Green Hospital Scorecard Report Presenting 2021 Data

February 2024

The Canadian Coalition for Green Health Care

The Canadian Coalition for Green Health Care
Coalition canadienne pour un système de santé écologie

Sponsors

The Green Hospital Scorecard (GHS) is an environmental benchmarking tool for health care facilities across Canada which enables them to track progress on their environmental initiatives. Through the support of various organisations, the Canadian Coalition for Green Health Care has been able to support hospitals to gain an awareness of their environmental impact.

Since the Canadian Coalition for Green Health Care took over the GHS in 2016, support for the data gathering and the annual report has been enabled by several government departments and agencies. We are grateful for all past funders. If your government organisation is interested in becoming a sponsor for the GHS data gathering and the GHS Report, email our Executive Director Myles Sergeant at myles.sergeant@greenhealthcare.ca.

This year we thank Health Canada for supporting the Green Hospital Scorecard (GHS) 2021 data collection, data analysis and report.

Authors

The primary authors of this report are Coalition staff and contractors:

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1. Introduction

1.1 Overview of the Health Care Sector in Canada

Hospitals provide health services 24 hours a day, seven days a week, and in the process consume products and natural resources which results in a notable environmental footprint. It is important to reduce this environmental footprint through initiatives and programs which support the excellent care health care facilities provide. The Canadian Government committed to climate resilient and low carbon sustainable health systems at the Conference of the Parties (COP26)[1] in 2021 and again at the G7 Health Ministers meeting in 2022 as part of their commitment to climate-resilient and sustainable, climate-neutral health systems[2].

The Green Hospital Scorecard (GHS) can help move the health sector towards these goals by providing an environmental benchmarking program to help hospitals track their environmental impact and allowing comparisons to other like facilities. By doing so, hospitals can improve the environmental sustainability performance of their facilities, and at the same time, their resilience to climate change impacts. In fact, close to 80% of GHS participants told us the reason they participate in the GHS is to help their facility become more environmentally sustainable.

The primary categories within the GHS include the following: energy and greenhouse gas (GHG) emissions from buildings, water consumption, waste generation as well as appropriate waste diversion practices within the circular economy (reduction, reuse and recycling), pollution prevention, leadership, health care transportation, food services, and anesthetic gas emissions.

Equally important is the section on climate change which asks questions on how the facility is impacted by, and how they are preparing for, extreme weather events. Notably, by becoming more sustainable and reducing their energy or other resource use, health care facilities will also increase their resilience to climate change. Every section in the GHS where resources are reduced contributes to the resiliency of the health care facility. In addition, climate change events such as extreme weather and forest fires have already impacted health care facilities across Canada. Identifying how health care facilities have been impacted by climate change, and developing adaptation and resilience initiatives is important to keep health care facilities fully operational, in the near and the more distant future.

Various studies have shown that emissions by health systems contribute to pollutants which affect the health of people and our planet. In a 2018 study, the authors found that '*Canadian healthcare activities generated 33 million tonnes of GHG emissions (4.6% of Canada's national GHG emission based on data from 2009-2015) and over 200,000 tonnes of other pollutant*

[1] ATACH Country Commitments https://www.who.int/initiatives/alliance-for-transformative-action-on-climate-and-health/country-commitments
[2] G7 Health Ministers' Communiqué 20 May 2022, Berlin https://www.g7germany.de/resource/blob/974430/2042058/5651daa321517b089cdccfaffd1e37a1/2022-05-20-g7-health-ministers-communique-data.pdf?download=1

emissions, resulting in 23,000 disability-adjusted life years lost annually. These emissions arise from direct hospital activities such as from energy and water use, and indirect activities such as procurement activities and waste management. Environmental contaminants have been associated with compromised health status, including cancer, birth defects, respiratory and cardiovascular illness, gastrointestinal ailments and death — and an increased demand for a range of health care services[3].

Climate change also exacerbates many health conditions. For example, heat-related illnesses can increase the burden of disease from infectious and non-communicable diseases. The impacts of climate change may also increase risks to mental health. Higher frequency and intensity of extreme weather events such as heatwaves, wildfires and floods place additional stress on populations, as well as undermining the capacity of the health care workforce, health systems and critical infrastructures to deliver health services[4]. Climate change and the related biodiversity loss are some of the drivers increasing the risk of zoonoses, and therefore may increase the risk of future pandemics[5]. This is the second year of reporting that takes into consideration health care facilities environmental performance during the COVID-19 pandemic.

The health sector continues to be a significant part of Canada's economy, estimated at having contributed approximately 12.7% of gross domestic product (GDP) and utilized a sizeable $308 billion dollars nationally in 2021. Based on the total expenditure of health spending in Canada in 2021, hospital costs were the largest component at 25%, followed by drugs at 14%, and physician costs at 13%[6]. Across Canada, health sector spending represents the largest budgetary outlay for every provincial and territorial government, representing between 30-40% of provincial and territorial budgets[7].

Hospitals are often one of the largest employers in a community with a health and social services workforce of 2.16 million Canadians in 2021, which represents approximately 13% of the employment sector – the second largest employer type in Canada[8]. In the period 2021-2022, there were a total 604 hospital corporations across Canada with a combined 94,774 hospital

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[4] WHO Climate change fact sheet. October 2023. https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health#:~:text=Between%202030%20and%202050%2C%20climate,diarrhoea%20and%20heat%20stress%20alone.

[5] Lawler OK, Allan HL, Baxter PWJ, Castagnino R, Tor MC, Dann LE, Hungerford J, Karmacharya D, Lloyd TJ, López-Jara MJ, Massie GN, Novera J, Rogers AM, Kark S. The COVID-19 pandemic is intricately linked to biodiversity loss and ecosystem health. Lancet Planet Health. 2021 Nov;5(11):e840-e850. doi: 10.1016/S2542-5196(21)00258-8. PMID: 34774124; PMCID: PMC8580505.

[6] National Health Expenditure Trends, 2021 – Snapshot, Canadian Institute for Health Information. https://www.cihi.ca/en/national-health-expenditure-trends-2021-snapshot#:~:text=Total%20health%20spending%20in%20Canada,and%20in%201997%20constant%20dollars.

[7] Canadian Medical Association. Health care funding in Canada. October 18, 2022. https://www.cma.ca/latest-stories/health-care-funding-canada#:~:text=Health%20care%20continues%20to%20be,much%20faster%20than%20projected%20revenues

[8] Statistics Canada (SC). 2021. Employment by industry, annual. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410020201

beds[9].

Although there are important health, financial, and ethical reasons for adopting environmentally sustainable practices in the health sector, several challenges still exist, including financial, technical and administrative.

1.2 Background on the Green Hospital Scorecard

In 2013, the Ontario Hospital Association (OHA) developed the Green Hospital Scorecard (GHS) with a steering committee of hospital staff and health care experts. The OHA administered the GHS through the Green Hospital Champion Fund program and funding support from the Ontario Ministry of Consumer and Government Services. Once the OHA program ended in 2016, the Canadian Coalition for Green Health Care (The Coalition) was asked to continue the delivery of the GHS program. The Coalition has been a historic collaborator with the OHA on the development of the GHS since its inception and as well as the annual Green Health Care Awards. The 2021 GHS program is the nineth year that the GHS program has been offered.

1.3 Green Hospital Scorecard

The GHS scorecard provides for a benchmarking and recognition tool measuring hospital's energy conservation, water conservation, waste management, pollution prevention, and corporate leadership, planning and management. Participating hospitals report on their environmental and sustainability initiatives through the online GHS survey, receive a scorecard summarizing their environmental performance, and receive a Gold, Silver, or Bronze rating, relative to their peers. This program allows for enhancement of existing benchmarking data, refinement of collection methodologies and the creation of meaningful reporting data to inform hospital operations workforce and it's executives.

The purpose of the scorecard is to raise the hospital's awareness, motivate behavioral change for future conservation efforts, and incite improvements in the environmental initiatives by recognizing each hospital's achievements. While the scorecard provides hospital specific scoring on the primary categories noted above, the categories of transportation, food, anesthetic gases and climate change are also summarized in this sector report.

In addition to the above, the GHS:

- Provides detailed analysis of the organisation's environmental performance against a backdrop of de-identified peer data;
- Supports identifying potential areas for improvements to environmental performance and operational efficiency;
- Creates a benchmarking platform for hospitals to compare efficiencies;

- Offers the opportunity to be individually recognized through annual Gold, Silver and Bronze level achievements; and
- Encourages excellence in environmental performance by honoring top performing organisations with annual Green Health Awards.

This report subscribes to the following reporting conventions:

- Will report on data for the 2021 calendar year (January to December)
- Will display data from previous calendar years from 2017/18 – 2021

1.4 Methodology

The methodology for developing the 2021 GHS participant's environmental performance results included survey design, distribution, response and analysis.

1.5 Survey design

Questions included in the GHS survey are organized into 10 main sections, *Table 1.1* provides an overview of each of the GHS survey sections.

Section	Focus
General Information	General information about the hospital site and contact information.
Energy	Energy consumption, type of energy usage, conservation initiatives and their benefits.
Water	Water consumption, both for buildings and ground maintenance, billing information, conservation initiatives and their benefits.
Waste	Type of waste, circular economy initiatives (reduction, reuse and recycling), disposal methods, and benefits of waste reduction initiatives.
Pollution Prevention	Policy, targets, action plans and initiatives and their benefits.
Corporate Leadership, Planning and Management	Policies, action plans and outreach programs.
Transportation	Active and clean energy initiatives and infrastructure, along with adoption of virtual medicine.
Food	Healthy food policies, along with food procurement, and perceived barriers.
Anesthetic Gases	Anesthetic gas carriers used, recycling practices, and awareness of environmental impacts.

Climate Change	Management policies, types of extreme weather and impacts, resilience and adaptation initiatives, and experience around Climate Change related events.

Table 1. 1 Green Hospital Scorecard survey sections (2021 data).

1.6 Distribution

The survey was set up on the web-based platform, Cognito Forms, and was available in English, and more recently in French. It was promoted via direct email invitations to past participants of the program, as well as potential participants that had expressed interest in previous scorecards but had yet to participate. In addition, the survey was promoted through the Coalition's newsletter, The Green Digest, direct email to other Coalition program participants, and social media channels, including Twitter, LinkedIn and Facebook. Coalition partners and supporters such as the Ontario Hospital Association, the Canadian Healthcare Engineering Society (CHES) and the Ontario Healthcare Housekeeping Association (OHHA) also promote participation in the GHS to their networks.

1.7 Response

There was a total of 81 responses from this year's GHS program. This response rate is consistent with the 2019/2020 GHS, which saw an overall response rate of 83. The 2019 rate had been lower than previous years due to the unexpectedly intense strain on hospital resources due to the COVID-19 pandemic, which is ongoing in many areas. The 2022 GHS survey (collecting 2021 data) was completed by hospitals in Ontario and British Columbia. The GHS 2021 data call saw the highest response rate from Ontario hospitals, thanks to the Coalition's long history with Ontario-based organisations and the committed hospital participants who have participated in the GHS since the program was run by the OHA.

In previous years, GHS participants came from Ontario, British Columbia, Alberta, Manitoba, and Nova Scotia. This year there was also interest from other provinces such as New Brunswick and Quebec. The timing of the data call was identified as a problem, as was the length of the survey, as reasons some hospitals provided for not participating this year.

1.8 Analysis

This report is based on a descriptive analysis of the survey data, including a content analysis of the free-text answers. The quantitative questions were analyzed using descriptive statistics and visualized using Excel. Qualitative questions were analyzed using content analysis, frequently mentioned themes and other content that were derived and summarized.

Information presented in this report was compiled and interpreted exclusively for the purpose of this GHS document. The Coalition exercised reasonable skill and consideration in order to

validate all data acquired during the preparation of the report but makes no warranties as to the accuracy or completeness of the information. All information contained in this report is based upon data and insights provided by the GHS participants, which is believed to be accurate but cannot be fully guaranteed.

2. GHS Awards for 2021 Data Call

The Green Hospital Scorecard (GHS) Awards for the 2021 data call were announced Wednesday December 13th, 2023 at virtual award presentations held by the Canadian Coalition for Green Health Care. The awards recognize the outstanding achievements of this year's GHS participants, honouring the top performing Canadian hospitals in Energy Efficiency, Water Excellence, Waste Management, Pollution Prevention, and Leadership. The hospitals with the best overall scores in their respective peer groups receive the Green Hospital of the Year Award. The Coalition recognized the following hospitals in each category and peer group:

Highest Overall Scores

- Sechelt Hospital, Vancouver Coastal Health, BC – Community
- Humber River Health, ON – Academic
- Baycrest Hospital, ON– Non-Acute
- Four Counties Health Services, Middlesex Hospital Alliance, ON – Small

Highest Energy Scores

- Kootenay Lake Hospital, Interior Health, BC - Community
- Teck Acute Care Centre, Provincial Health Services Authority, BC – Academic
- West Park Healthcare, ON – Non-Acute

Highest Water Scores

- Northumberland Hills Hospital, ON - Community
- The Hospital for Sick Children, ON - Academic
- Holland Bloorview Kids Rehabilitation Hospital, ON – Non-Acute
- Four Counties Health Services, Middlesex Hospital

Highest Waste Scores

- Northumberland Hills Hospital, ON – Community
- Monfort Hospital, ON - Academic
- Holland Bloorview Kids Rehabilitation Hospital, ON – Non-Acute

Highest Pollution Prevention Scores

- Markham Stouffville Hospital, Oak Valley Health, ON - Community
- Unity Health Toronto, ON - Academic
- West Park Healthcare Centre, ON – Non-Acute

Highest Leadership Scores

- Northumberland Hills Hospital, ON - Community
- Peterborough Regional Health Centre, ON - Community
- University Health Network, ON – Academic
- Unity Health Toronto, ON - Academic
- The Hospital for Sick Children, ON - Academic
- West Park Healthcare Centre, ON – Non-Acute
- Holland Bloorview Kids Rehabilitation Hospital, ON – Non-Acute
- Hennick Bridgepoint Hospital, Sinai Health System – Non-Acute

2.1 GHS Award Sponsors

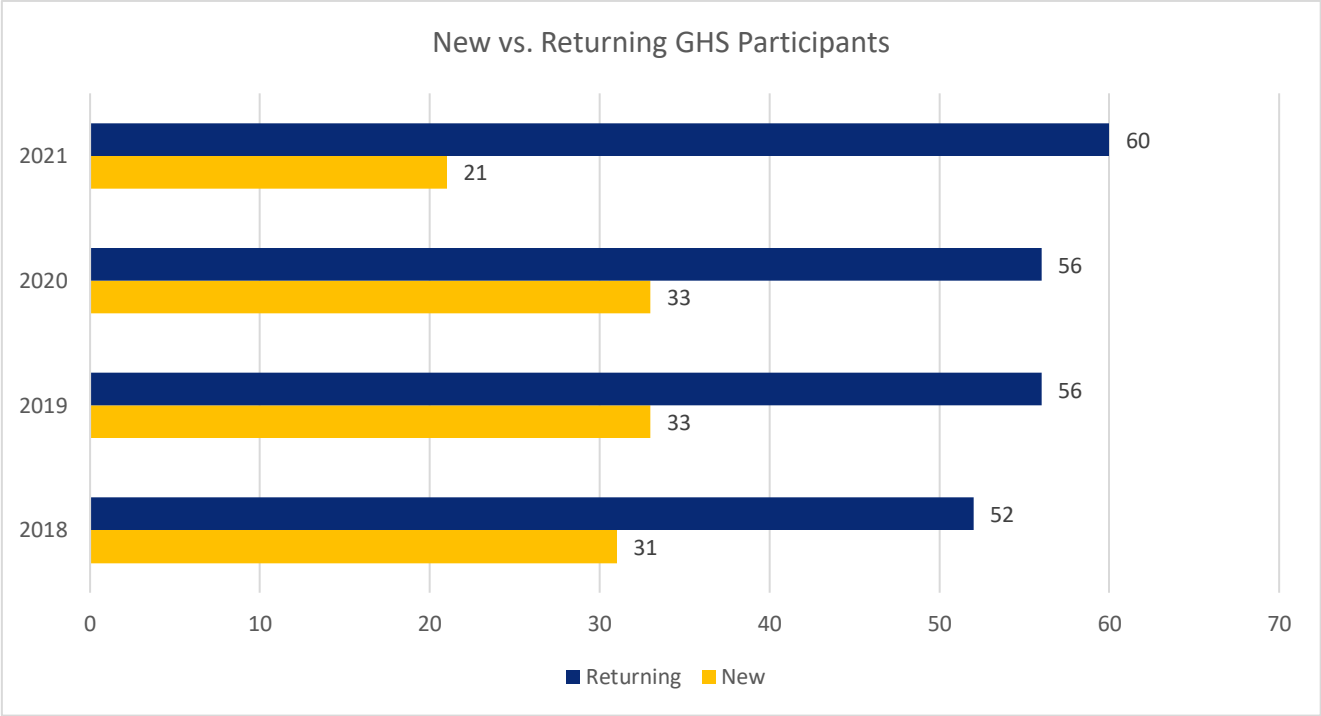
We want to thank Trane, Shift Energy, Roche Diagnostics, Ecotex Healthcare Linen Service, GE Healthcare, and Better Battery for supporting the Green Hospital Scorecard (GHS) Awards for the 2021 data call. If your organisation is interested in becoming a sponsor for future GHS awards, email our Executive Director Myles Sergeant at myles.sergeant@greenhealthcare.ca.

3. Program Details

The GHS program began in 2013 as an Ontario focused initiative but has been promoted as a National initiative starting in 2017. This GHS report describes 2021 data reported by participants representing 81 hospital sites. The goal of the program is to encourage facilities from across the country to participate and use their scorecards and submissions to become more environmentally sustainable and climate resilient. The following Figures explore participation within the GHS program with data from the reporting years 2018 - 2021.

3.1 New vs. Returning Participants

Figure 3.1 compares the number of new versus returning participants from the data collected for 2018 – 2021. This GHS report (collecting 2021 data) revealed there were 60 participants returning to the survey with 21 new participants.



Canadian Coalition for Green Health Care, 2024

Figure 3. 1 GHS New vs Returning Participants (2018-2021 data call).

