

# Building a climate resilient health system: Toward net-zero in Canada



The time to curb climate change is running out. But we're not there yet. The healthcare system can establish itself as a leader in climate action. In fact, health organizations have made remarkable efforts to mitigate their carbon footprints. If governments are serious about fighting climate change then actions must include the healthcare sector.

## 2023: A SUMMER TO REMEMBER

---

This year has been another unprecedented year of record-breaking temperatures, severe storms, floods, wildfires, droughts, and heat waves. Globally, September 2023 was the [warmest September on record](#), being the fourth consecutive month to break global ambient temperature records. Canadians are weather-hardy people and no strangers to unusual weather, but these events are happening more frequently, are more intense, and are lasting longer.

This past summer alone, Nova Scotia experienced extreme flooding that resulted in the deaths of four people, and the [largest recorded wildfires in the province's history](#) caused the loss and damage of more than 200 structures. Forest fires in Quebec produced off-the-charts air quality warnings and eerie dark orange skies blanketing Quebec, Southern Ontario, and the Eastern United States. The entire city of Yellowknife was evacuated because of wildfires in the Northwest Territories; and it was not the only one: dozens of towns, cities, and First Nations communities were evacuated or under evacuation orders because of out-of-control wildfires in B.C., N.W.T., Alberta, Saskatchewan, Manitoba, Quebec, and Nova Scotia. The primary culprit of this climate turmoil is an increase in greenhouse gases (GHGs) caused by humans in the earth's atmosphere that has created unpredictable and severe weather, increases in global temperatures, and irreversible biodiversity loss.<sup>1</sup>

## A RISK TO HUMAN HEALTH

---

It is another stark reminder that as global temperatures rise, the risks to human health escalate and threaten populations by exacerbating socioeconomic inequities. Worsening air pollution from wildfires increases the frequency of asthma attacks and other respiratory diseases.<sup>2</sup> The loss of a person's home and displacement from their community is associated with post-traumatic stress disorder, depression, and anxiety. Further, high temperatures and heat waves can increase morbidity and mortality rates among a population's most vulnerable, as was the case during the heat dome in B.C. in 2021 where 619 people died due to the sweltering heat.<sup>3</sup>

## CLIMATE SOLUTIONS ARE HEALTH SOLUTIONS<sup>4</sup>

---

The 2022 *Lancet* Countdown declared that health is at “the mercy of fossil fuels,”<sup>5</sup> but a year later, the [2023 Lancet Countdown](#) provided more hope by calling for a health-centred response to tackle climate change. As the title of this section suggests, if climate change can endanger our well-being, action to reduce carbon emissions can yield immediate positive benefits for our health and likely avoid the most catastrophic climate change impacts.

A report published by the Canadian Climate Institute in 2021 offers an example: “Canada’s path to net zero greenhouse gas emissions could have an added benefit: cleaner, healthier air.”<sup>6</sup> The harmful effects from air pollution are associated with 6.7 million premature deaths annually, with a majority of deaths occurring in low-and-middle-income countries.<sup>7</sup> In comparison, the World Health Organization (WHO) has recorded a total of [nearly 7 million deaths from COVID-19](#) since January 2020. Health Canada estimates that air pollution contributes to more than 15,000 deaths per year in Canada.<sup>8</sup> The total economic cost in Canada of all health impacts attributable to air pollution was calculated to be \$120 billion (2016), or equivalent to six per cent of Canada’s GDP in 2016.<sup>9</sup> Climate solutions to reduce air pollution will save lives and money.

## COMMITTING TO A NET-ZERO HEALTHCARE SYSTEM

---

The Intergovernmental Panel on Climate Change (IPCC) has made it abundantly clear that global temperatures need to be limited to 1.5 to 2°C above pre-industrial levels to limit the dangerous and cascading effects of human-generated climate change.<sup>10</sup> To achieve this, GHG emissions, and in particular, carbon dioxide emissions must come down. Ultimately, the goal is net zero emissions, meaning the amount of GHGs produced are counterbalanced by an equal amount of GHGs eliminated from the atmosphere.<sup>11</sup> This is done by a reduction in emissions (e.g., transitioning from fossil fuels to renewable energy sources) or removal from the atmosphere (e.g., tree planting). Canada and 120 other countries have [committed to net zero emissions](#) by 2050.

