:

Scope 1: Direct, onsite GHG emissions from sources that are owned or controlled by the organization.

Scope 2: Indirect emissions occurring from the generation of energy purchased and consumed by the organization.

Scope 3: Emissions that are unaccounted for in scopes 1 and 2 and are the consequence of the organization's activities but are from sources not owned or controlled by that organization. These emissions arise from the value chain.

For more information see the GHGP Corporate Standard (scopes 1 and 2) and the Corporate Value Chain (Scope 3) Standard

[1] For more information on the strengths and weaknesses of GHG emissions performance monitoring, see the Greenhouse Gas Emissions Estimation in Canadian Healthcare playbook developed by CASCADES.

Efforts to understand health system emissions

Given global commitments and increased attention to health system emissions, efforts to estimate these emissions have been growing. In 2021, at COP 26, the Health Programme was introduced to seek country commitments to develop both climate resilient (commitment 1) and sustainable low carbon health systems (commitment 2) (7). As part of commitment 2, high ambition or high emitting countries were asked to commit to setting a target date by which net zero health system emissions would be achieved (8). Canada committed to developing climate resilient and sustainable low carbon health systems, but has not identified a net zero target date for health system emissions(9). Countries that signed on to the "low carbon sustainable health system" goal, including Canada, were to conduct baseline assessments of their health system GHG emissions, including from supply chains (7).

The Health Programme has transitioned into the Alliance for Transformative Action on Climate and Health (ATACH), supported by the World Health Organization as secretariat. Five ATACH working groups have been formed to support countries in implementing their commitments.(9). To that end, the Action Plan for the Low Carbon Sustainable Health System Working Group includes the identification and agreement of indicators to measure progress toward low carbon sustainability in health systems (10).

GHG Emissions Estimation – International Work

The English National Health Service (NHS) has been tracking and reporting GHG emissions since 2008 (20). Since 2019, the Greener NHS programme has created centralized capacity to do this estimation work and, in 2020, committed to deliver a net zero health service (20). In 2022, the Health and Care Act was revised to embed net-zero into legislation (20).

In 2023, Australia released the National Health and Climate Strategy which, among other goals, will help develop a plan to decarbonize the Australian health system and will see regular reporting of health system GHG emissions (21).

For more examples, see the Greenhouse Gas Emissions Estimation in Canadian Healthcare Playbook and Report and Hough et al (22).

Workshop overview

There has been growing interest in estimating health system GHG emissions in Canada. Regular and routine GHG emissions estimation by healthcare organizations has been focused on energy-related emissions and has been facilities-based, not usually tracking scope 3 emissions(11). However, more organizations have been working to expand estimation activities to include emissions from more sources, including scope 3[2]. In addition, the GHG emissions of the entire Canadian healthcare system have been estimated using financial data (4). This workshop was designed to share current or planned work to estimate health system GHG emissions and discuss opportunities for coordinated efforts.

Presentations focused on different methods for estimating GHG emissions and current work underway to estimate emissions at a provincial/territorial, health authority and organizational level.

Understanding national health system emissions

Dr. Matthew Eckelman, Associate Professor at Northeastern University, gave a presentation on *Mapping Canada's Healthcare Carbon Footprint*. This presentation provided an overview of top-down and bottom-up modelling and how these approaches can be used to estimate GHG emissions in the healthcare system.

Bottom-up studies evaluate specific products or processes using a footprinting or life cycle assessment approach. These models are much more detailed and specific because they can map individual material and energy inputs for a specific product and location. Bottom-up studies can be used to compare products or make changes to product designs, services, or care pathways that will improve environmental performance.

Top-down models allow for GHG emissions estimation of national health systems, which are too large and complex for analyses solely focused on individual products, hospitals, procedures, and so on. These models, use input-output tables that demonstrate how money moves through the economy, recognizing the interconnected nature of supply chains. CIRAIG has created a Canadian environmentally extended input-output model called Open IO. In top-down modelling, the amount of money spent in different spend categories can be used to estimate emissions by mapping these onto different economic sectors and using emissions factors for those sectors. A top-down study of the Canadian health care system's GHG emissions was published in 2018 (see Eckelman, Sherman, MacNeill (2018) in reference list).

[2] Efforts by various Canadian healthcare organizations to estimate their GHG emissions across scopes 1,2 and 3 are described in the Greenhouse Gas Emissions Estimation in Canadian Healthcare Systems Report produced by CASCADES.