3.2 Peer Groups

Each year, GHS participants are asked to identify as one of four peer groups:

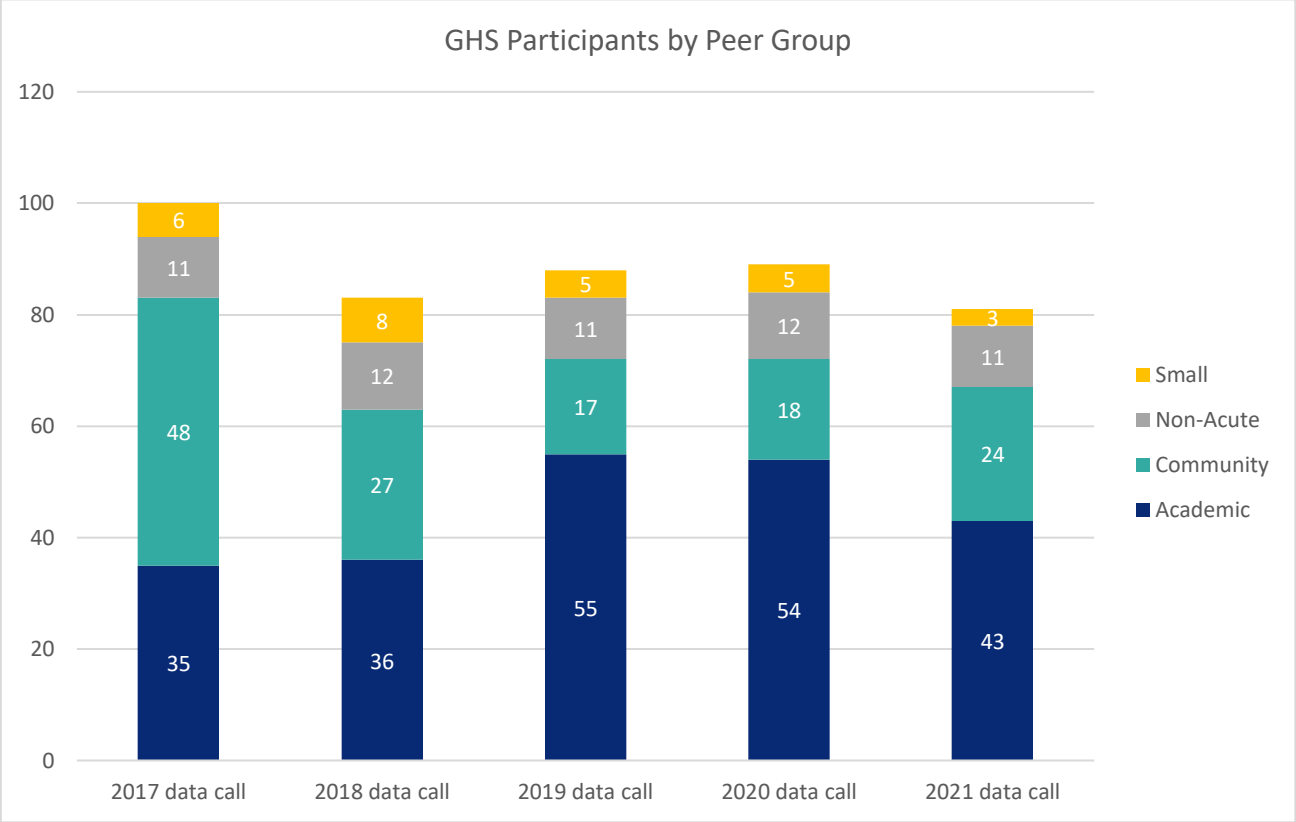
Community Hospitals: Acute care hospitals that do not fit the definition of a small or academic (teaching) hospital.

Academic Hospitals: All acute general and pediatric hospitals that are members of the Council of Academic Hospitals of Ontario (CAHO).

Non-Acute Hospitals: Complex Continuing Care (CCC), rehabilitation, and mental healtl hospitals. Have standalone CCC or Rehabilitation beds.

Small Hospitals: Provides less than 3,500 weighted cases, have a referral population of less than 20,000, and is the only hospital in the community.

Participating sites represent academic, community, non-acute and small hospitals, and include in those categories are other associated facilities such as outpatient clinics, mental health facilities and research buildings. *Figure 3.2* shows the number of participants in each peer group from the 2018 data call to the 2021 data call. The 2021 data call saw a decrease in academic peer group participation as well as small peer group participation but an increase in community peer group participation. The non-acute peer group has been consistent over the last 4 years of the GHS.



Canadian Coalition for Green Health Care, 2024

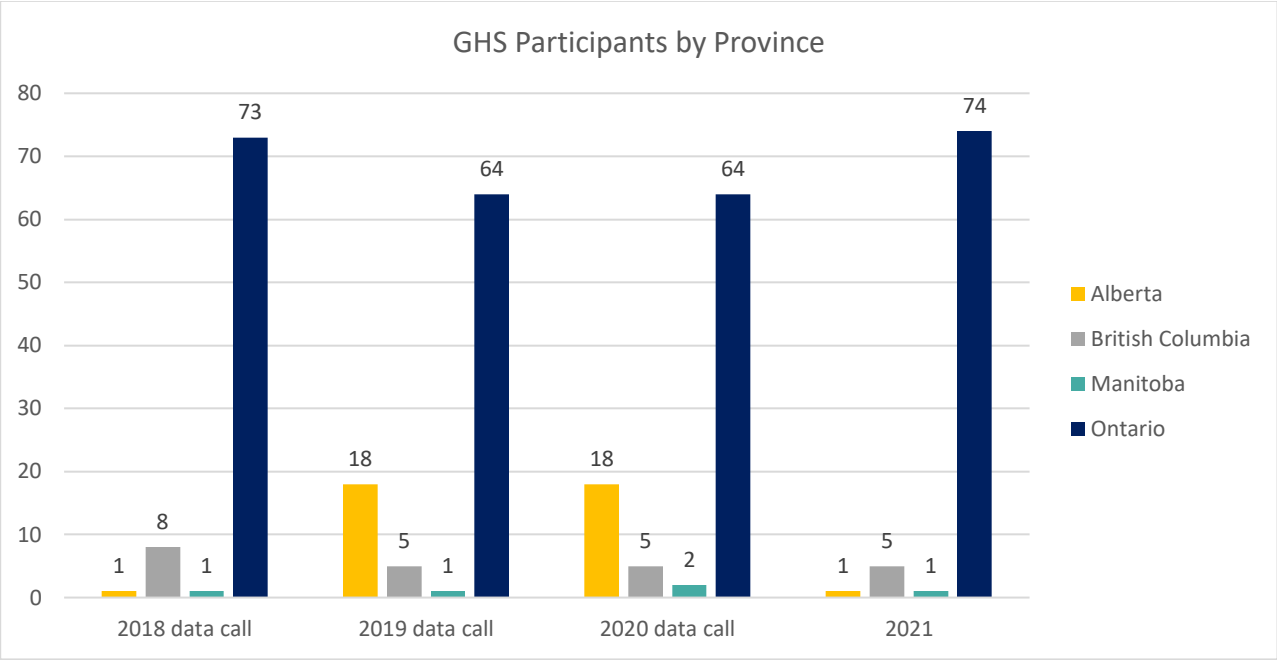
Figure 3. 2 GHS Participants by Peer Groups (2017-2021 data call)

3.3 Provincial Distribution

The provincial distribution of GHS participants has varied year over year. When the GHS was first created it was only offered to Ontario Hospitals by the Ontario Hospital Association. Since the GHS was taken over by the Canadian Coalition for Green Health Care the benchmarking tool has be offered to all provinces and territories across Canada. However, due to the commitment of Ontario Hospitals and challenges expanding the reach of the GHS, the largest

amount of participants continue to be Ontario Hospitals.

Figure 3.3 shows the provincial distribution of GHS participants from the 2018-2021 data call. The Canadian Coalition for Green Health Care hopes that, as the GHS is improved and relationships with partners such as Health Canada continue, that the reach of this benchmarking tool will continue to grow.



Canadian Coalition for Green Health Care, 2024

Figure 3. 3 GHS Participants by Province (2018-2021 data call).

4. General Information and Sector Summaries

4.1 General Information

The General Information section of the survey collects data on the hospital site, its area, number of beds, inpatient days, outpatient visits and contact information. Each hospital provides data throughout the various sectors highlighted in the scorecard and only inclusive of conditioned buildings at the site. Similar to the previous scorecard, organisations with multiple hospital sites were required to generate a unique survey for each site.

Within the General Information category there were several questions pertaining to the following five listed areas, as shown in *Table 4.1* below.

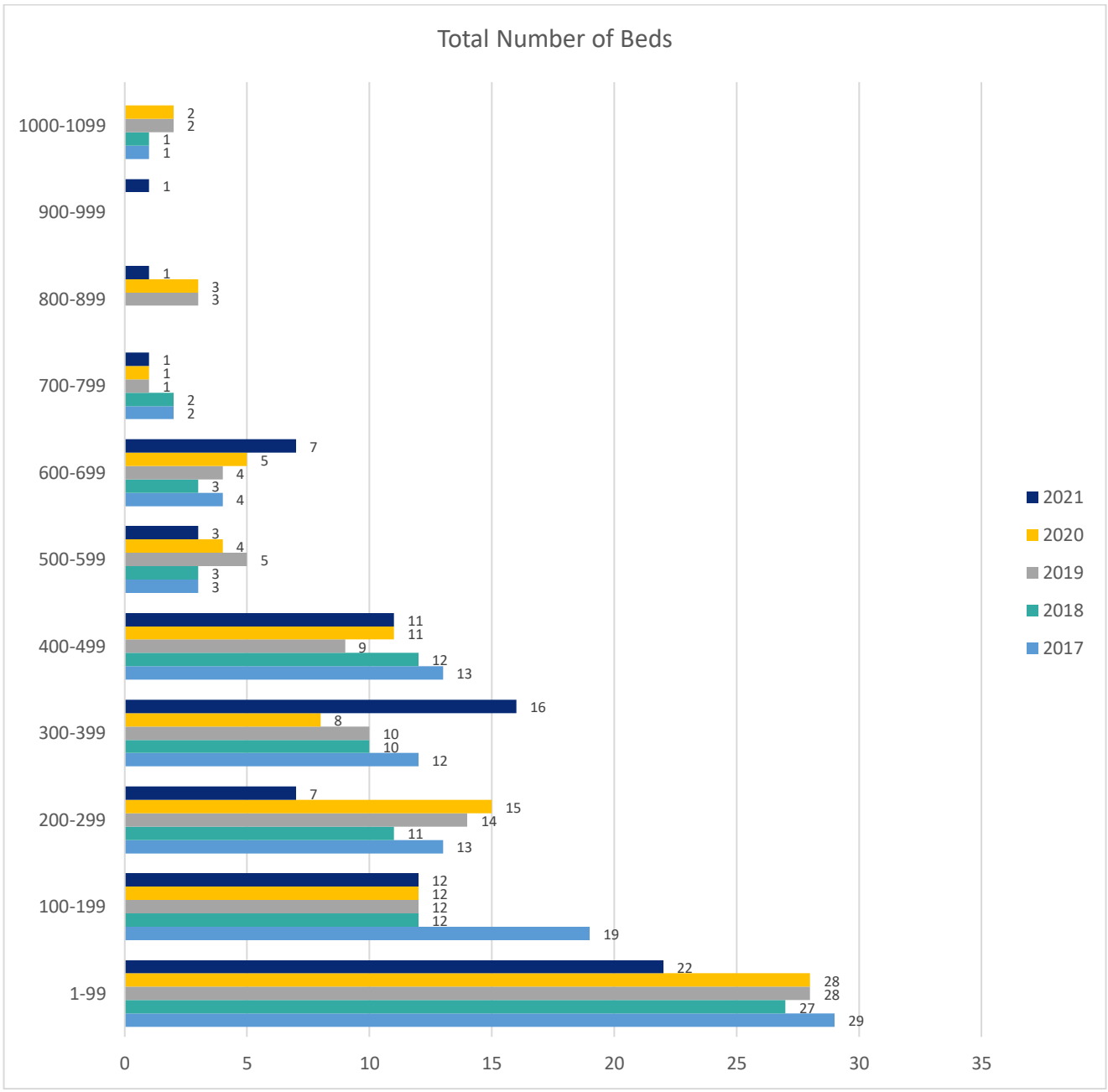
General Information	Summary
Conditioned floor area	Conditioned floor area is restricted to climate-controlled areas excluding underground parking and other large, maintained areas that are not common to all hospitals. Area includes all medical buildings as well as non-medical buildings if data for these buildings were reported throughout the survey.
Number of beds	Each hospital provides the number of beds in place during 2022. For those hospitals that had a bed count of zero, it indicates that it is another type of building such as outpatient clinic, administration or research building.
Inpatient days	The days during which services are provided to an inpatient where the day of admission is counted as an inpatient day but the day of separation is not. When the service recipient is admitted and separation on the same day, one inpatient day is counted.
Outpatient visits	A patient who is not hospitalized overnight but who visits a hospital, clinic, or associated facility for diagnosis or treatment. It includes ambulatory visits, surgical cases and any face to face visits.
Contact information	First and last name, email address, phone number and title.

Table 4. 1 General Information from GHS survey.

4.1.2 Number of Beds

Each year the participants are asked to provide the number of beds within each of their site(s).

The sites that included a bed count of zero indicated the nature of their operations as either outpatient clinic or administrative buildings. A total of 9 sites identified having a zero-bed count 2021. *Figure 4.1* shows the range of bed counts for all sites, with the most frequently cited being between one and 100 beds.

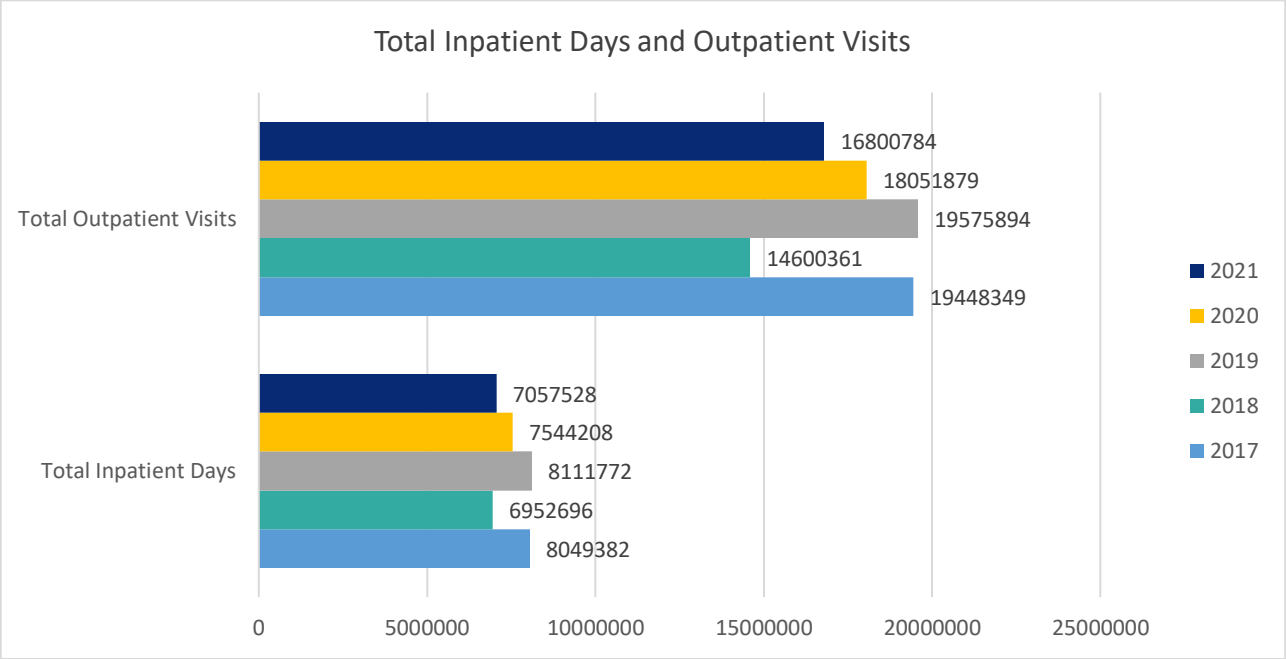


Canadian Coalition for Green Health Care, 2024

Figure 4. 1 GHS Participants by Total Bed Count (2017-2021 data).

4.1.3 Inpatient Days and Outpatient Visits

Each year the participants are asked to provide the number of inpatient days and outpatient visits at their site(s). *Figure 4.2* shows a decrease in both inpatient days and outpatient visits in 2021 when compared with 2020 and 2019 but is still higher 2018 data.

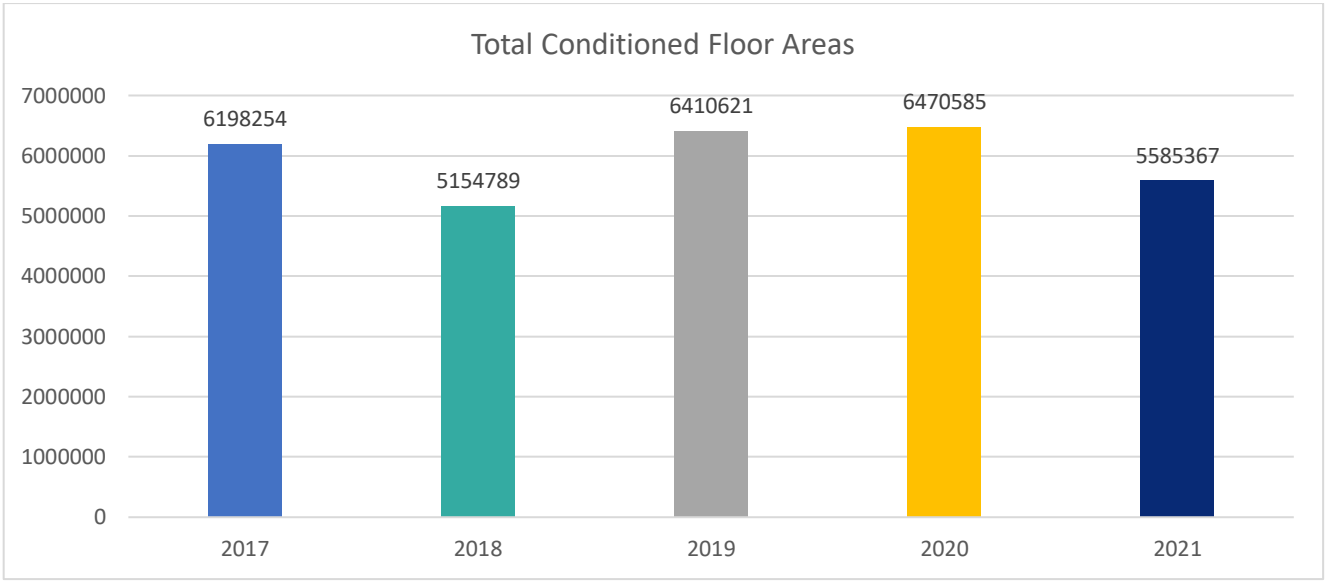


Canadian Coalition for Green Health Care, 2024

Figure 4. 2 GHS Participants by total inpatient days and outpatient visits (2017-2021 data).