**The health sector is responsible for 4.6% of global GHG emissions** and in Canada, it accounts for about the same amount.<sup>12</sup> Because of this, in 2021, at COP26, at the time, [Canada along with 50 \(now more than 70\) other nations](#), committed to deliver a low carbon health system. Canada, however, did not identify a net zero target for its system. That said, the health sector has an important responsibility and opportunity to reduce its carbon footprint and minimize widespread harms to human health.

To fulfill net-zero emissions by 2050 or before, leading health systems can be “Proactive by undertaking meaningful decarbonization action.”<sup>13</sup> The transition to a low carbon healthcare system is feasible and essential.

To start down the path to net-zero, health organizations should set carbon reduction goals it would like to achieve. In developing effective goals, they should follow the SMART criteria: specific, measurable, attainable, realistic, and timely. Canadian healthcare organizations can draw inspiration from the carbon reduction goals of Britain’s National Health Service (NHS). The NHS has emerged as the global leader in delivering a net-zero healthcare system among higher income nations committed to decarbonizing their

healthcare systems. The NHS has been tracking and reporting on its carbon footprint since 2008 but has ramped up its efforts after the release of [Delivering a 'Net Zero' National Health Service](#) in 2020.

The NHS has set two clear and ambitious targets for the net zero commitment under two themes:

1. **The NHS Carbon Footprint:** To reach net zero by 2040, with an ambition to reach an 80% reduction by 2028 to 2032 for emissions under direct control of the NHS;
2. **The NHS Carbon Footprint Plus:** To reach net zero by 2045, with an ambition to reach an 80% reduction by 2036 to 2039, for the emissions the NHS can influence.

Working toward net-zero comes with many promising potential health co-benefits. Although difficult to quantify long-term outcomes of the NHS net-zero plan, early projections show an estimated 5,770 lives will be saved per year by 2040 in the United Kingdom due to reductions in air pollution.<sup>14</sup>

## IDENTIFYING ACTIONS TO REDUCE CARBON EMISSIONS IN HEALTHCARE

---

Putting healthcare organizations on a course to achieve net-zero means implementing low carbon solutions to drive emissions reductions.

Health systems are large, complex and energy intensive. The NHS has grouped carbon emissions stemming from health systems under three scopes ([click to view the infographic](#)):

- Direct emissions from owned or directly controlled sources,
- Indirect emissions from generation of purchased energy, and
- All other indirect emissions that occur in manufacturing and transporting goods and services, and patient travel.

The National Academy of Medicine (NAM) has established a pathway to reduce GHGs in hospitals and healthcare systems in the United States. The U.S. health sector is responsible for approximately 8.5% of carbon emissions in the U.S. and is among the most, if not *the* most, carbon polluting health system in the world.<sup>15</sup> As a result, the NAM Collaborative on Decarbonizing the U.S. Health Sector developed actions with the greatest potential to successfully deliver a low carbon system. More information is available on the NAM [website](#).

Not exhaustive by any means, the National Academy of Medicine and others have identified the following areas where hospitals and health organization may focus their efforts to reduce carbon emissions:<sup>15,16</sup>

- Building emissions
- Anesthetic gases and pressurized metered dose inhalers
- Physical waste and single-use plastics
- Food services
- Transportation and travel
- Procurement and supply chains

There is a wide range of interventions to “green” a health organization’s operations, ranging from easy-to-implement initiatives to much more extensive and expensive building retrofits.

HealthCareCAN members are eligible to apply to Environment and Climate Change Canada’s Low Carbon Economy Challenge.