The same top-down input-output models that are used to estimate GHG emissions can also be used to estimate other emissions of concern that also have implications for health, like particulate matter and carcinogens emitted to the air. These environmental impacts were included in Eckelman et al. giving a quantification of health damages (measured in disability life adjusted years lost) related to Canadian health system annual expenditures.

Top-down models can also be used to compare emissions across countries' health systems. This comparison is done annually as one of the indicators in the Lancet Countdown on Climate Change and Health report (1) (see indicator 3.4). Tracking these metrics allows for tracking toward national decarbonisation goals.

Both top-down and bottom-up modelling are useful and provide complementary information. The most comprehensive estimates of GHG emissions require a hybrid approach, using both top-down and bottom-up models. For more information on top-down, bottom-up and hybrid modelling and the Greenhouse Gas Protocol as it relates to healthcare, see the Greenhouse Gas Emissions Estimation in Canadian Healthcare Playbook.

Work in Canada

Alberta Health Services Carbon Footprint Evaluation

Tareq Saleh, Measurement & Verification Specialist, Office of Sustainability and Energy Management, Alberta Health Services (AHS), presented work to expand the types of emissions that are tracked and estimated at AHS. AHS has been tracking and reporting emissions since 2018. Scope 1 and 2 emissions are tracked, using activity data, for facilities that are owned and operated by AHS and for which they receive energy bills. Scope 1 emissions are also tracked and estimated for owned vehicles and anesthetic gases. Some scope 3 emissions are also tracked and estimated using activity data including waste, wastewater, business travel and paper.

GHG emissions from additional purchased goods and services (scope 3) are estimated using a spend-based approach. Supply chain expense data are from AHS financial services. These expenses are categorized by cost code, which is mapped onto an economic sector and the associated emissions intensity factor is applied. Emissions that are estimated with activity data are removed to avoid double-counting. The input-output model used is the same as the one that is used by NHS England, based on the UK economy. This effort has confirmed that, of the emissions categories that are being estimated, most emissions are attributable to scope 3.

It is important to note that GHG emissions estimated with the spend-based approach are best understood as an estimate of the true emissions of a product or process. Despite its approximate nature, this approach is useful in identifying emissions "hot spots" to focus attention on the categories and supplies that have the highest estimated emissions.

GHG emissions estimation in British Columbia health authorities

Sonja Janousek, Regional Environmental Sustainability Manager, Vancouver Coastal Health presented on work done in BC health authorities to estimate GHG emissions to meet provincial legislation. Coordinated efforts to expand the types of emissions being tracked and reported were also discussed. In British Columbia, the Climate Change Accountability Act requires all public and broader public sector organizations, including health authorities, to report on GHG emissions in Climate Change Accountability Reports (12). The GHG emissions that public sector organizations must report are from stationary fuel combustion, purchased energy, fleet vehicles and paper as well as the offsets used to reach net-zero emissions (13).

This work has paved the way for other GHG emissions estimates to be done in areas not currently required by legislation. This includes anesthetic gases, staff commuting, and patient travel reductions during Covid-19 travel restrictions. Currently, representatives from across the seven health authorities are working together to discuss standardized approaches to GHG emissions estimation so that comparisons can happen between health authorities and with other jurisdictions. In addition, health authorities are making new commitments to climate action and planetary health and sustainability that expand emissions reduction and reporting. For example, two health authorities released sustainability plans or roadmaps in 2023. Interior Health's Climate Change and Sustainability Roadmap 2023-2028 includes a goal to work with suppliers and other partners to implement a scope 3 monitoring and reduction plan (see goal CC1.2). Fraser Health's Planetary Health Strategy includes a goal to assess and reduce emissions and includes an intent to estimate emissions beyond currently reported categories of emissions (see goal 1.1). More health authority commitments are forthcoming.

Developing pathways to decarbonize the Quebec health care sector

Audrey Yank, Consultant at Dunsky, provided an overview of the report *Décarbonation du secteur de la santé* (available in French only) that they produced, commissioned by the ASPQ and supported by the Trottier Family Foundation. The province of Quebec has targets for public buildings and fleet vehicles to be net zero by 2040. Healthcare buildings represent 51% of public building GHG emissions, but only 25% of the surface area demonstrating a high carbon intensity compared to other public sectors. When considering emissions from scopes 1, 2, and 3 the provincial healthcare sector represents approximately 3.6% of Québec's GHG emissions. This study focused on reducing emissions from buildings and vehicles. The roadmap identified actions related to scope 1 emissions for healthcare facilities and fleet vehicles and the associated GHG emissions reductions and the required financial investment (from additional funds, not existing healthcare budgets).