4.1.4 Conditioned Floor Area

Each year the participants are asked to provide the total condition floor area of their site(s). *Figure 4.3* shows a decrease in floor area from 2020 to 2021. This change can be attributed to a reduced number of participants compared to the previous year and a change in GHS participants year over year.



Canadian Coalition for Green Health Care, 2024

Figure 4. 3 Conditioned floor area of participating facilities (2017-2021 data).

5. Building Energy and Building Greenhouse Gas Emissions

5.1 Background

In 2020, the Canadian health and social services sector had one of the highest energy use within the commercial and institutional sectors at 212.1 petajoules (1 petajoule = $1x10^{15}$ joules) or 17.5% of the energy used in the commercial and institutional sector[10]. The energy used in buildings also results in greenhouse gas (GHG) emissions, with higher GHG emissions from use of fossil fuels, such as space and water heating, or where electricity is generated through fossil fuels such as coal, oil or natural gas. Where and how energy is used can vary by site, but generally the usage hierarchy follows the itemized list below, in order of magnitude[11]:

I. space heating
II. auxiliary equipment
III. auxiliary motors
IV. lighting / water heating, and
V. space cooling

The energy use breakdown of 300 hospitals reporting in the ENERGY STAR Portfolio Manager program in 2020 is as follows:

- Natural Gas: 51%
- Electricity: 38%
- District Steam: 7%
- Fuel Oil: 2%
- District Chilled Water: 1%
- Propane: less than 1%
- Other: 1%

Hospital energy use intensity (in GJ/m^2) has been reported through national surveys:

- 2005: 2.83 GJ/m^2 (second highest in the commercial and institutional sector)[12]
- 2009: 2.55 GJ/m^2 (second highest in the commercial and institutional sector)[13]
- 2019: 2.67 GJ/m^2 median site energy use intensity[11]

[10] Natural Resources Canada. Commercial/Institutional Sectors. Table 2: Secondary Energy Use and GHG Emissions by Activity Type – Including Electricity-Related Emissions 2017-2020 Natural Resources Canada. Available from: https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=CP&sector=com&juris=ca&rn=2&page=0#footnotes

[11] Major Energy Retrofit Guidelines for Commercial and Institutional Buildings. HOSPITALS. Natural Resources Canada, 2018. Page 4. Available from: https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oee/buildings/pdf/NRCan_Hospital_e.pdf

[12] Natural Resources Canada. Commercial and Institutional Consumption of Energy Survey June 2005. Summary report June 2007. Available from https://oee.nrcan.gc.ca/Publications/statistics/cices06/pdf/cices06.pdf

[13] Survey of Commercial and Institutional Energy Use: Establishments 2009. Summary report August 2013. Available from https://oee.nrcan.gc.ca/publications/statistics/scieu/2009/pdf/SCIEU2009Establishments.pdf

- 2020: 2.4 GJ/m^2 median site energy use intensity[14]

The energy footprint of healthcare systems in 49 regions (44 countries and five rest-of-the-world regions) was examined in a 2023 Lancet report using data from 1995 – 2015[15]. Canadian health systems show a relatively high index of Health Care Access and Quality (which relates to the quality of care), while using double the energy found in some of the European health care facilities such as France, and Italy. Of the countries examined, Canada's health system has the 10th largest energy footprint in GJ/capita.

As illustrated in *Table 5.1*, the hospital sector has an aging infrastructure, with over 40% of hospital buildings over 51 years since the year of construction. This age of a health care facility (HCF) accounts for over 50% of the floor space[16]. Note that the total number of hospitals reported in *Table 5.1* is 798 (2019 data), which is higher than the 2021-22 number of 604 hospitals, likely due to hospital amalgamations.

Hospitals				
Year of Construction	**# Buildings**	**Floor Space (millions m^2)**	**Energy Use (PJ)**	**Energy Intensity (GJ/m^2)**
Total	798	15.4	37.7	2.45
Before 1920	23	1.1	2.2	1.99
1920 - 1959	162	4.4	11.8	2.68
1960-1969	148	2.4	5.7	2.41
1970-1979	124	1.6	4.6	2.98
1980-1989	102	2.0	4.2	2.08
1990-1999	58	1.9	4.2	2.24
2000-2009	158	1.1	2.5	2.36
2010 or later	23	1.0	2.5	2.40

Table 5. 1 Age, floor space, energy use and energy intensity of hospital buildings (Source: NRCan, 2019 data)

GHG emissions from health care buildings are significant, but in most cases do not represent the greatest portion of the GHG emissions from health care facilities. The largest portion of GHG from the health system is through the supply chain and products/services purchased.

The Greenhouse Gas Protocol (GHGP)[17] is used as an international accounting and reporting standard for categorizing and estimating organizational GHG emissions. The GHGP is used to track an organization's emissions over time, and although not health care specific, it outlines

[14] Energy Benchmarking Data Snapshot for Hospitals 2020 data. Available from: https://natural-resources.canada.ca/energy-efficiency/energy-star-canada/energy-star-for-buildings/energy-benchmarking-data-snapshots/energy-benchmarking-data-snapshot-for-hospitals/24230

[15] Andrieu B, Marrauld L, Vidal O, Egnell M, Boyer L, Fond G. Health-care systems' resource footprints and their access and quality in 49 regions between 1995 and 2015: an input-output analysis. Lancet Planet Health. 2023 Sep;7(9):e747-e758. doi: 10.1016/S2542-5196(23)00169-9.PMID: 37673545

[16] Natural Resources Canada Hospitals. From OEE Table 2.1. Buildings – Characteristics by year of construction, 2019. Note: the establishment survey yielded 757 hospitals representing 2008 buildings. Available from: https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=SC&sector=aaa&juris=ca&year=2019&rn=2&page=1

[17] Greenhouse Gas Protocol (ghgprotocol.org)

methods to be used to collect the data by categorizing emissions into three Scopes to capture different types of directly and indirectly controlled emissions. The specific GHG sources assigned to the three different Scopes from health care are shown below:

- Scope 1: Direct GHG emissions from sources that are owned or controlled by the organization including:
  - stationary combustion (e.g., boilers, furnaces),
  - mobile combustion (e.g., owned/controlled vehicles),
  - anesthetic and medical gases (e.g., Desflurane, Sevoflurane and Isoflurane, and nitrous oxide)
  - fugitive emissions (e.g., refrigerant leaks from air conditioning units and fire suppression systems).
- Scope 2: Indirect emissions occurring from:
  - consumption of purchased electricity, heated water or chilled waste, and steam.
  - These emissions are upstream activities from the purchase of goods and services.
- Scope 3: Indirect emissions that are not covered in Scope 2, such as
  - the value/supply chain,
  - business travel, employee commuting, waste generation, and product transport.
  - investments
  - Some of these emissions are upstream and some are downstream.

While there is no national representation of Canadian health care-specific GHG emissions designations of Scope 1, 2 and 3 emissions, the 2022 Lancet Countdown on Health and Climate Change report analyzed 37 country health systems and their GHG emissions per capita[18]. This report identified the Canadian health sector as the second highest emitter of GHG emissions per capita of the countries analyzed, with the USA health system identified as having the greatest GHG emissions per capita.

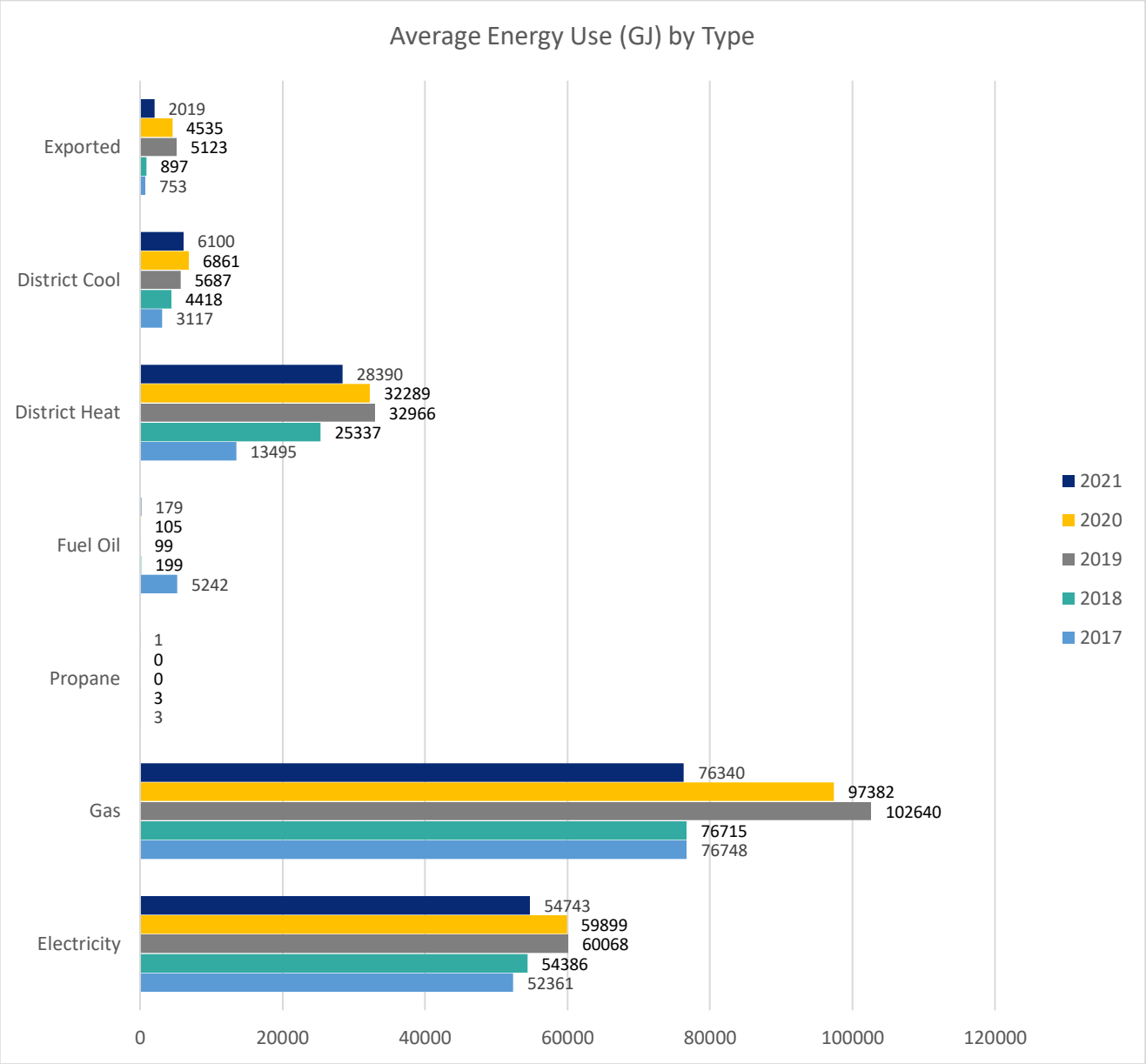
5.2 Results

An analysis of the GHS participant 2021 data shows that, the combined total energy use from all 81 participants was 13,825,730 GJ (13.8 PJ), with the combined total conditioned floor area being 5,585,367 m^2. Participating sites range from 2,000 m^2 up to more than 200,000 m^2.

5.2.1 Energy Use by Type

Participants reported on the type of energy used as per the following categories: electricity, natural gas, propane, fuel oil, district heat, district cooling and exported energy. Below, *Figure 5.1* shows energy use, in gigajoules (GJ), by fuel type. The portion of gas used in health care sites in relation to electricity use has remained consistent from 2018 – 2021, where the gas component was 59% (2018), 63% (2019), 62% (2020) and 58% (2021). District heat and cooling has remained relatively consistent through those years.

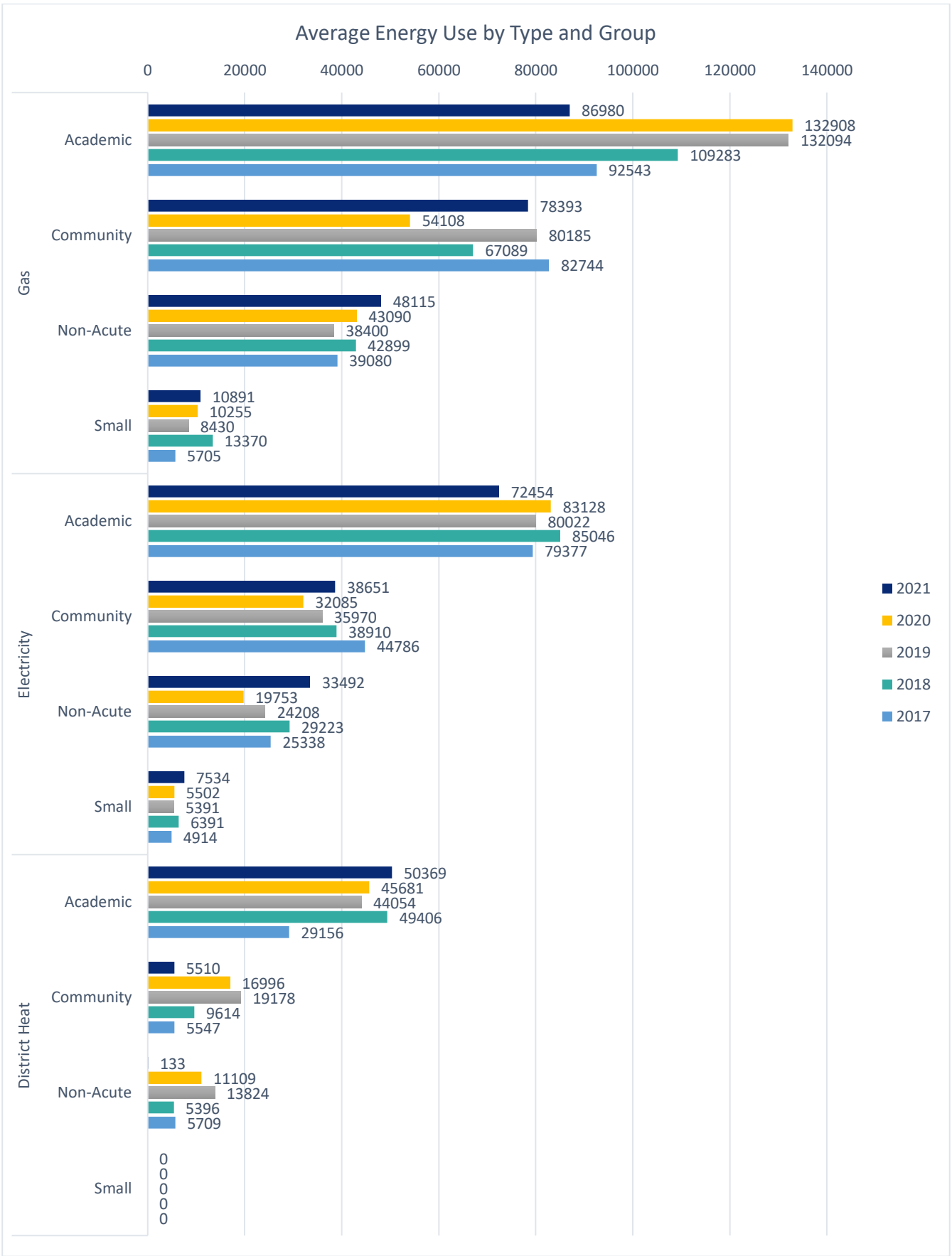
[18] Lancet Countdown on Health and Climate Change, 2022. https://www.thelancet.com/infographics-do/cite-lancet-cite-countdown-health-and-climate-change-2022



Canadian Coalition for Green Health Care, 2024

Figure 5. 1 GHS participant energy use (GJ) by type (2017-2021 data).

Figure 5.2 shows the distribution of energy use between the 4 peer groups. Academic hospitals were more likely to export energy, access district cooling and heating, and were the primary consumers of electricity and natural gas.


Average Energy Use by Type and Group
0
20000
40000
60000
80000
100000
120000
140000
Gas
Academic
86980
132908
132094
109283
92543
Community
78393
54108
80185
67089
82744
Non-Acute
48115
43090
38400
42899
39080
Small
10891
10255
8430
13370
5705
Electricity
Academic
72454
83128
80022
85046
79377
Community
38651
32085
35970
38910
44786
Non-Acute
33492
19753
24208
29223
25338
Small
7534
5502
5391
6391
4914
District Heat
Academic
50369
45681
44054
49406
29156
Community
5510
16996
19178
9614
5547
Non-Acute
133
11109
13824
5396
5709
Small
0
0
0
0
0
2021
2020
2019
2018
2017

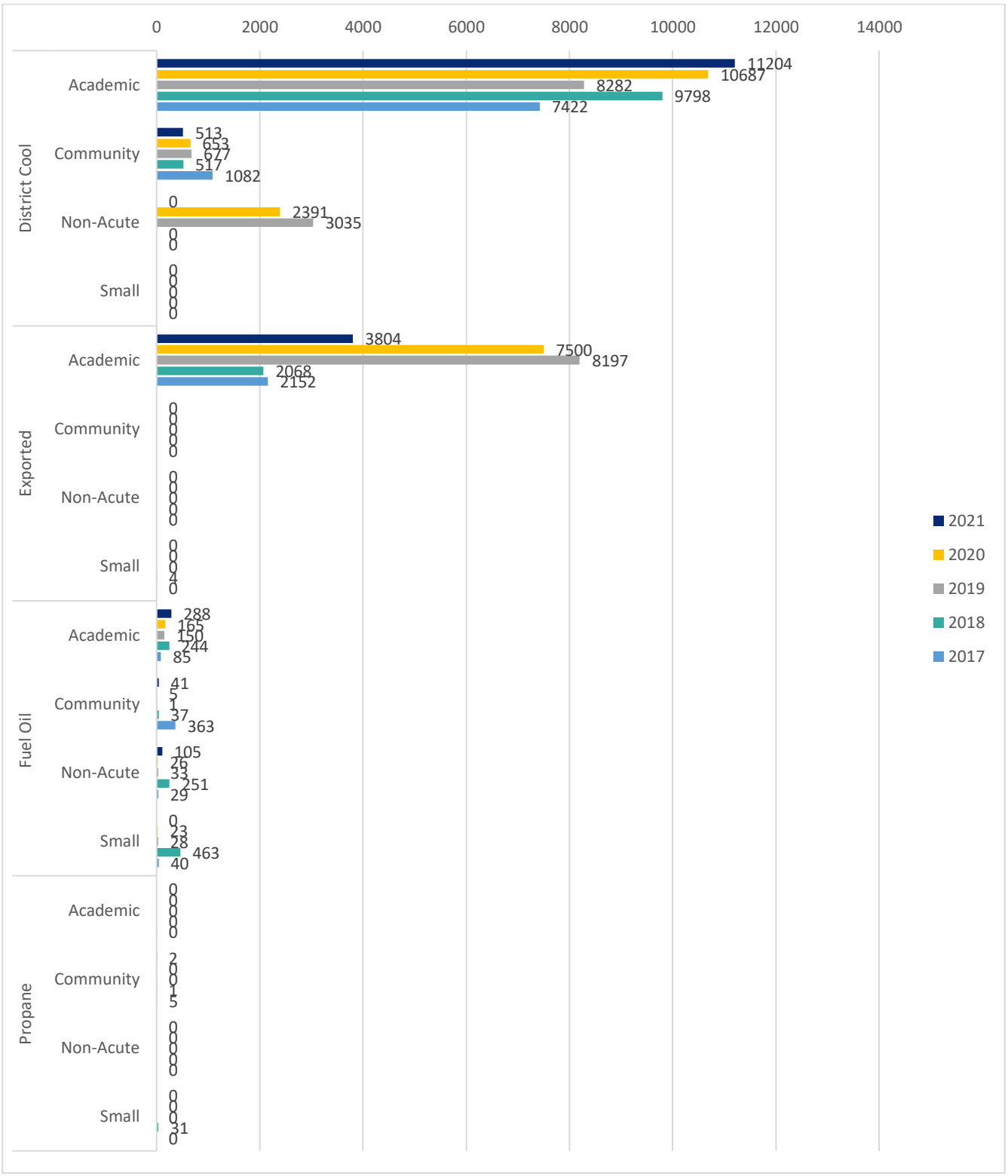


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Figure 5. 2 GHS participant energy use (GJ) by type per peer group (2017-2021 data).