The fund will invest up to \$170 million into projects that reduce GHG emissions and generate clean growth.

**You can find the application guide and more information on the [Low Carbon Economy Challenge webpage](#).**

Anesthetic gas like desflurane and nitrous oxide have high GHG footprints. Desflurane is estimated to be 2450 times more potent as a GHG than carbon dioxide.<sup>17</sup> Eliminating the use of desflurane is one of the most impactful interventions to lower carbon emissions in hospitals. Health Sciences North in Sudbury, Ontario, became the first hospital in Canada to eliminate desflurane from its formulary entirely.<sup>18</sup> Dozens of hospitals across Canada have also removed desflurane from their operating rooms and have switched to less carbon-intensive anesthetic gases like sevoflurane. According to HealthPRO Canada, Newfoundland and Labrador have decreased usage of desflurane gas by 39%, Ontario by 27%, B.C. by 23%, and the Northwest Territories have eliminated its use entirely.<sup>19</sup>

Pharmaceuticals account for an estimated 25% of the health sector's GHG emissions in Canada.<sup>20</sup> Therefore, adopting sustainable prescribing strategies such as deprescribing and switching to low carbon alternatives are effective. Organizations like [CASCADES<sup>i</sup> \(Creating a Sustainable Canadian Health System in a Climate Crisis\)](#) support the health sector's transition toward low carbon, climate resilient care and have published step-by-step guides in many health-related climate action areas, including a [step-by-step guide to climate resilient, low carbon prescribing](#).

The supply chain is another key contributor to GHG emissions within the health system. It accounts for more than 60% of the emissions generated.<sup>21</sup> The NHS counts 80,000 suppliers from which it procures products!<sup>22</sup> The potential for GHG reductions is substantial and even though health systems do not generally have direct control of the emissions from manufacturing and production processes, health systems and health organizations can use its considerable purchasing power to influence change. The NHS describes three ways it plans to decarbonize its supply chain: more efficient use of supplies; low carbon substitutions and product innovation, and ensuring suppliers are also committed to reduce their carbon footprint.<sup>23</sup> With the considerable GHG emissions from the healthcare supply chain, it is important to involve all supply chain and procurement partners. For example, [HealthPRO Canada has recognized the need to implement better sustainability practices](#) and has committed to a more sustainable healthcare supply chain in Canada.

Healthcare organizations also produce a lot of waste, which has a huge environmental impact. The worst offenders are the single-use items. For instance, 564 boxes of 100 gloves emit around 2 tonnes of CO<sub>2</sub> equivalent, equivalent to a round-trip flight from Paris to Montreal.<sup>24</sup> There are initiatives in Canada and around the world to reduce health systems' reliance on disposables and divert waste from landfills. For example, healthcare organizations have developed campaigns in their respective institutions to reduce glove misuse, promote good hand hygiene and decrease PPE waste burden. This fall, Quebec<sup>ii</sup> launched "[Les gants, pas tout le temps](#)". Island Health launched "[Gloves Off!](#)" in the spring, and similar campaigns are underway at Vancouver Coastal Health and Fraser Health. The Great Ormond Hospital for Children in London, England, began their "[gloves off](#)" campaign in 2018 and have seen a reduction in glove use, financial savings, a decrease in skin infections among staff, and improved hand hygiene compliance. To learn more about these initiatives, please check out the webinar, [Look Ma, No Gloves!: Safely addressing unnecessary glove use](#), moderated by CASCADES and the Canadian Coalition for Green Health Care. The WHO also has a useful [information leaflet on appropriate glove use](#).

The Partnership for Environmental Action by Clinicians and Communities for Healthcare Facilities or 'PEACH' put together a list of 19 climate interventions for healthcare organizations that they have calculated to have the most impact on GHG reduction and which are the least costly to implement. You can find the list [here](#).