Following this workshop, a roadmap for the decarbonization of health systems in other provinces and territories was released in April 2024(14), with suggestions for interventions and investments. The goal is reaching net zero GHG emissions for healthcare facilities and fleet vehicles by 2050.

Projet Décarbonation : Accompagner des établissements de santé et de services sociaux dans la décarbonation de leurs activités

Jerome Ribesse, Executive Director of Synergie Santé Environment (SSE), presented on work SSE is leading to conduct scope 3 GHG emissions estimates in selected healthcare facilities in Montreal and surrounding areas. This work is using a specialized online tool to conduct these emissions audits. This project will allow the healthcare institutions to conduct GHG estimates and manage decarbonization plans autonomously. The project will build a methodology that is adapted to the Quebec health care sector and that can support consistency in future estimation efforts. Data will come from multiple sources, including activity data, spend data and other sources like surveys. Organizations will determine their absolute emissions as well as sources of emissions. Suggested emissions reductions actions will also be provided and along with decarbonization plans.
More information is available here.

Next steps: Opportunities, challenges and future action and investment

Opportunities

Following the presentations and discussions, the following opportunities were identified.

Conduct an updated top-down estimate of Canada's health system GHG emissions

There is interest in seeing an updated study of Canada's health system GHG emissions and observing differences between the 2018 study (4) and current GHG emissions estimates. Additionally, there is interest in getting GHG estimates at the provincial/territorial level. The elements required to do this work exist:

- Financial data is collected annually by CIHI in a standardized way. Both the Canadian Management Information System Database (CMDB) and the National Health Expenditure data contain information on health system spending.
- CIRAIG has updated OpenIO Canada, which is a multi-regional input-output open-source database. Open IO Canada is specific to the Canadian economy. Because it is a multi-regional model, each province and territory can be modelled separately.

Opportunities for action and investment: Provide resources to conduct an updated top-down study of Canada's health system emissions.

CIHI has relevant data holdings and expertise in standardized data collection

The Canadian Institute for Health Information (CIHI) collects comparable, pan-Canadian data on different aspects of the health system including system-wide health expenditures and financial and statistical information on the day-to-day operations of public hospitals, other health facilities and regional health authorities across Canada (15). The Canadian Management Information System (MIS) Database (CMDB) contains financial and statistical information for publicly funded health care organizations. Data are collected across jurisdictions using the MIS Standards. Spend information for financial accounts are collected across many data points of interest for GHG emissions estimation like medical and surgical supplies and drugs and anesthetic/medical gases. Statistical accounts in the CMDB with relevance to estimating GHG emissions include counts of fuel oil consumed, natural gas consumed, kilograms of biohazardous waste disposed of and/or received from other facilities (16). The existence of a standardized approach to expenditure data collection can help standardize spend-based modelling and statistical data collection can provide samples of usage volumes.

The next iteration of the MIS Standards will be released in Fall 2024 and CIHI is currently creating guidance for organizations that would like to track, report and monitor GHG emissions, and other environmental impacts, using data points that are already collected.

Opportunities for action and investment: CIHI has experience and expertise in the development of data standards and supporting the uptake of those standards. Investments could be made to support CIHI in convening the necessary partners to identify data gaps and determine what data exists to support the standardization of GHG emissions tracking and reporting.

New standards on sustainability reporting

The Independent Review Committee on Standard Setting in Canada issued recommendations on sustainability reporting and assurance in 2023. This included a recommendation to create a Canadian Sustainability Standards Board (CSSB). The CSSB was established in 2023; the Independent Review Committee' s report included a recommendation that the sustainability standards have universal application to all categories of Canadian reporting entities including public sector entities (17). The CSSB is currently seeking feedback on the Canadian Sustainability Disclosure Standard (CSDS) 1: General Requirements for Disclosure of Sustainability-related Financial Information and CSDS 2: Climate-related Disclosures (18). The decision to require compliance with the standards will be determined by Canadian regulators and legislators.