A number of sites used district energy sources for heat and cooling. These sources played a role at sites through the following examples:

- Our data showed that 15 sites have stated that they received purchased steam from either

utility companies or other partnering organisation powerplants. Six sites referenced Enwave as a source of steam. Alternatively, several sites partnered with other hospitals or local universities to use energy plants to supply energy demands.

- A total of four sites explained their use of cogeneration sites to reach energy needs. It was calculated that capacity of cogeneration (cogen) systems was around 30.25 MW between these four sites. Seven sites in total use cogen systems for heating, cooling, humidification and sterilization.

5.2.2 Energy Use Intensities

Energy Use Intensity (EUI) captures a building's annual energy use as a function of its size. It is a measure that determines the building's energy performance and is useful for benchmarking and setting targets. EUI's are Environmental Performance Indicators (EPI) that hospitals can compare on an annual basis to see improvements.

Energy data reported by participants was converted to GJ to maintain consistency, and to enable the various energy types to be compiled, and then divided by the reported floor area (m^2) to calculate a final EUI (GJ/m^2). The total average EUI across all hospitals for 2018 – 2021 was calculated to be:

- 2021: 2.9 GJ/m2/year
- 2020: 2.65 GJ/m2/year
- 2019: 3.04 GJ/m2/year
- 2018: 2.83 GJ/m2/year
- 2017: 2.42 GJ/m2/year

Figure 5.3 captures the average EUI by peer group. In 2021, the highest average EUI was found in Community hospitals, at 3.80 GJ/m^2/year, followed by non-acute hospitals at 3.21 GJ/m^2/year. Community hospitals have consistently shown the highest EUIs, except for 2020. EUI's in academic hospitals have been relatively consistent (2.51 - 2.37), with small hospitals showing a trend in decreased EUIs (2.40 - 1.55). This EUI reduction for small hospitals can be attributed, in-part, to decreased participation from small hospitals in the GHS. The program had eight small hospitals participate in the 2018 data call, five participate in the 2019, five participate in the 2020 data call, and three participate in the 2021 data call.

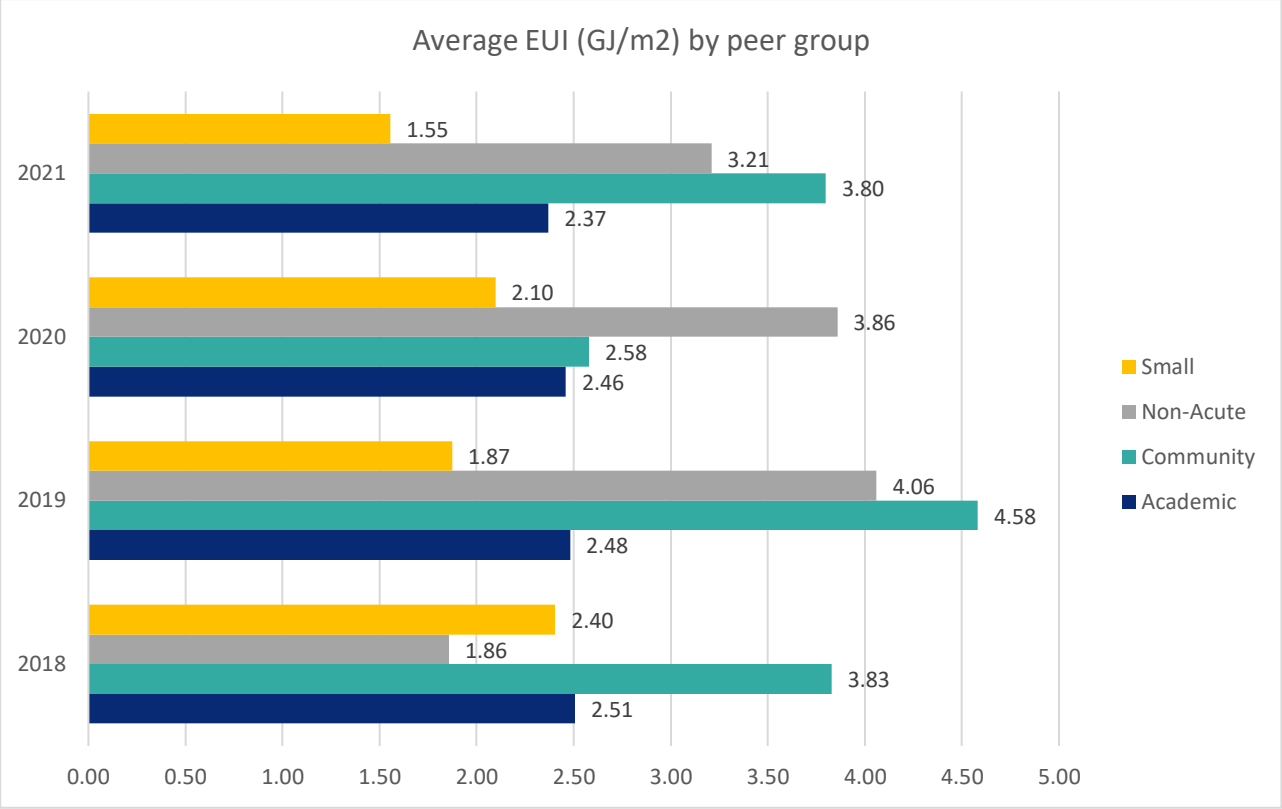

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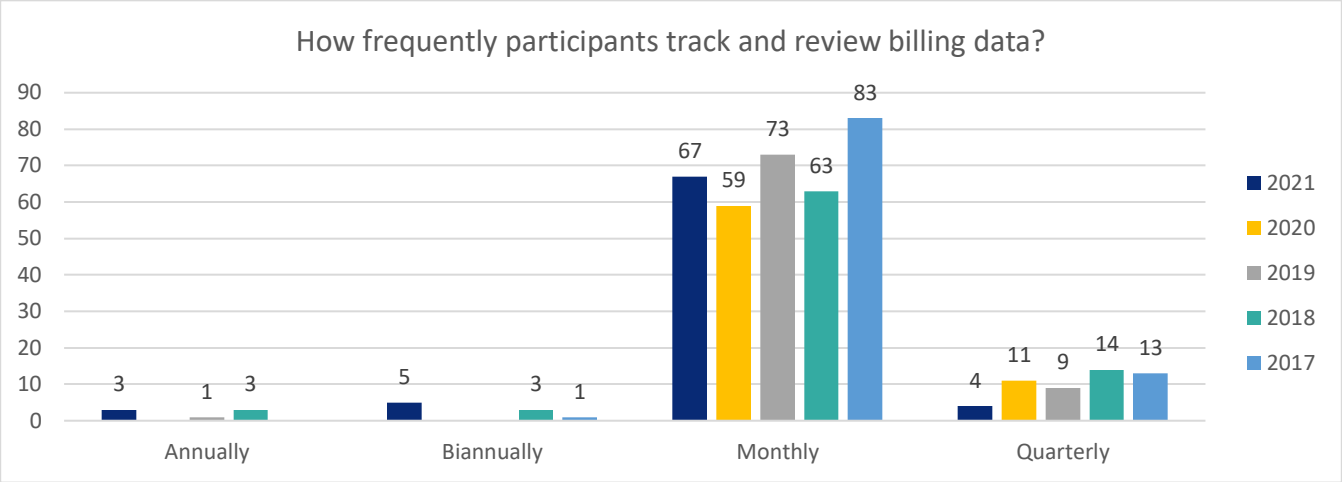
Figure 5. 3 GHS participant average energy use intensity (EUI) by peer group (GJ/m2) (2017-2021 data).

5.2.3 Monitoring and Management

Participants identified how often they are tracking and reviewing their utility billing data, with the majority or participants reporting monthly. *Figure 5.4* shows 68 out of 81 participants in the 2021 data call reported they track their data monthly. With only three sites reporting annually, five sites reporting biannually and four sites reporting quarterly.



Canadian Coalition for Green Health Care, 2024

Figure 5. 4 Frequency GHS participants track and review billing data (2017-2021 data).

5.2.4 Energy Leadership, Initiatives and Innovations

According to data displayed in *Figure 5.4*, 54% of hospitals have energy conservation policies, 60% have energy targets, and 63% have action plans, which are similar to the two years prior (2019 and 2020). As for budgets for staff engagement and outreach programming, there was a significant drop from previous years with only 31% reporting that they have budgets for staff engagement and outreach programming. One reason this may be the case is a strain on resources caused by the COVID 19 pandemic. Reductions in these budgets could be related to the high costs of the COVID-19 pandemic, with an effort by some hospitals to reduce spending in general.

National Resources Canada (NRCan) has several online energy management tools including ENERGY STAR Portfolio Manager (ESPM), RETScreen, and the Simple Savings Calculator, which can be used to identify energy savings opportunities and help meet energy reduction targets. Participants were asked which of these tools they have used. *Figure 5.5* shows trends in the usage of these products by GHS participants. Users of ESPM were trending upward, until 2020 which showed a decrease (start of the pandemic) and then increased again in 2021. RETScreen usage was also showing a trend upwards, with a decrease in 2020, then increased slightly in 2021. Use of Simple Savings Calculator use was stable from 2018-2020, followed by a decrease of almost 50% in 2021. Changes in the use of these energy management tools can also be reflected in changes of the GHS participants from year to year.

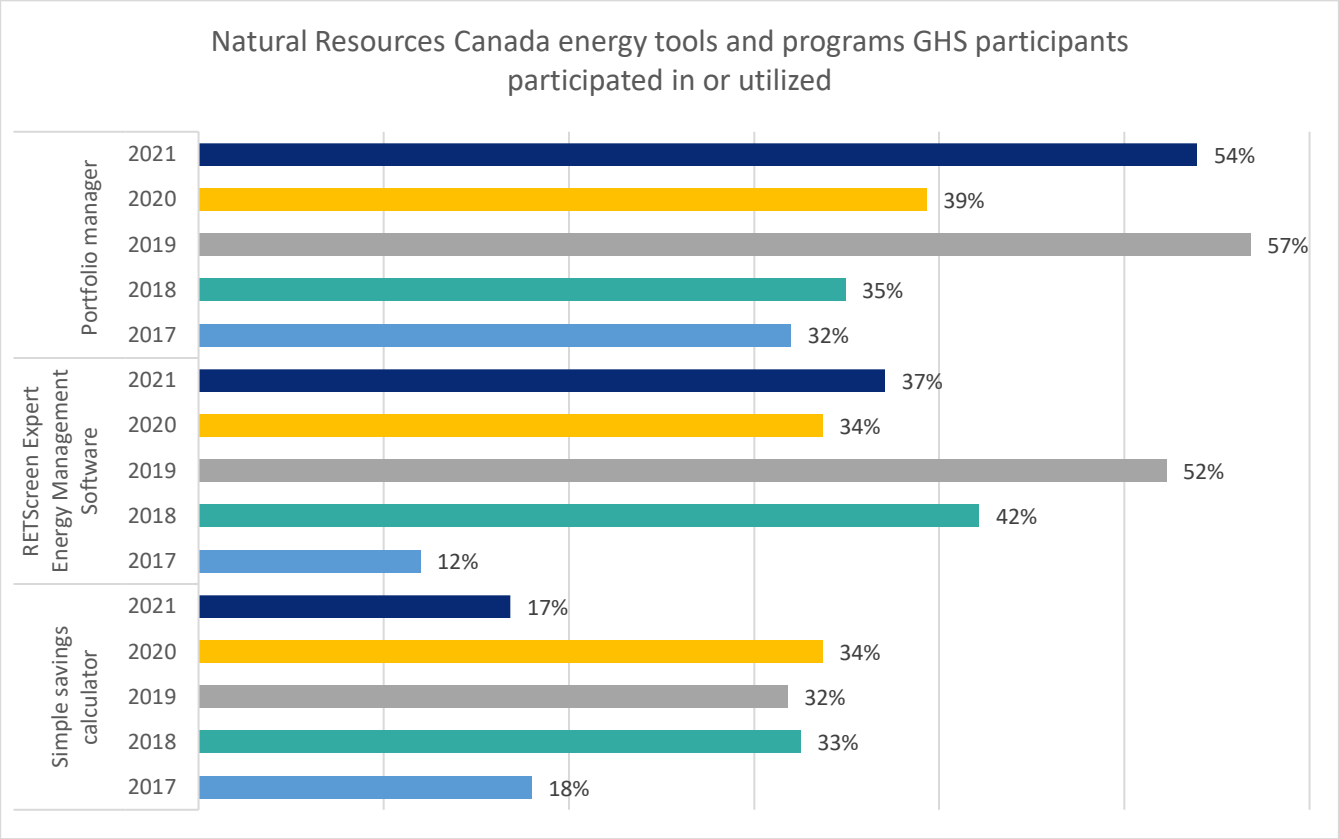


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Figure 5. 5 Use of NRCan's energy management program tools (2017-2021 data).

There are numerous ways hospitals can incorporate energy conservation measures at their site, ranging from sustainable energy technologies to building automation. Every year the GHS questionnaire asks participants what new technologies or services for energy efficiency and/or conservation sites have implemented. These are just a few examples of technologies and services undertaken by hospitals:

- Installation of variable frequency drives (VFD).
- Upgraded lighting systems to LEDs and exit signs to LED models.
- Upgraded windows, doors, roofs, and replaced or additional insulation for HVAC optimization.
- Installation of electric vehicle charging stations.
- Upgrades to building automation system.
- Heat recovery optimization.
- Installation of energy efficient chillers.
- Installation of motion sensors for lighting, water faucets and toilets
- Upgraded air handling systems.
- Energy assessments.
- Installation of Thermal Gradient Header (TGH).
- Replacing existing Domestic Hot Water (DHW) Storage Heaters with On Demand DHW

Heaters and a Storage Tank.
- Completion of a third part Greenhouse Gas Reduction Roadmap and Action Plan.

5.2.5 Renewable Energy

According to NRCan, renewable energy sources made up 17.3% of Canada's total energy sources in 2020[19].

Within the health care sector, the reported use of renewable energy sources has not significantly increased over the past four years. The following shows the percentage of respondents reporting some kind of renewable energy use at their site:

- 2018: 29%
- 2019: 18%
- 2020: 26%
- 2021: 27%

Where renewable energy has been implemented, solar photovoltaics were the most popular ranging from 13% (2018) to 9% (2021) as shown in *Figure 5.6*. Use of deep lake cooling (in Toronto area hospitals) and geothermal systems is also on the rise. Most of those who chose 'other' identified the other as 'none of the above'.

[19] Natural Resources Canada Renewable Energy Fact Book. Available from: https://natural-resources.canada.ca/sites/nrcan/files/energy/energy_fact/2022-2023/PDF/Section_1_Energy-factbook-2022-2023_EN.pdf

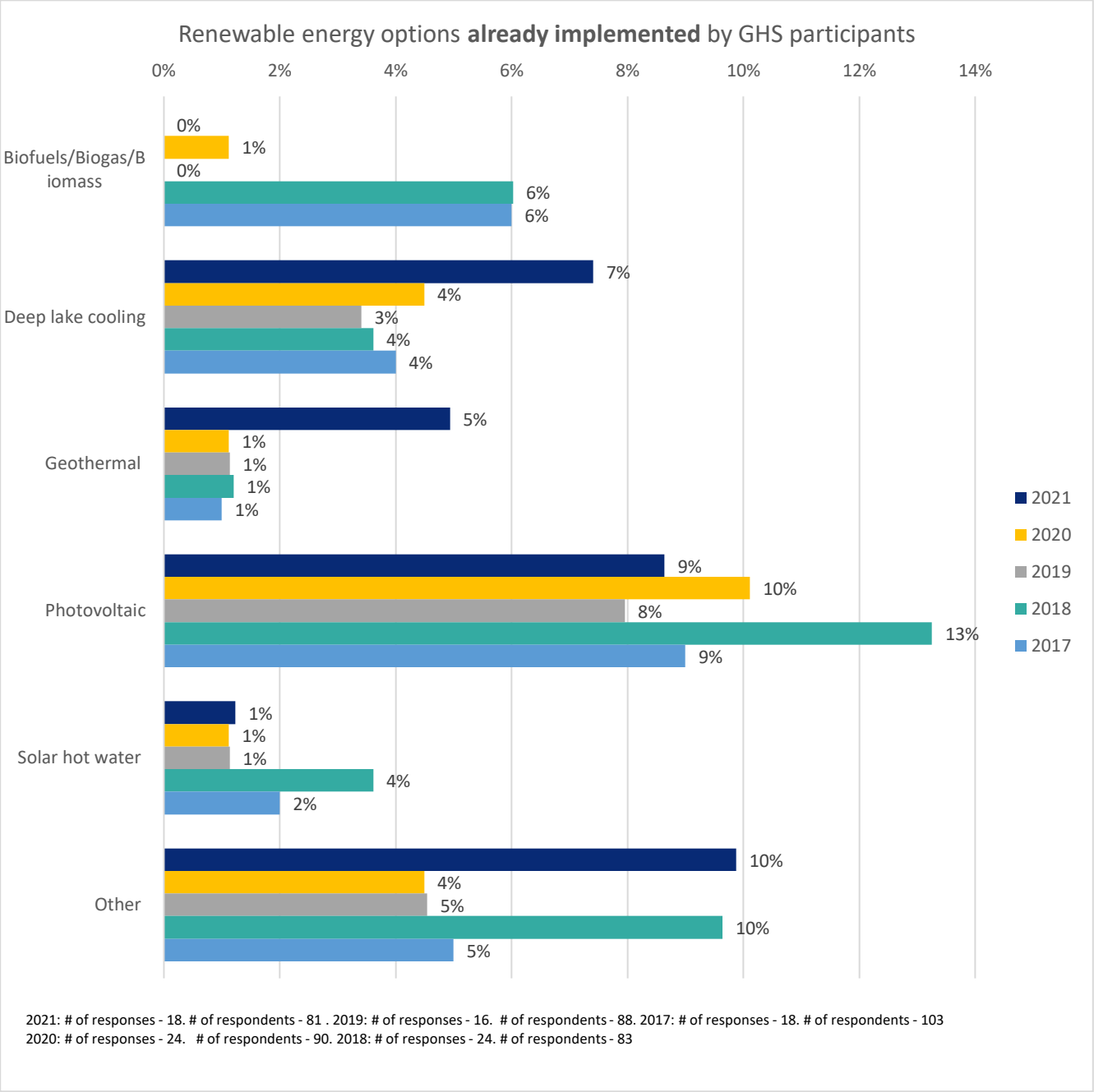

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Figure 5. 6 Renewable energy options already implemented by GHS participants (2018-2021 data).