---

<sup>i</sup> HealthCareCAN is a member of the CASCADES Advisory Committee

<sup>ii</sup> In partnership with Réseau d'Action pour la Santé Durable du Québec (RASDQ), the Association québécoise des médecins pour l'environnement (AQME), Synergie Santé Environnement (SSE) and CASCADES, and with the support of the Association des médecins d'urgence du Québec (AMUQ), Médecins Francophones du Canada, and Choisir avec soin Québec.

## HEALTH SYSTEM TRANSFORMATION AND A NET-ZERO HEALTHCARE SYSTEM

---

Meeting the challenges of a fractured healthcare system in Canada requires broad transformative steps and the same can be said of achieving net-zero in healthcare. There are synergies between the two to be realized.

Improving access to primary care has been identified as a critical component to transforming the healthcare system in Canada, but it turns out there is even a bonus to investing in better primary care – reducing carbon emissions! The NHS has embedded a new service delivery model within its efforts to reduce carbon emissions and deliver sustainable healthcare services. A major focus is to shift care away from the hospital and improve access to primary and community care, foster a greater emphasis on prevention, and optimize telemedicine and virtual care. There are carbon savings and health co-benefits (less air pollution) to be sought by reducing unnecessary trips and travelling shorter distances to and from health facilities.

COVID-19 was the [catalyst that underscored the need for system changes](#) to create a resilient, sustainable, and equitable healthcare system capable of withstanding shocks and stressors. Climate change is one more chronic stressor adding further strain to a healthcare system stretched beyond its capacity. Making commitments to achieve a net-zero healthcare sector by 2050 also means simultaneously developing a sustainable and climate-resilient system capable of continuing to deliver care in the face of the unpredictable environment Canadians experience now or in 2050.

Climate adaptation in the health sector is a very important topic on its own and it is further explored in [Building a climate-resilient healthcare system: the importance of adaptation and health infrastructure](#).

Ultimately, as recommended in [The Chief Public Health Officer of Canada's Report on the State of Public Health in Canada 2022](#), to sustain progress toward net-zero across Canada, predictable and dedicated funding is required to adequately support climate-health action.

## CHALLENGES FACING THE PATH TO A LOW CARBON HEALTHCARE SYSTEM

---

Delivering a net-zero health system is complicated and in the current political environment, it can be very difficult to mobilize policymakers to act on a polarized issue such as climate change, even when lives and livelihoods are being harmed. Multiple internal and external variables will impede progress to a low carbon healthcare system, including low encouragement from leadership, health workforce capacity, supply chain challenges, infrastructure, financing and cost, jurisdictional responsibility, public support, and political will. Decarbonization must also never imperil patient and provider safety and quality of care.

Notwithstanding, countless publications, scientists, climate and health experts, and many others have repeatedly expressed that transitioning away from fossil fuels can simultaneously prevent millions of deaths and create a healthier planet for everyone.

## MOVING FORWARD

---

The healthcare sector can establish itself as a leader in climate action. This brief makes a significant case that climate action must include the health sector. HealthCareCAN will support its members and help them secure government investment as they seek to mitigate their carbon emissions, whether health organization are at the beginning of their decarbonization journey or are well-on their way. HealthCareCAN will continue to advocate on behalf of its members and impart to parliamentarians how crucial health organizations are to the fight against climate change.

## FOR MORE INFORMATION

---

HealthCareCAN remains attentive to our members – if your organization has any questions, concerns or feedback in connection with these developments we encourage you to contact us.