Other standards and accreditation bodies (e.g. Health Standards Organization and Accreditation Canada) can play a role as well.

Look for decarbonization opportunities in facilities and care pathways

As the largest single source of GHG emissions (1), energy system decarbonization represents a significant opportunity to decarbonize the healthcare sector. To this end, the Lancet Countdown includes an indicator on energy use, energy generation and health (see indicator 3.1.). In Canada, the recommendations in the report on health care decarbonization in Quebec (19) reflect this opportunity. However, looking beyond facilities-based solutions to include innovations in clinical pathways will be necessary if health systems are to become sustainable, low carbon, and climate resilient. This includes reducing demand for health services by addressing the social determinants of health and ensuring adequate access to primary care, community care and public health services, matching the supply of health services to demand and reducing emissions from the delivery of healthcare (20). Additionally, resilience and adaptation efforts should be considered at the same time as mitigation efforts.

Opportunities for action and investment: Create research funding opportunities on low-carbon, high-quality, climate resilient care.

Challenges

Participants were asked about challenges in conducting comprehensive GHG estimates, including estimating emissions from the supply chain. These are listed below.

Absence of reporting standards for suppliers

There is limited information on GHG emissions from suppliers, making it difficult to estimate emissions from products and services. Regulation and cooperation will be needed to ensure access to transparent and accurate data, with which to enhance the ability to accurately quantify GHG emissions.

Opportunities for action or investment:

- Look to other countries that have developed supplier roadmaps, such as NHS England (21).
- Create research funding opportunities to address needs for data transparency and accuracy.

Data quality and availability

There are challenges in collecting robust data to estimate emissions, especially for those emissions in scope 3. Provincial mandates and targets can be levers to support access to necessary data, recognizing that much access is possible without new data.

Opportunities for action or investment:

- Automate data collection processes – some of the resourcing challenges in expanded GHG emission estimation are related to the time-consuming nature of manually collecting required data.

- Consider the best tools for estimating emissions, including scope 3. The most relevant tools would be based on Canadian economic models. International tools are not very disaggregated, so there are limitations to how those tools can be used and results interpreted.
- Invest in data access in proportion to potential for impact and ability to influence actions.

Human resources/ organizational capacity/expertise

GHG emissions' estimation requires expertise, time, and robust data systems. GHG emissions estimates are not the final goal, rather the data they provide should be actionable and lead to improvements in mitigation, adaptation, and resiliency efforts. These efforts should fit into overall sustainability goals.

Opportunities for action or investment:

- Support provincial/territorial health systems to build capacity for this work, paying attention to financial and human resource requirements. Training opportunities, such as the CASCADES course Metrics for Change: Towards Sustainable Health Systems and others, can be leveraged.
- Learn from organizations that have already started to estimate their emissions from across scopes 1, 2 and 3, recognizing that unique work may not be required by each organization or in each setting. There is also opportunity to collaborate to find consistent approaches to do this work. This can be supported by existing structures and data resources.
- Support opportunities to bring people together to learn and share best practices. One opportunity is the CASCADES/Canadian Coalition for Green Health Care Community of Practice.

Lack of standards for how to do GHG estimation work that would allow for comparability, benchmarking and consistency

No standard approach to estimating GHG emissions in healthcare exists and reporting requirements across jurisdictions are not consistent. In the absence of these standards, there will continue to be variation in the emissions that get tracked and reported and variation in the methods which are employed. This makes benchmarking and comparison between organizations or provinces difficult.

Opportunities for action or investment:

- Support efforts to increase methodological consistency. The use of data sources collected through a standard (such as those held by CIHI) and leveraging standards and accreditation bodies could also assist these efforts.
    - Note: Place-based differences must be accounted for
- Create research funding opportunities to improve measurement and performance monitoring capacity.

Conclusion

To meet commitments made at COP 26 - and to support the transition to high-quality, low-carbon, climate resilient, sustainable health systems - a robust assessment of GHG emissions across scopes 1, 2, and 3 of the GHG Protocol will be required. Efforts to do so should build on the work already underway and the expertise present across Canada. These efforts should fit into overall sustainability goals, with other sustainability efforts pursued in parallel.

Federally, the government can promote collaboration across departments and portfolios to take integrated, comprehensive action on climate change and its impact on health and health systems. In addition, provincial and territorial health systems can be supported to build capacity to conduct this estimation work.

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Appendix A - Workshop attendees

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