Looking into the future in *Figure 5.7*, the top three renewable energy options being explored were solar photovoltaics (36% of 2021 participants), geothermal energy systems (23% of 2021 participants), and solar hot water energy sources (19% of 2021 participants). Other renewable energy options included hydroelectricity, solar power, waste water heat recovery, and wind energy.

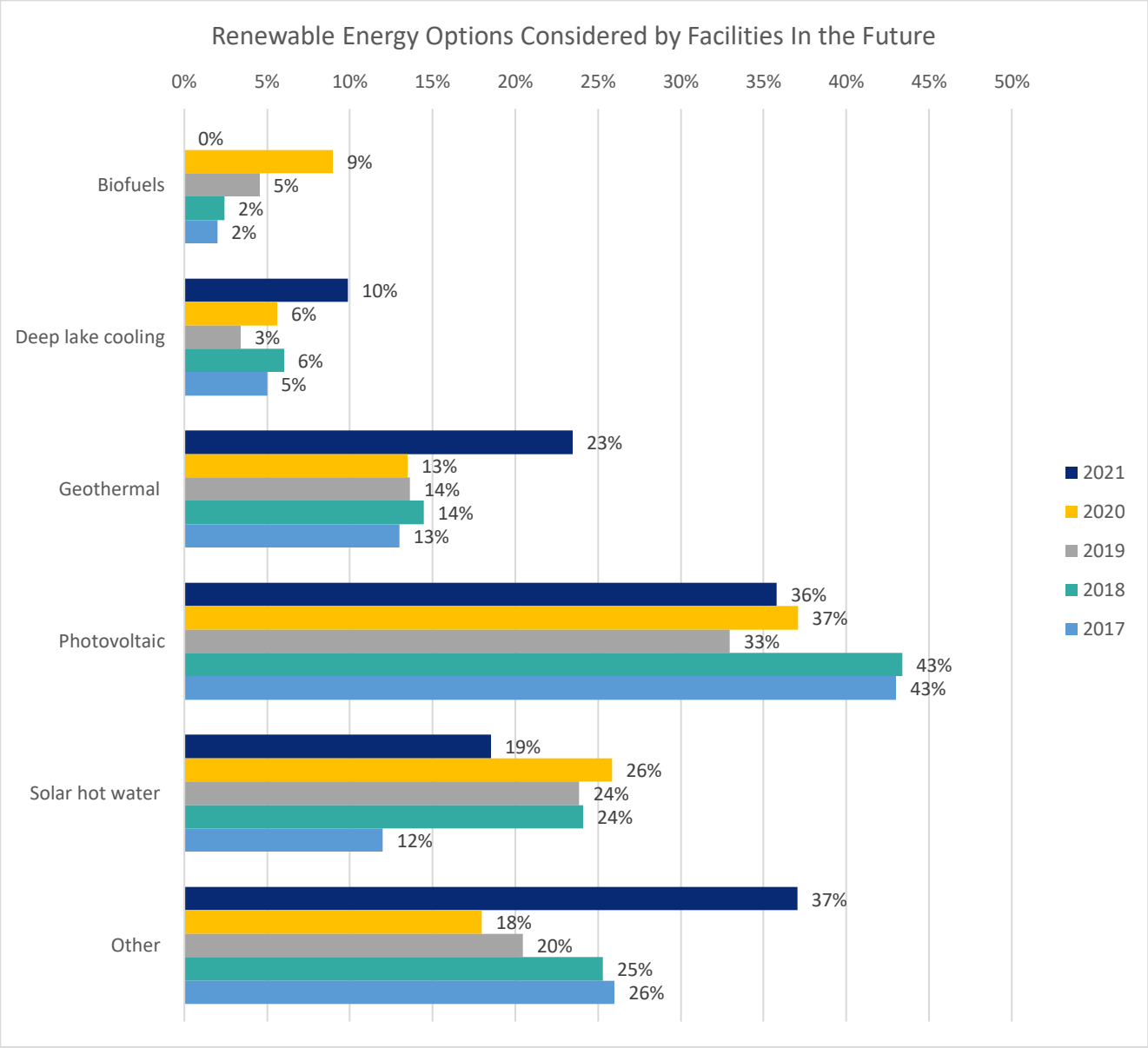

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Figure 5. 7 Renewable energy options being considered in the future by GHS participants (2018-2021 data).

5.2.6 Distributed Generated or Distributed Electricity Resources

Distributed Generated (DG) and Distributed Electricity Resources (DERs) refer to energy sources produced near the site of consumption and thus reduce the amount of energy lost when transmitting electricity from further distances. The most popular DG or DER options in participant energy management plans, or in discussion are controllable loads within HVAC systems, and renewable energy. Figure 5.8 shows the number of GHS participant with DG or DERs in their energy management plan. In 2021, HVAC Systems were the most popular with 62% of participants having it as part of their energy management strategy.

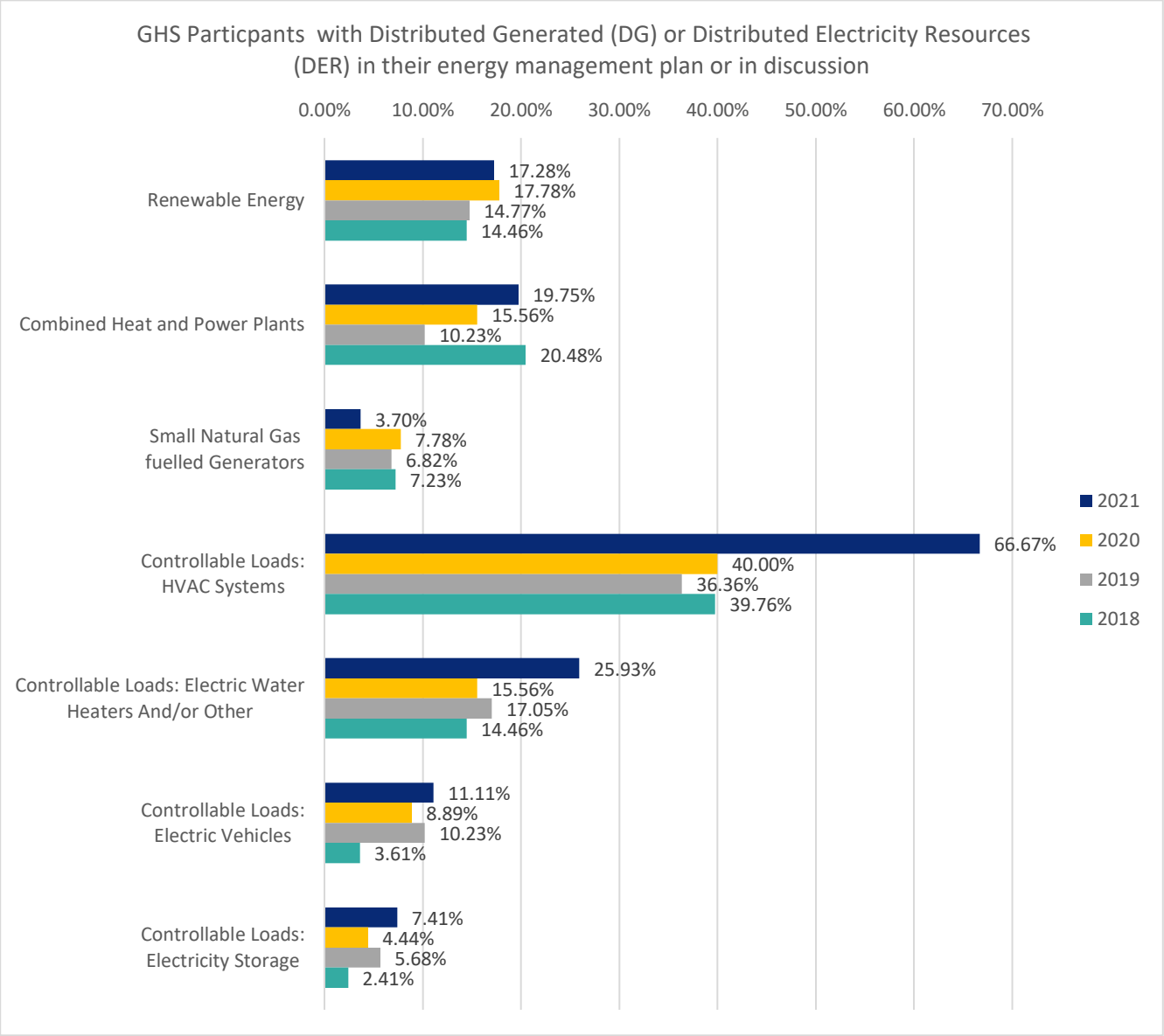

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Figure 5. 8 GHS participants with Distributed Generated (DG) or Distributed Electricity Resources (DER) in their energy management plan or in discussion (2018-2021 data).

5.3 Energy Behaviour

Accounting for human behaviour patterns in energy management in addition to technology can potentially result in greater energy savings and persist for longer periods of time than if the human element is ignored[20]. A crucial part of implementing energy behaviour involves leadership, and having a dedicated full-time-equivalent (FTE), or energy champion to support staff.

[20] Cowan et al. Chapter 21, Behaviour and Energy Facility Management. In the 8th Edition of 'Guide to Energy Management' by Capehart, Turner & Kennedy (Fairmont Press).

While human behaviour has been well studied in projects directed at the residential sector, not as much is known about how the industrial, commercial, and institutional sectors can benefit by including a human focus to energy management. This survey asked questions related to energy behaviour to better understand the extent of knowledge of key actors, initiatives, norms and goals around energy behaviour in hospitals. By considering these survey questions, organisations can begin to understand opportunities to integrate energy behaviour and incorporate energy behaviour principles, thereby incentivizing conscious energy use by staff and patients and operationalize savings through planning, supporting, investing in, and implementing energy saving projects.

5.3.1. Energy Behaviour Awareness

Figure 5.9 shows a majority of participants became aware of energy behaviour through webinars (53%) in 2021, although other methods of learning, including specific websites, conferences, and workshops, were also relevant. Access to energy behaviour training decreased in 2021 compared to 2020/19.

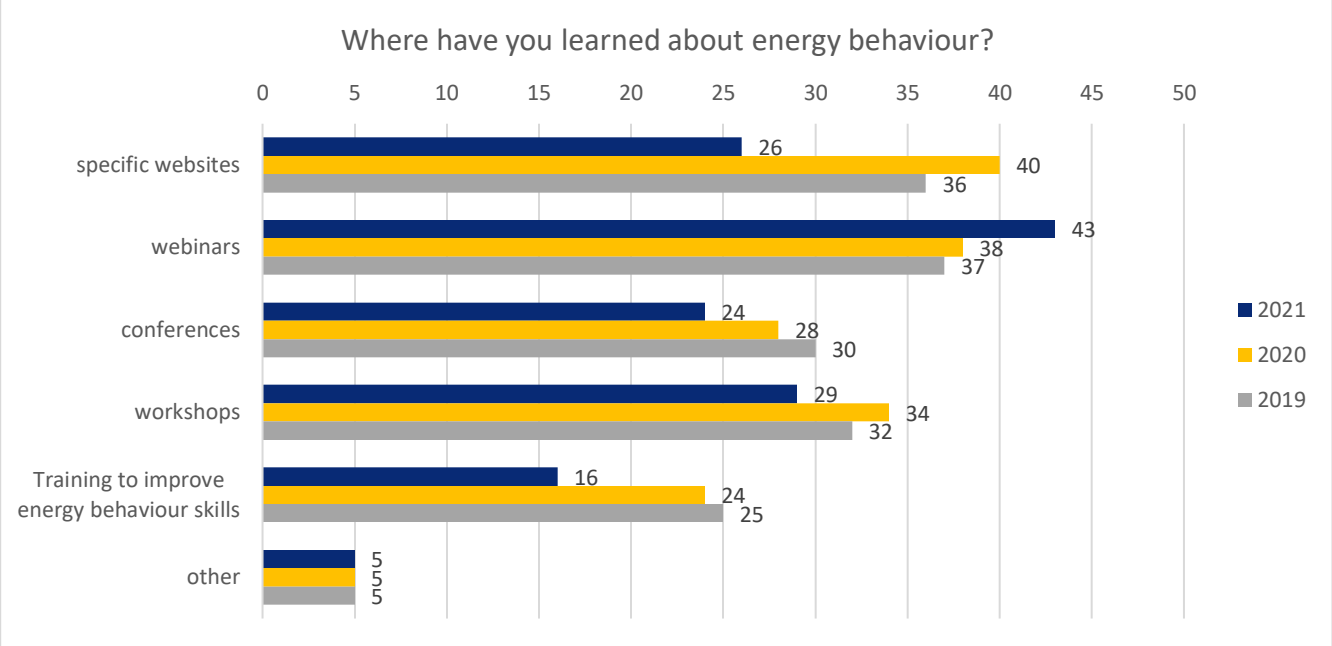

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Figure 5. 9 Where participants learned about energy behaviour (2019-2021 data).

5.3.2 Energy Behaviour Policy

In *Figure 5.10* participants rated how well they agreed with the statement 'Energy efficiency is applied consistently across the organisation' with '1' meaning strongly disagreeing and '7' strongly agreeing. See scale below.

Select 1 if you very strongly disagree with the statement;
Select 2 if you moderately disagree with the statement;
Select 3 if you slightly disagree with the statement;
Select 4 if you are undecided as to the statement;
Select 5 if you slightly agree with the statement;
Select 6 if you moderately agree with the statement;
Select 7 if you very strongly agree with the statement.

The trend shows that more participants are reporting that energy efficiency is being applied more consistently across the organisation. The number of participants that did not answer the question before (i.e. rated as '0') decreased by 75% in 2021, and there was a significant increase (i.e. more than 10 times increase) of respondents who strongly agreed (i.e. rated as '7') with that statement. However, the total percentage of respondents who rated '5' and above (i.e. agreeing with the statement), has not varied significantly over the three years: 55% (2021), 61% (2020) and 61% in 2019) when not including the non-responders.

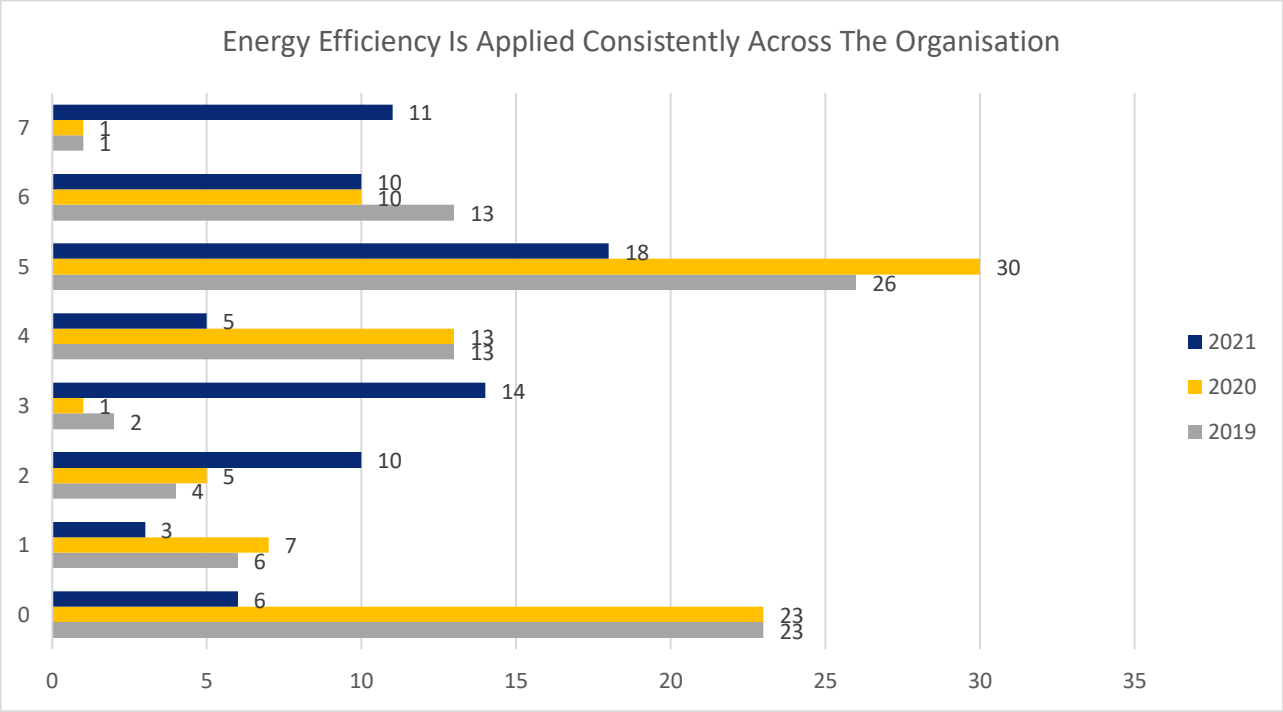

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Figure 5. 10 How energy efficiency is applied across the organisation (2019-2021 data).