Emily Follwell  
Policy and Research Analyst  
[efollwell@healthcarecan.ca](mailto:efollwell@healthcarecan.ca)

Jonathan Mitchell  
Vice-President, Research and Policy  
[jmitchell@healthcarecan.ca](mailto:jmitchell@healthcarecan.ca)

## ENDNOTES

---

1. Kamran Abbasi, Parveen Ali, Virginia Barbour, Thomas Benfield, et al. Time to treat the climate and nature crisis as one indivisible global health emergency. *BMJ* 383 (2023): 2355. <http://dx.doi.org/10.1136/bmj.p2355>
2. Health impacts of *air pollution: estimates of premature deaths and nonfatal outcomes*, prepared by Health Canada (Ottawa, ON, 2021).
3. *Extreme heat and human mortality: a review of heat-related deaths in B.C. in Summer 2021*, prepared by B.C. Coroners Services (2022).
4. Katharine Hayhoe, “The Sickness and the Cure,” in *Saving Us*. (New York, NY: One Signal Publishers, 2021).117-128.
5. Marina Romanello, Claudia Di Napoli, Paul Drummond, Carole Green, et al. “The 2022 report of the *Lancet* Countdown on health and climate change: health at the mercy of fossil fuels.” *The Lancet* 400, no. 10363 (2022): 1619-1654. [https://doi.org/10.1016/S0140-6736\(22\)01540-9](https://doi.org/10.1016/S0140-6736(22)01540-9)
6. Jonathan Arnold and Amir Hakami. “A Hidden Benefit of Net Zero? Cleaner, Healthier Air.” Canadian Climate Institute, May 19, 2021. <https://climateinstitute.ca/a-hidden-benefit-of-net-zero-cleaner-healthier-air/>
7. World Health Organization. “Ambient (outdoor) air pollution,” December 19, 2022. [https://www.who.int/news-room/fact-sheets/detail/ambient-\(outdoor\)-air-quality-and-health](https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health)
8. *Health impacts of air pollution* (Ottawa, ON, 2021).
9. Ibid.
10. International Panel on Climate Change. “Special report: Global warming of 1.5°C.” n.d. <https://www.ipcc.ch/sr15/>
11. Renee Cho. “What is decarbonization, and how do we make it happen?” *State of the Planet*, April 22, 2022. <https://news.climate.columbia.edu/2022/04/22/what-is-decarbonization-and-how-do-we-make-it-happen/>
12. Miles Sargent, Richard Webster, Linda Varangu, Anita Rao, et al. “Identifying opportunities for greenhouse gas reductions and cost savings in hospitals: a knowledge translation tree.” *Healthcare Quarterly* 25, no. 3 (2022): 18-22.
13. Renee Salas, Edward Maibach, David Pencheon, Nick Watts, et al. “A pathway to net zero emissions for healthcare.” *BMJ* 371 (2020): m3785. <https://doi.org/10.1136/bmj.m3785>

14. Vivian Tseng. "Canada's plans to reach net-zero by 2050 must include the health sector." November 25, 2020. <https://www.sustainablehealthsystems.ca/blog/canadas-plans-to-reach-net-zero-carbon-by-2050-must-include-the-health-sector>
15. National Academy of Medicine. "Key actions to reduce greenhouse gas emissions by U.S. hospitals and health systems." n.d. <https://nam.edu/programs/climate-change-and-human-health/action-collaborative-on-decarbonizing-the-u-s-health-sector/key-actions-to-reduce-greenhouse-gas-emissions-by-u-s-hospitals-and-health-systems/>
16. *Delivering a 'net-zero' national health service*, prepared by The National Health Service (London, United Kingdom, 2020).
17. Diana Duong. "How Canadian hospitals are decreasing carbon emissions." *CMAJ* 195 (2023): E594.
18. Diana Duong, *How Canadian hospitals are decreasing carbon emissions*, E594
19. HealthPRO Canada. "Canada's ORs make the switch to greener gases." November 14, 2023. <https://www.healthprocanada.com/article/canadas-ors-make-the-switch-to-greener-gases-1>
20. Miles Sergent et al, Identifying opportunities for greenhouse gas reductions, 18-22.
21. Duong, *Canadian hospitals*.
22. *Delivering a 'net-zero' national health service* (London, United Kingdom, 2020).
23. Ibid.
24. CASCADES. "Quebec campaign – les gants, pas tout le temps," Campaigns for appropriate glove use. n.d. <https://cascadescanada.ca/campaigns-for-appropriate-glove-use/>