5.3.3 Energy Behaviour Integration at Facility

Participants reported on how they viewed integration of energy behaviour within their organisation. Similar to the previous rating systems, participants rated the integration of energy behaviour across their entire organisation by reporting how they agreed with the statement: *Energy behaviour approaches are fully integrated across the entire organisation.* The ranking

ranged from 1 (strongly disagreed with the statement) to 7 (strongly agreed with the statement).

Similar to the responses in *Figure 5.10*, the responses in *Figure 5.11* showed that the number non-responders to the question in 2021 (i.e. rated as '0') decreased by 75%, and there was a significant increase (i.e. more than 4 times increase) of responders who strongly agreed (i.e. rated as '7') with that statement. However, the total percentage of responders who rated '5' and above (i.e. agreeing with the statement), was lower in 2021 (39%) than in 2020 (55%), and 2019 (60%) when not including the non-responders.

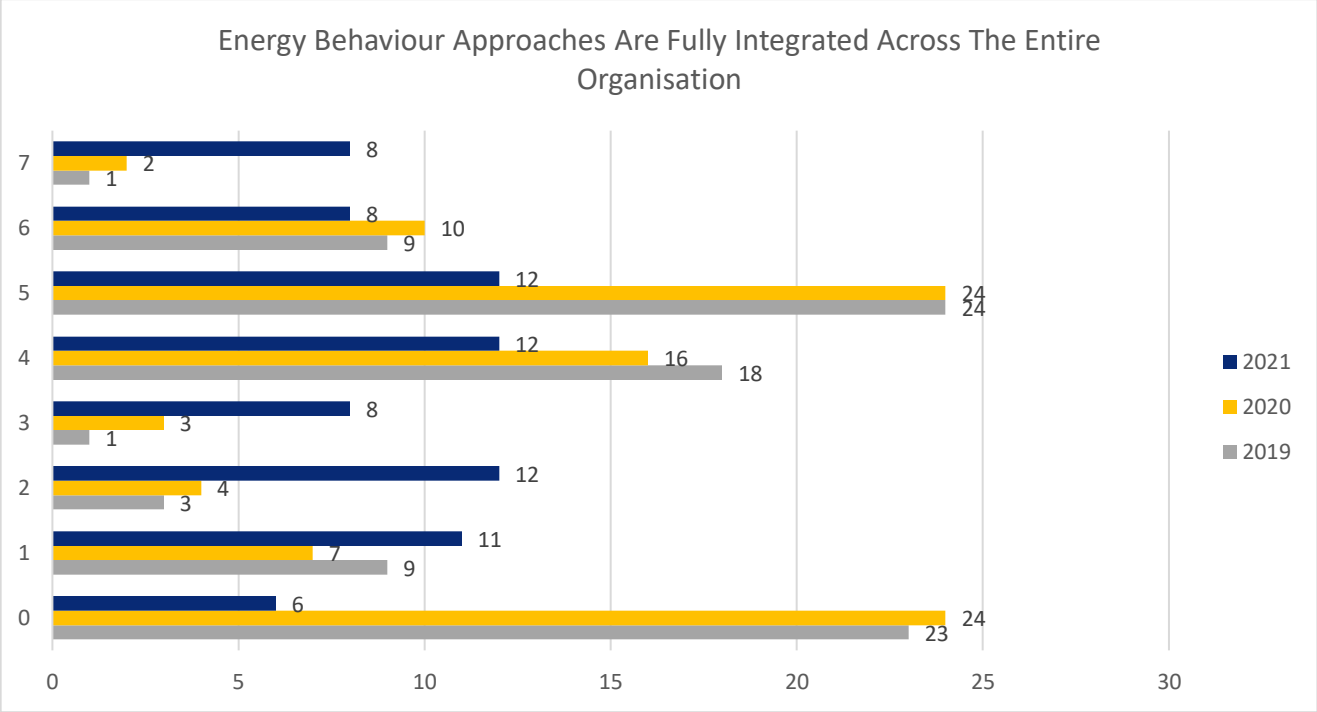

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Figure 5. 11 Self ranking of how well behaviour is integrated across the entire orgaisation (2019-2021 data).

Figure 5.12 provides insights into whether an evaluation has been carried out on energy behaviour initiatives. There was a slight decrease in respondents reporting that a cursory, moderate or full analysis or evaluation was carried on energy behaviour initiatives: 42% (2021), 56% (2020) and 52% (2019).

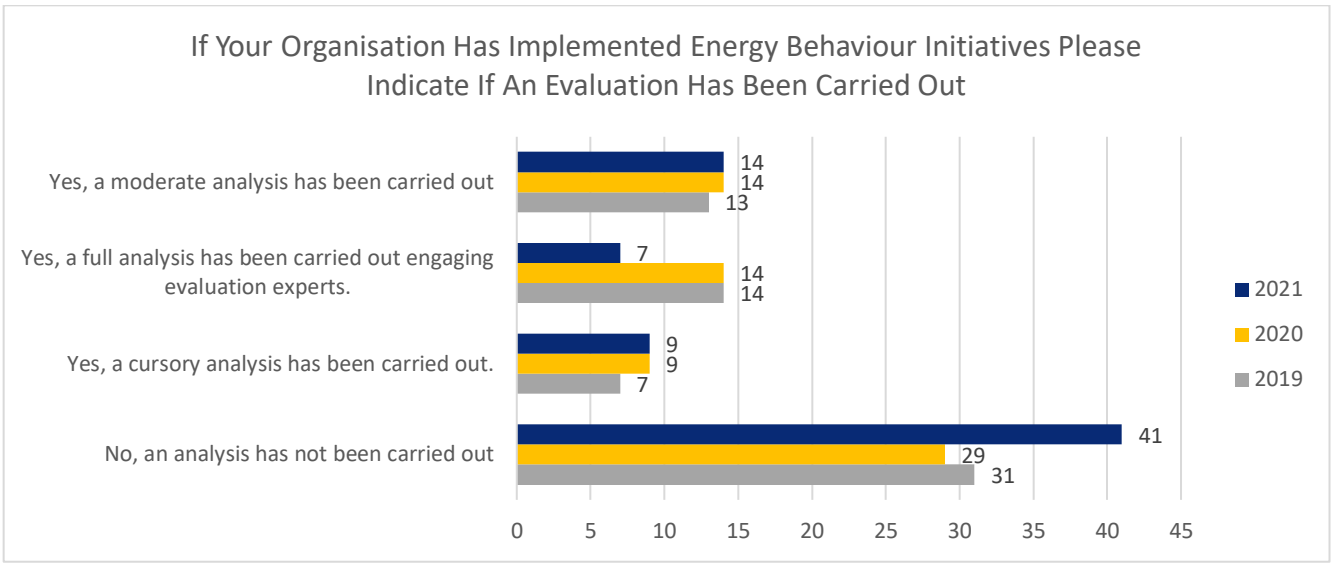

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Figure 5. 12 Have energy behviour initiatives been evaluated? (2019-2021 data).

5.3.4 Energy Behaviour Participation

Leadership support for energy behaviour activities helps guide the organisational initiatives, but it is ultimately up to the staff to carry out these activities. *Figure 5.13* illustrates that 66% of participants fall in the positive range (answering five, six, and seven) in 2021, which means that majority of frontline staff have a voice at the decision-making table. However, this is a decrease from 2020 (85%) and 2019 (87%). Of note is that the portion of participants that were non-responders in 2020/19, decreased by approximately six-fold in 2021, which indicates that more participants are able to consider this question.

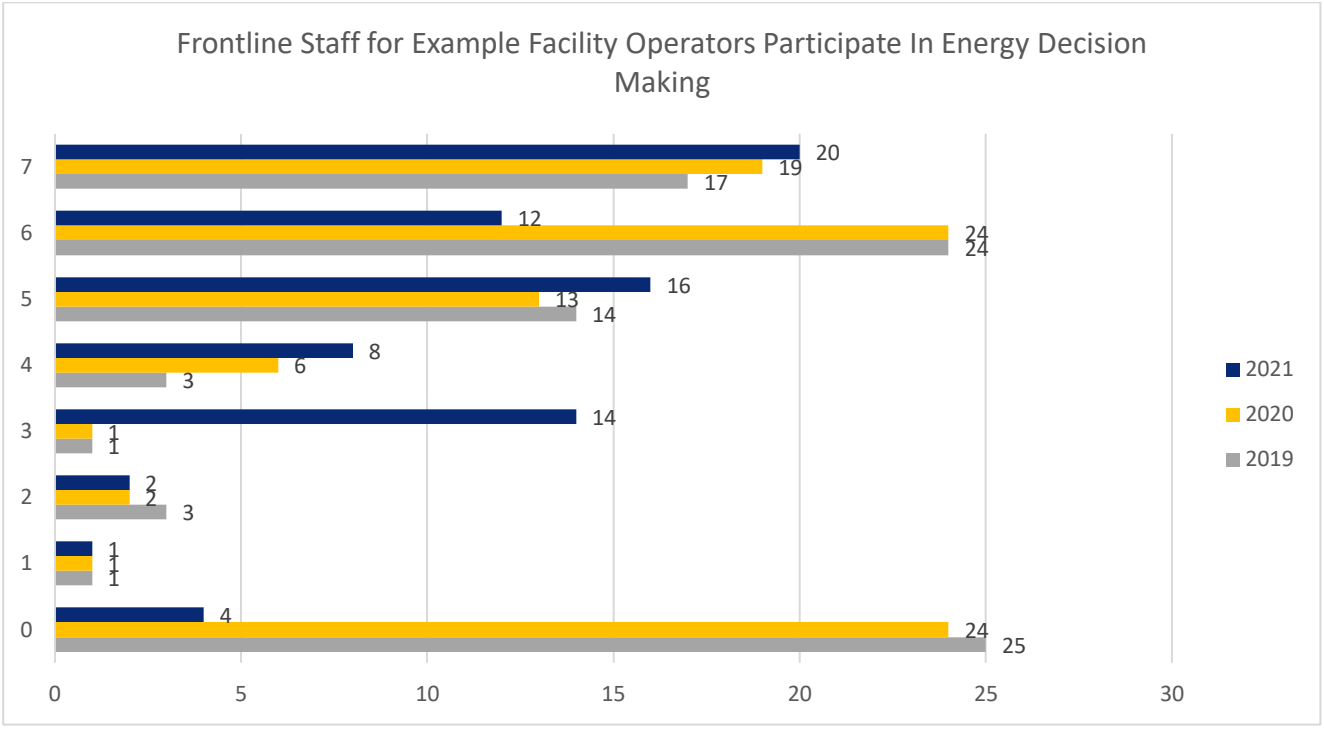

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Figure 5. 13 Frontline staff (i.e., facility operators) participate in energy decision making (2019-2021 data).

As for staff participation in new energy participating activities, *Figure 5.14* shows that 59% of participants fall in the positive range (answering five, six, and seven), which means that majority of frontline staff have tried new energy making activities in 2021.

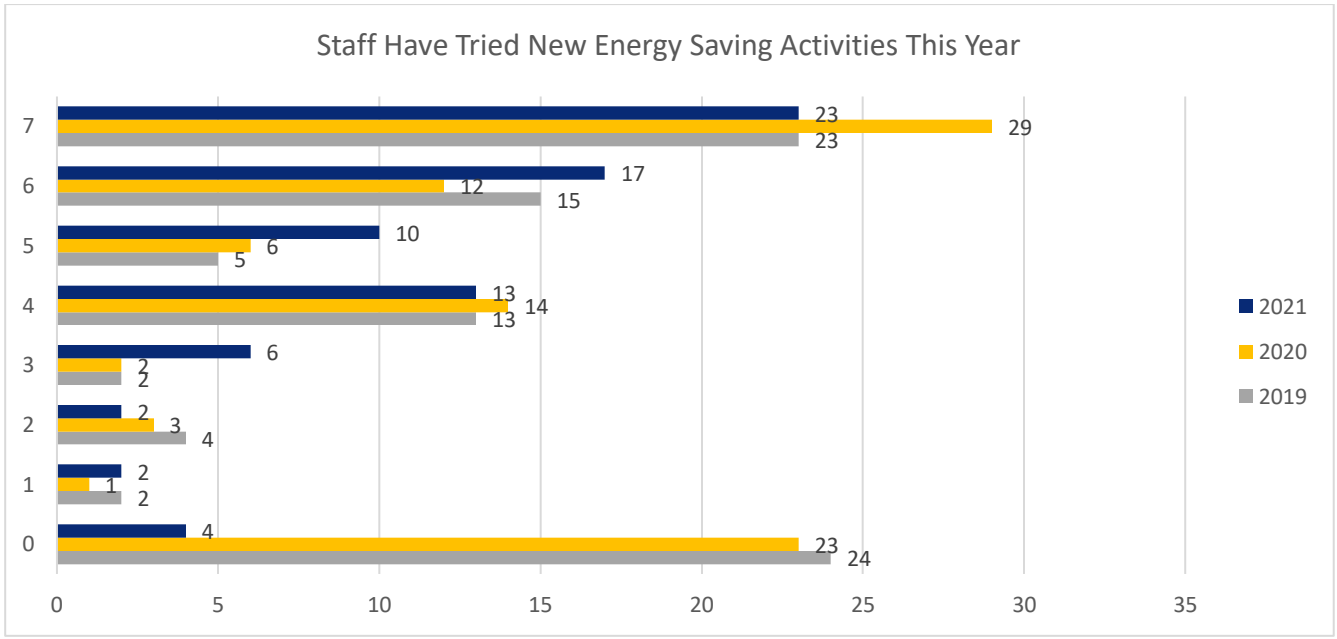

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Figure 5. 14 Staff have tried new energy saving activities this year (2019-2021).

5.5 Summary

Some general conclusions include:

1. EUIs appear to be gradually decreasing for academic hospitals and small hospitals, while there are fluctuations year to year in acute care and community hospitals.
    a. The EUIs for academic hospitals in 2021 (2.37 GJ/m^2) compare well with the median site EUIs reported in the ESPM report on hospitals for 2020[21] (2.4 GJ/m^2).
    b. The 2021 EUIs for community hospitals (3.80 GJ/m^2) and non-acute hospitals (3.21 GJ/m^2) are higher, and indicate that these types of hospitals may need more guidance and help to reduce their energy use.
2. The largest portion of energy use in HCFs is natural gas which is consistent with data presented by NRCan ESPM's Snapshot of Energy Use in Hospitals (2020 data)[22].
    a. Note that reduced use of fossil fuels will contribute to reduced GHG emissions from HCF buildings.
    b. Exploration of non-fossil fuel options for space and water heating should be encouraged where possible (i.e., geothermal systems, recovery of waste heat, solar hot water systems)
3. While over 50% of participants report that they have developed energy use reduction targets and action plans, this should be further encouraged to those HCFs who do not have these in place.
4. Budgets for staff energy-related engagement and outreach decreased significantly (30% in 2021, compared to 51% in 2020.
    a. This may have been due to cost-cutting measures as HCFs faced higher expenses during the COVID-19 pandemic.
5. Combining technical and behavioural practices to reduce energy use needs to be further explored.

5.5.1 Climate Change Resilience and Energy Use

Reducing energy use contributes to environmental sustainability by using fewer resources, and can help reduce costs, but using less energy also helps facilities become more resilient to the impacts of climate change. HCFs must prepare for power outages by having back-up power systems. A facility that has reduced their energy use as much as possible is able to be able to continue to operate on their back-up power systems for a longer period, and thus be more resilient to the impacts of climate change and extreme weather events and other emergencies.

Facilities which have diversified their energy sources, for example by using energy from renewable energy systems, may be able to rely on these alternative energy sources should traditional energy sources become unavailable, thereby increasing their resilience to climate change, while reducing GHG emissions from their energy use. One example is the first renewable

[21] NRCan ESPM Energy Benchmarking Data Snapshot for Hospitals (2020 data) https://natural-resources.canada.ca/energy-efficiency/energy-star-canada/energy-star-for-buildings/energy-benchmarking-data-snapshots/energy-benchmarking-data-snapshot-for-hospitals/24230

[22] NRCan ESPM Energy Benchmarking Data Snapshot for Hospitals (2020 data) https://natural-resources.canada.ca/energy-efficiency/energy-star-canada/energy-star-for-buildings/energy-benchmarking-data-snapshots/energy-benchmarking-data-snapshot-for-hospitals/24230

hospital microgrid in California (2018) at Kaiser Permanente's Richmond Medical Centre parking garage, which operates even if the power grid goes down[23].

5.6 Additional Resources

The following resources are available for guidance on HCF energy and GHG emissions reduction from building operations:

1. To assist the health care workforce address their building GHG emissions, the Coalition developed the GHG+H20 toolkit. Examples of hospital energy-related conservation initiatives that can results in GHG reductions from building operations include those identified in the checklist section of the report including undertaking benchmarking exercises, optimizing lighting, HVAC, and control systems.
2. The Canadian Coalition for Green Health Care in partnership with CASCADES (Creating a Sustainable Canadian Health System in a Climate Crisis) are co-hosts of the Greenhouse Gas Emissions Estimation in Canadian Healthcare Organizations Community of Practice. This network is made up of experts working in the healthcare system in facilities and/or energy management roles. Topics of interest include technical/methodological aspects of estimating greenhouse gas emissions as well as actions to support reduction greenhouse gas emissions in healthcare organizations. Opportunities to connect actions to climate change adaptation and resilience are also in scope. See this link: https://cascadescanada.ca/action-areas/measurement/
3. Greenhouse Gas Emissions Estimation in Canadian Healthcare
    a. A step-by-step guide to greenhouse gas emissions estimation in health systems and care organizations. https://cascadescanada.ca/resources/greenhouse-gas-emissions-estimation-in-canadian-healthcare-playbook/
4. Report: Greenhouse gas emissions estimation in Canadian healthcare systems.
    a. An overview of how greenhouse gas emissions are estimated in healthcare and information on the current state of emissions estimation in healthcare organizations across Canada. https://cascadescanada.ca/resources/ghg-report/

[23] Kaiser Permanente: The Road to carbon neutral. Available from: https://about.kaiserpermanente.org/commitments-and-impact/healthy-communities/improving-community-conditions/environmental-stewardship/the-road-to-carbon-neutral#:~:text=To%20reduce%20pollution%20and%20emissions,the%20power%20grid%20goes%20down.

6. Water

6.1 Background

Canada possesses an abundance of freshwater resources relative to most other nations - roughly eight percent of the world's renewable freshwater resources are in Canada. Consequently, the total supply of water in Canada from renewable sources significantly exceeds total national water-use demand. This rich supply of water resources has caused Canada to lag behind most of the rest of the world in water system efficiency and the implementation of sound water conservation practices. Per capita, Canadians consume more water than citizens of almost any other developed nation.

Health care operations can be very water-intensive and are often the largest water users in their communities. Furthermore, the health sector faces unique challenges related to infection control and prevention requirements, which make the implementation of some common routes for conserving water challenging or unfeasible.

Depending on specific locations, some areas across Canada may experience water shortages and drought, while increased flooding may occur in other areas[24].

6.2 Results

Water data reported by participants was converted to cubic metres (m^3) to maintain consistency. The total average water use across all hospitals in the years 2018-2021 was calculated to be:

- 2018: 100,990 m^3
- 2019: 108,822 m^3
- 2020: 114,825 m^3
- 2021: 89,873 m^3

Figure 6.1 illustrates some trends in water use within hospitals. Academic hospitals are trending to lower water use from 2017 – 2021 (20% reduction). Small hospitals appear to be basically unchanged in their water use. Community hospitals show lower water consumption in 2021 than they were using in 2017 (30% reduction). Non-acute care facilities are using slightly more water in 2021 (3% more) than they did in 2017. As expected, academic hospitals are the largest users of water of the different hospital types.

[24] Bonsal, B.R., Peters, D.L., Seglenieks, F., Rivera, A., and Berg, A. (2019): Changes in freshwater availability across Canada; Chapter 6 in Canada's Changing Climate Report, (ed.) E. Bush and D.S. Lemmen; Government of Canada, Ottawa, Ontario, p. 261–342.

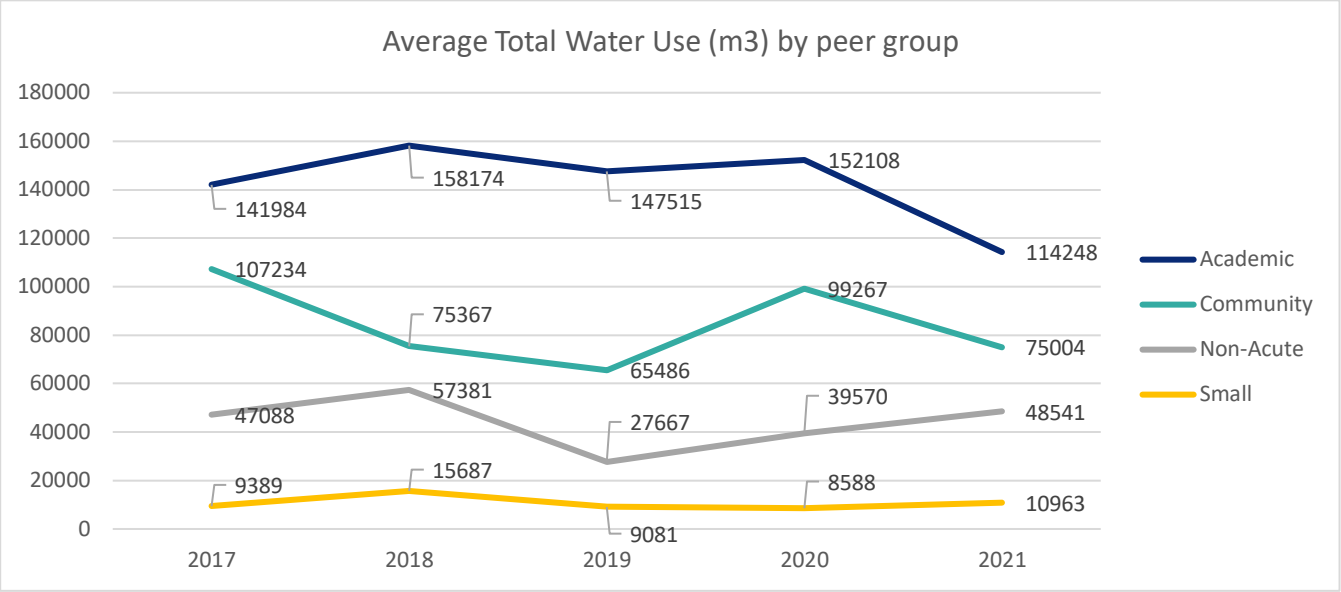

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Figure 6. 1 GHS participant total water use (m3) by per peer group (2017-2021 data).

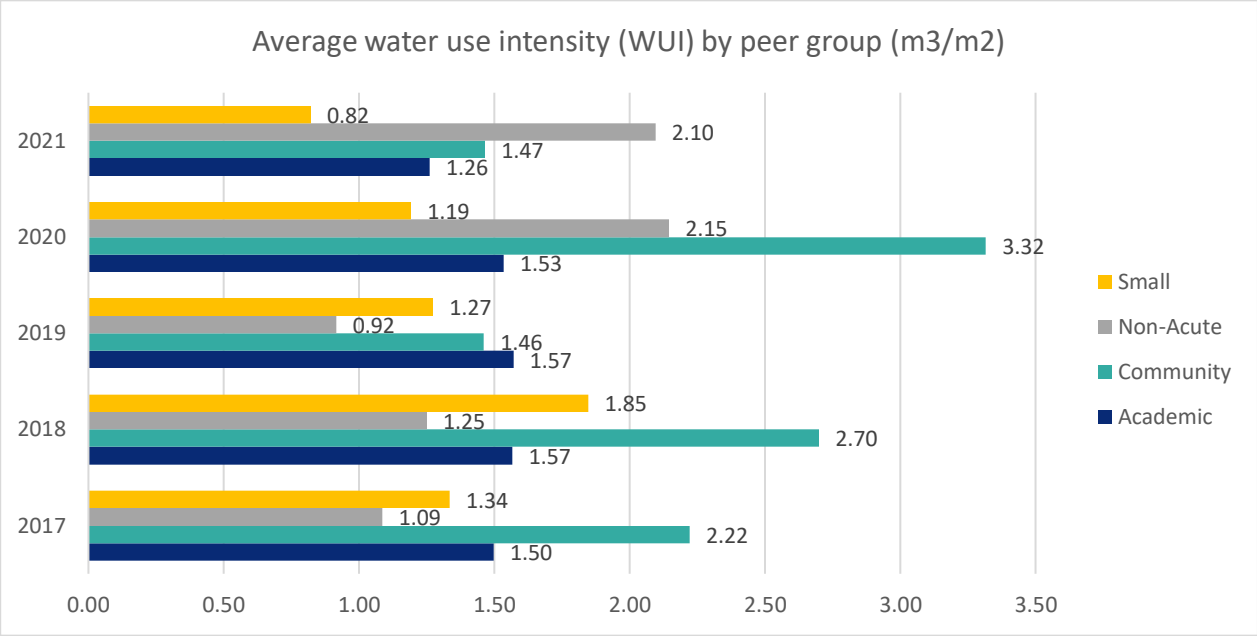
6.2.1 Water Use Intensity

Water Use Intensity (WUI) is expressed as the hospital's annual water use relative to the total conditioned floor area. It is a measure that is used to determine the building's water performance and is useful for benchmarking and setting targets. WUIs are Environmental Performance Indicators that hospitals can compare on an annual basis to see improvements. Participant water data was converted to cubic metres (m^3) and divided by the reported conditioned floor area (m^2) to calculate a final WUI (m^3/m^2).

The total average WUI across all hospitals for the years 2018 – 2021 are as follows:

- 2018: 1.6 WUI (m^3/m^2)
- 2019: 1.5 WUI (m^3/m^2)
- 2020: 1.8 WUI (m^3/m^2)
- 2021: 1.4 WUI (m^3/m^2)

There was a decrease in the WUI across all peer groups from 2020 to 2021, shown in *Figure 6.2*. Trends in lower WUI across the years from 2018 – 2021 occur in both academic hospitals (20% lower in 2021), and the smaller hospitals (56% lower in 2021). Fluctuations in WUIs in the non-acute and community hospitals reveal inconsistencies in their water usage and/or reporting.

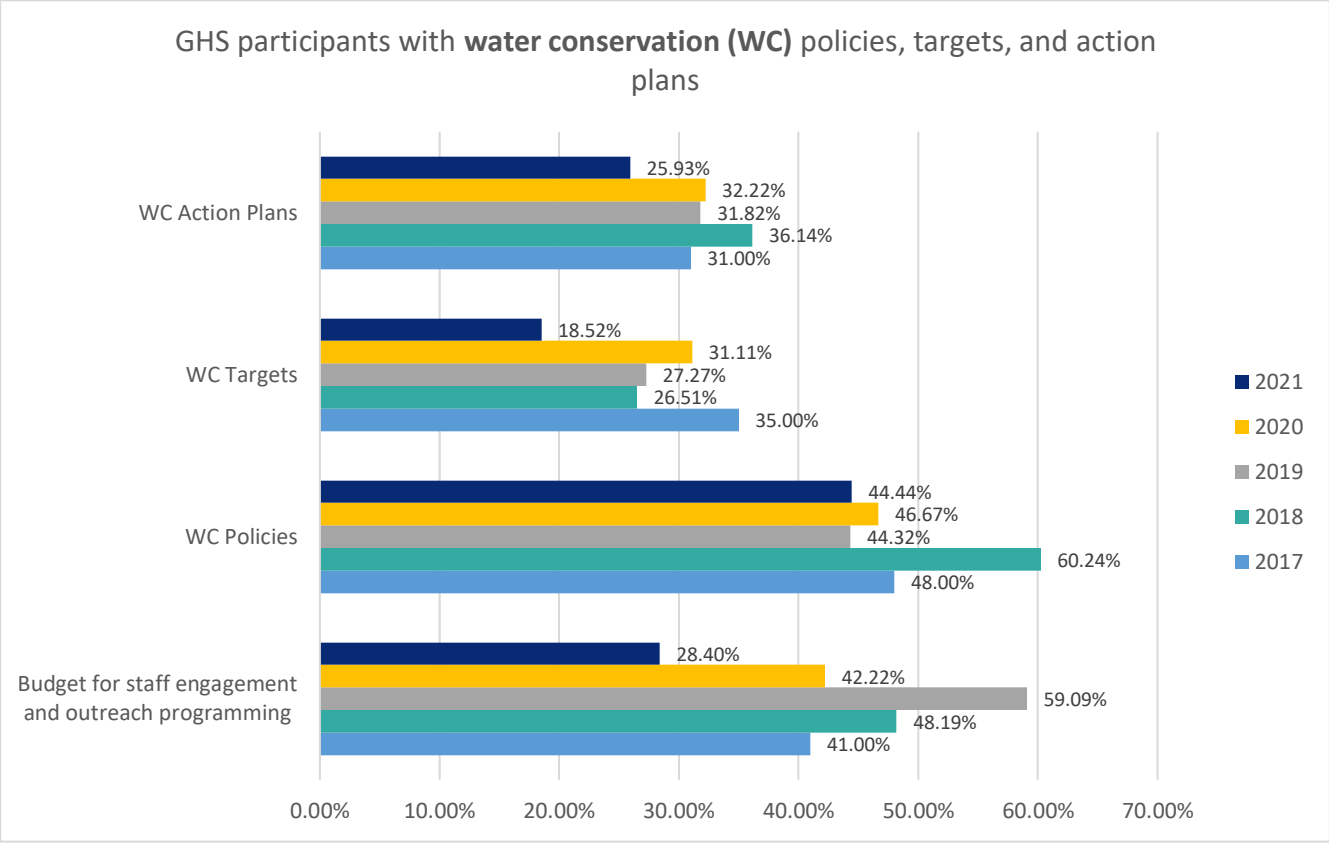


Canadian Coalition for Green Health Care, 2024

Figure 6. 2 Average water use intensity by peer group (2017-2021 data).

6.2.1 Water Conservation Leadership, Initiatives and Innovations

According to *Figure 6.3*, which provides insight into water policy and planning activities at hospitals, the number of hospitals with water conservation policies, targets and action plans decreased in each category from 2020 to 2021. The most significant decrease was budgets for staff engagement and outreach programming, with 63% of hospitals reporting their presence in 2020 and only 28% of hospitals reporting their presence in 2021. These changes in the data can also be reflected in changes of the GHS participants from year to year.



Canadian Coalition for Green Health Care, 2024

Figure 6. 3 GHS participants with budgets for staff engagement, water conservation policies, targets and action plans (2017 – 2021 data).

There are numerous ways hospitals can incorporate water conservation measures at their site. Every year the GHS questionnaire asks participants what new technologies or services for water efficiency and/or conservation sites have implemented. These are just a few examples of technologies and services undertaken by hospitals:

- Having water data along with personal water use reduction tips strategically shared during Earth Day events and through monthly poster campaigns.
- Utilizing a top-down approach of sharing organizational cost and consumption data, then presenting ongoing water use reduction projects and providing personal use reduction information to help individuals understand the grand scale of water use at their facility.
- Regular review of water consumption data to identify areas for potential improvement and discuss opportunities for savings.
- Installation of low-flow water fixtures and motion sensors for toilets and faucets.
- Implementation of Deep Lake Water Cooling and Blow Down Heat Recovery.
- Harvesting rain water.
- Updating of balancing valves and hot water heaters.
- Optimizing geo-exchange systems.
- Water cooled units replaced with alternative cooling options

- Participation in an Energy Service Company (ESCO) project.

6.3 Summary

Some general conclusions include:

1. WUIs appear to be gradually decreasing for academic hospitals and small hospitals, while there are fluctuations year to year in non-acute care and community hospitals. WUIs reported in 2021 for academic hospitals (1.26 m^3/m^2), small hospitals (0.82 m^3/m^2), community hospitals (1.47 m^3/m^2) and non-acute hospitals (2.10 m^3/m^2) will also depend on what water using activities are practiced on site. Many facilities no longer have onsite laundries, and water use in landscaping is starting to be curtailed in many municipalities to reduce water use during times of restricted access to potable water.
    a. The median WUI reported for US hospitals is 2.27 m3/m2 [25]. The highest water use intensities are reported for community senior living and hospitals of the12 types of institutional and retail facility types reported on.
    b. Less than 50% of respondents report that they have policies for water conservation and less than a quarter of participants report that they have developed water use reduction targets and action plans. These actions should be further encouraged.
2. Budgets for staff water-related engagement and outreach decreased significantly (28% in 2021 compared to 63% in 2020).
3. This may have been due to cost-cutting measures as HCFs faced higher expenses during the COVID-19 pandemic.

6.3.1 Climate Change Resilience and Water Use

Reduced water use can help a health care facility (HCF) become more resilient, as it can operate for longer periods of time when potable water issues do arise. HCFs need to undertake resiliency assessments and determine how their facility may be impacted by climate change-related events.

Climate change can result in various types of water concerns for HCFs:

1. Droughts and water scarcity can become more common occurrences in some areas and happen more frequently due to our warming climate.
    a. HCFs need to identify if droughts will be a concern in their location as part of their climate change resiliency assessments.
    b. Climate change resilient hospitals have prepared for water system interruptions, because when water supplies are not available, this can severely impact the safe operations of a HCF and safe patient care within hours of water being cut off.
2. Droughts have also been precursors to wildfires.

[25] US ENERGY STAR Portfolio Manager, What is Water Use Intensity? https://www.energystar.gov/buildings/benchmark/understand_metrics/what_water_use_intensity_wui

3. Droughts can impact human health through increased respiratory diseases, water-borne diseases, food-borne diseases, vector-borne diseases and mental health. HCFs may see increased admissions due to these and other health impacts[26].
4. Extreme weather events can also bring strong storms which impact and damage drinking water systems, resulting in contaminated drinking water, and possibly resulting in more hospital admissions.
5. Flooding due to extreme rain or increases in coastal water flooding can also impact certain HCFs.

By 'anticipating impacts, assessing local climate risks and vulnerabilities, developing action plans, improving surveillance systems, building climate-resilient water systems, and promoting intersectoral collaboration to protect water resources and address climate-related risks', mitigation and adaptation actions can help to reduce the effects of climate change on health impacts[27].

6.4 Additional Resources

The following resources are available for guidance on HCF water and GHG emissions reduction from building operations:

1. To assist the health care workforce address building water and GHG emissions, the Coalition developed the GHG+H20 toolkit[28]. Health care workers can consult the toolkit to identify specific water-related conservation initiatives that can result in GHG emissions reductions from building operations.

[26] National Collaborating Centre for Environmental Health. Health Impacts of Drought web page. https://ncceh.ca/resources/subject-guides/health-impacts-drought-canada

[27] Takaro, T., Enright, P., Waters, S., Galway, L., Brubacher, J., Galanis, E., McIntyre, L., Cook, C., Dunn, G., Fleury, M. D., Smith, B., & Kosatsky, T. (2022). Water Quality, Quantity, and Security. In P. Berry & R. Schnitter (Eds.), *Health of Canadians in a Changing Climate: Advancing our Knowledge for Action*. Ottawa, ON: Government of Canada.

[28] Canadian Coalition for Green Health Care. GHG+H2O Green Facility Toolkit. Available from https://greenhealthcare.ca/ghgwater

7. Waste

7.1 Background

Environment and Climate Change Canada estimates that in 2020 approximately 36 million tonnes of waste was disposed of in Canada[29]. Within the 2022-2026 Federal Sustainable Development Strategy, the Federal Government has set targets and indicators for the management of waste, resources and chemicals and has identified a 30% reduction of waste per person by 2030 from a 2014 baseline, and a 50% reduction of waste per person by 2040[30].

Environment and Climate Change Canada's reporting on our official GHG inventory also looked at landfilled waste[31] and *Figure 7.1* reveals the following waste components disposed of to landfill in Canada. Components relevant to the day-to-day activities of the health sector include food waste, diapers, paper and plastics.

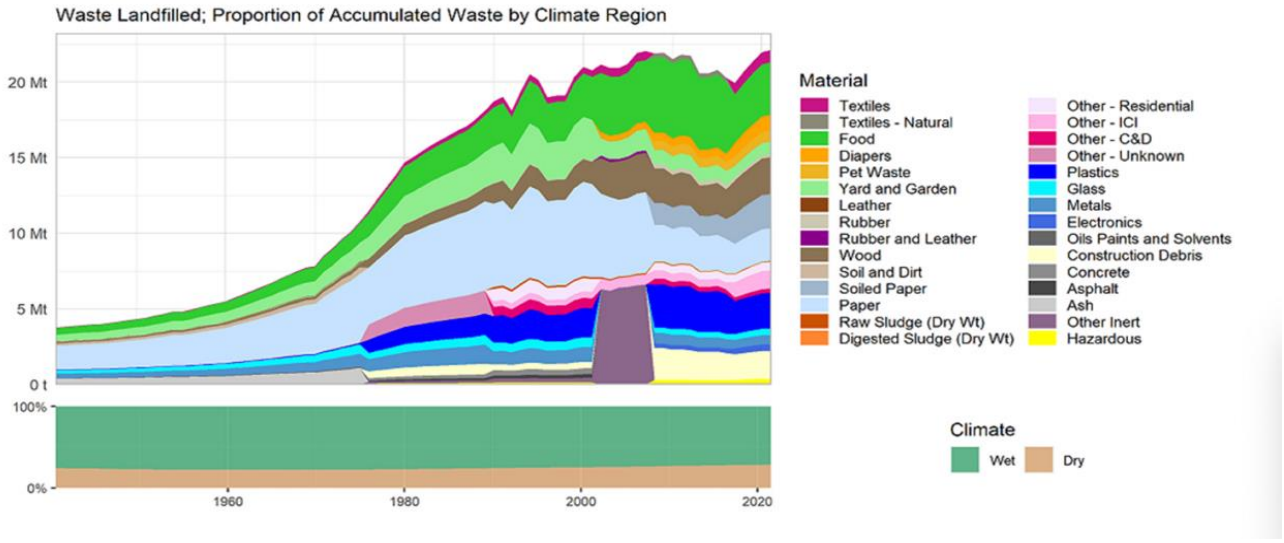


Figure 7. 1 Waste landfilled: proportion of accumulated waste in Canada (2023).

In a peer reviewed journal article, 78 hospitals around the world were assessed for their waste generation rates[32]. Canadian hospitals were identified as the second greatest waste generator at 8.2 kg/bed/day, with USA hospitals cited as the highest waste generators at 8.4 kg/bed/day. Canadian hospitals generated more than double that of European hospitals. For example, in

[29] Environment and Climate Change Canada. Solid waste diversion and disposal web page 2024. From https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/solid-waste-diversion-disposal.html

[30] Government of Canada. Achieving a Sustainable Future. 2022-2026 Federal Sustainable Development Strategy. From https://www.fsds-sfdd.ca/en

[31] Canada's Official GHG Inventory. 2023. Pg 213 Source: https://publications.gc.ca/collections/collection_2023/eccc/En81-4-2021-1-eng.pdf

[32] Narendra Singh, Oladele A. Ogunseitan & Yuanyuan Tang (2022) Medical waste: Current challenges and future opportunities for sustainable management, Critical Reviews in Environmental Science and Technology, 52:11, 2000-2022, DOI: 10.1080/10643389.2021.1885325 (with waste data from 2000 from 2020)

comparison, hospitals in the UK generated 3.3 kg/bed/day, hospitals in France generated 1.9 kg/bed/day and hospitals in Germany generated 3.6 kg/bed/day. Other sources indicate that waste generation in Canadian hospitals is in the range of 6 kg/bed/day[33]. It is estimated that hospitals generate 200,000 - 300,000 tonnes of waste per year, or 0.8% of waste disposed of in Canada, using estimated waste generation rates of 6 – 8.2 kg/bed/day and 93,550 hospital beds[34].

The types of waste from hospitals have been identified through hospital waste audits. *Figure 7.2* shows the results of a waste audit undertaken at an Ontario hospital reported in 1990, and *Figure 7.3* of a pre-pandemic hospital waste audit conducted in a BC hospital. Of note are:

- There was a large increase of plastic waste over the 30 years between the waste audits – from an estimated 14% in 1990 to between 30 – 40% in the 2019 waste audit – including disposable PPE.
- Food waste is a significant portion of the waste in both waste audits.
- Paper waste, which likely became part of the mixed recyclables, but significantly reduced likely due to digitization.

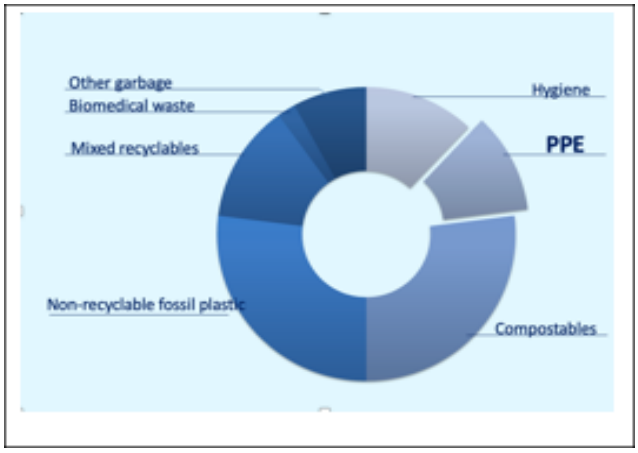


Figure 7. 2 Results of pre-pandemic hospital waste audit conducted in a BC hospital (Courtesy of BC GreenCare, 2019).

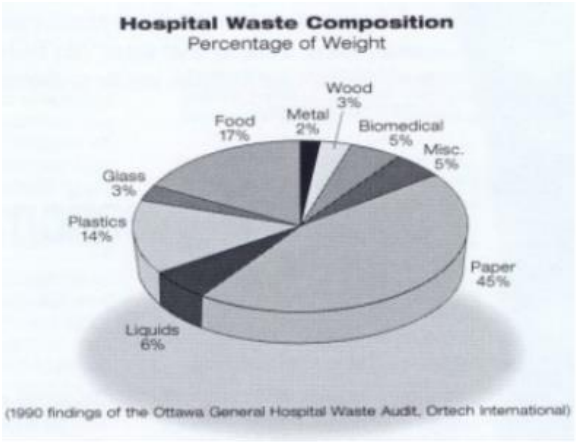


Figure 7. 3 Waste composition Ottawa from General Hospital in 1990.

Hospitals use a significant quantity of single-use products and many of these are plastic. Single-use plastics in health care is advocated on behalf of the manufacturers to the health care work-force to expect increased infection control results. These increased infection control expectations are being challenged by champions in the health sector, who also see the large amount of waste emanating from use of disposable products, and who understand the high degree to which sterilization processes are effectively supporting reusable products – by onsite Medical Device Reprocessing Departments, health care laundry operations, and offsite sterilization and reprocessing companies.

Waste management and sustainable procurement approaches which prioritize reduction, reuse,

[33] Synergie Sante Environnement. Microsite: Gestion des Matières Résiduelles. Accessed December 8, 2022. https://gmr.synergiesanteenvironnement.org/#1525353852430-c5af10e3-96ee.
[34] Canadian Institute for Health Information (CIHI). Hospital beds staffed and in operation 2020-2021. Accessed January 7, 2023. https://www.cihi.ca/sites/default/files/document/beds-staffed-and-in-operation-2020-2021-en.xlsx.

reprocessing, repair, and repurpose over recycling, and then disposal, seeks to keep resources in the economy before any final disposal options are considered. This shift from a linear approach to resource use (take-make-waste) towards a more circular model of managing wastes, is known as the Circular Economy[35].

There are many examples of circular economy practices which have already been incorporated into health care practices, including:

- Reduction practices such as optimizing medical implements on operating room trays, using disposable gloves only as recommended,
- Reusable PPE gowns, drapes, underpads, and reusable metal sterilization containers,
- Reprocessing medical devices,
- Repairing of medical devices and vinyl mattresses,
- Repurposing unneeded medical equipment and providing these items to those in need.

Recycling is practiced in hospitals and does keep materials from final disposal and in some facilities recyclable materials can make up 40% or more of the total waste disposed[36]. However, life cycle analysis[37] for many disposables (and possibly recyclable) versus reusable medical devices reveals that reusables have many benefits over their disposable counterparts.

Many reusables have a reduced environmental impact (including lower GHG emissions), are often more cost effective, create local jobs, and ensures that the health system has a continuous source of essential medical devices, even if the supply chain becomes interrupted, such as happened during the COVID-19 pandemic and has happened during climate-related extreme weather events.

Examples of medical product shortages which occurred as a result of supply chain disruptions include:

- 2017: Hurricane Maria resulted in power outages in Puerto Rico for many months, where 33% of the islands GDP comes from its pharmaceutical sector with ≈ 50 firms producing medications, and 40 making medical devices. Significant shortages of normal saline solutions were seen across hospitals in North America[38]. Interestingly, because there was an abrupt IV fluid shortage following this natural disaster, changes in practice led to re-introduction and implementation of a previously used high value care model known as IV syringe bolus push (IVP) instead of using intravenous drip infusions. Pharmacists evaluated opportunities for self-administration of antimicrobials and found that by re-introducing this older practice they found improved efficiency, reduced costs, and where

[35] Ellen MacArthur Foundation. https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview?gad_source=1&gclid=EAIaIQobChMI2aX5lpikhAMVInBHAR1Ryg-bEAAYASAAEgKw2_D_BwE
[36] CMAJ, 2012
[37] Healthcare Life Cycle Analysis. A database of healthcare's environmntal impacts. https://healthcarelca.com/
[38] Sacks CA, Kesselheim AS, Fralick M. The Shortage of Normal Saline in the Wake of Hurricane Maria. *JAMA Intern Med.* 2018;178(7):885–886. doi:10.1001/jamainternmed.2018.1936

the practice did not affect safety or efficacy[39].

- 2020: COVID-19 pandemic resulted in shortages of disposable PPE, which resulted in many Canadian hospitals increasing their use of reusable isolation gowns, goggles and reusable respirators[40]
- 2023: A tornado almost completely destroyed a majour Pfizer pharmaceutical plant warehouse in North Carolina in July 2023, destroying raw materials and finished medications. The plant made about 150 medicines including fentanyl and morphine for pain management, anesthetics and is one of the largest facilities in the world for sterile injectable drugs[41].

Hospitals collect many categories of waste for disposal, recycling and reuse. These categories include:

1. Landfill
2. Compost, food waste
3. Confidential
4. Cardboard recycling
5. Paper recycling
6. Cans and bottles recycling
7. Biomedical Yellow Bag & Sharps Container
8. Cytotoxic, Anatomical, Infectious Red Bag & Sharps Container
9. Pharmaceutical Waste
10. Chemical/Flammable waste
11. Construction
12. Linen
13. Medical device recovery
14. Electronic waste
15. Anesthetic Gas Recovery
16. Fluorescent Light Bulbs
17. Batteries and Toner Cartridges
18. Grease
19. Nuclear
20. Donations

In some provinces, setting up waste diversion programs is a requirement of regulations. For

[39] Yagnik KJ, Brown LS, Saad HA, Alvarez K, Mang N, Bird CE, Cerise F, Bhavan KP. Implementation of IV Push Antibiotics for Outpatients During a National Fluid Shortage Following Hurricane Maria. Open Forum Infect Dis. 2022 Mar 21;9(5):ofac117. doi: 10.1093/ofid/ofac117. PMID: 35493115; PMCID: PMC9045948.

[40] Varangu L, Cowan K, Amin O, Sarrazin M, Dawson M, Rubinstein Ed, Miller F, Hirst L, Trbovich P, Waddington K. Reusable personal protective equipment in Canadian healthcare: Safe, secure, and sustainable. Health Care Management Forum. 2023 July;36(4):207-216

[41] NBC News. Tornado that struck Pfizer plant ripped through warehouse where drugs were stored. July 21, 2023. Available from https://www.nbcnews.com/health/health-news/tornado-struck-pfizer-plant-ripped-warehouse-drugs-stored-rcna95384

example, in Ontario, public hospitals (defined as general hospitals with 100 or more beds, teaching hospital or hospitals for chronic patients with 200 or more beds) are required to collect for recycling the following: aluminum and steel cans, glass bottles and jars, paper and newsprint, and cardboard under regulation 102/94 and 103/94 under the Environmental Protection Act. In addition, hospitals that are subject to the IC&I waste reductions and generate over 150 kgs of organic waste/week are also required to set up organic waste diversion programs[42]. A 2021 report assessing food waste in the IC&I sector, revealed that waste disposed of by hospitals consisted of 21.24% food and organic waste. Most of the food and organic waste would likely have come from patient meals, with some from staff and visitor meals. 61% of the surveyed facilities had a food and organic waste diversion program[43].

Biomedical waste poses potential risks to public health and our environment and therefore must be segregated and managed accordingly. In Ontario, the definition of biomedical wastes is provided in the Environmental Protection Act[44] as:

a) Human anatomical,
b) Human blood waste,
c) Animal anatomical waste,
d) Animal blood waste,
e) Microbiology laboratory waste,
f) Sharps waste,
g) Cytotoxic waste,
h) Waste that has come into contact with human blood waste that is infected or suspected of being infected with any infectious substance (human), or
i) Waste containing or derived from one or more wastes described in clauses (a) through (h), but does not include amongst other things,
j) Treated biomedical waste, or
k) Dialysis waste not saturated with blood or blood products that is tubing, filters, towels or disposable sheets.

Biomedical waste is more expensive to dispose of. Most facilities generate less than 10% of their total waste as biomedical wastes. If the percentage is higher, then the biomedical waste is contaminated with non-hazardous wastes or recyclable wastes and the facility will pay higher disposal costs. Training staff on proper segregation of wastes can reduce these costs.

Forward-thinking health care facilities are starting to seek products for health services that result in less waste, and many are working together in sustainable purchasing initiatives. Some in the

[42] Office of the Auditor General Ontario. Value for Money Audit: Non-hazardous waste reduction and diversion in the IC&I sector. November 2021. From: https://www.auditor.on.ca/en/content/annualreports/arreports/en21/ENV_ICI_en21.pdf
[43] Overview of Organic Waste Management in Canada's Industrial, Commercial & Institutional (ICI) Sector (AET Group Inc., 2021)
[44] Management of Biomedical Waste in Ontario https://www.ontario.ca/page/c-4-management-biomedical- waste-ontario

medical community are calling for a systemic transformation in the medical device industry to a circular economy that will support a low-emissions future, while providing the delivery of excellent health care we have been accustomed to[45].

This section provides information on the quantities of non-hazardous waste, recyclable materials, biomedical waste, and the presence of circular economy practices. Non-hazardous materials are generally managed through landfill (or in some municipalities through their incinerators) and is the largest component of hospital waste. Recyclable materials include blue bin (which includes plastic, glass or metal/cans and paper), green bin (organic wastes), and other recyclable materials with specific diversion markets such as electronic wastes, and scrap metal.

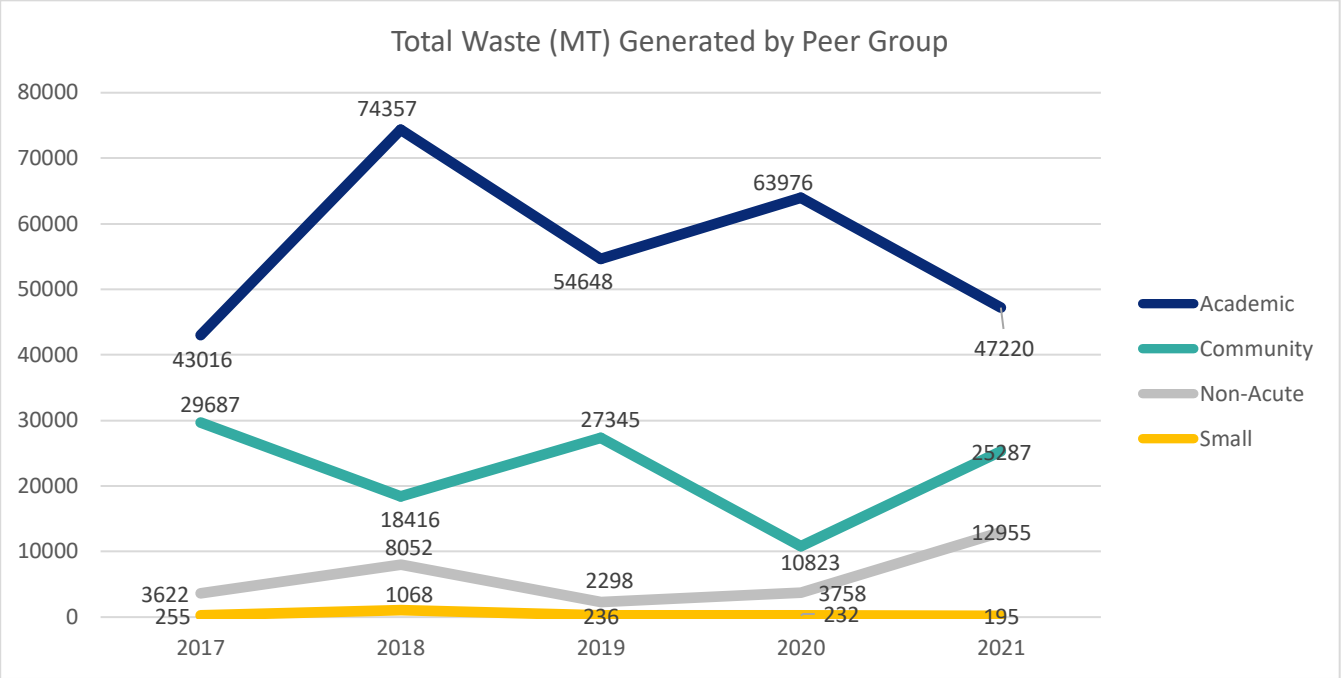
7.2 Results

Participants generated a total of 85,657 Metric Tonnes (MT) of waste in 2021. This total is a slight increase from the total of 78,789 MT in 2020. However, the total waste generated remains below the 2018 total of 101,893 MT likely due to a lower number of participants.

The primary Environmental Performance Indicator (EPI) for waste is the Waste Diversion Rate. Collectively, participants from the 2021 data call diverted a total 24,935 MT of waste (includes blue bin, green bin, and other recyclable materials) from the landfill, which is 29% of the total waste generated. Compared to 2020 data which saw 31% waste diversion this is only a slight decrease. This difference is most likely due to a lower number of participants or changes in GHS participants from year to year.

Figure 7.4, shows total waste by peer group where academic hospitals consistently produce the highest amount, followed by community hospitals, then non-acute hospitals and small hospitals.

[45] MacNeill AJ, Hopf H, Khanuja A, Alizamir S, Bilec M, Eckelman MJ, Hernandez L, McGain F, Simonsen K, Thiel C, Young S, Lagasse R, Sherman JD. Transforming The Medical Device Industry: Road Map To A Circular Economy. Health Aff (Millwood). 2020 Dec;39(12):2088-2097. doi: 10.1377/hlthaff.2020.01118. PMID: 33284689.



Canadian Coalition for Green Health Care, 2024.

Figure 7. 4 Total waste generated by peer group (2017 – 2021 data).

7.2.1 Waste Generation by Type

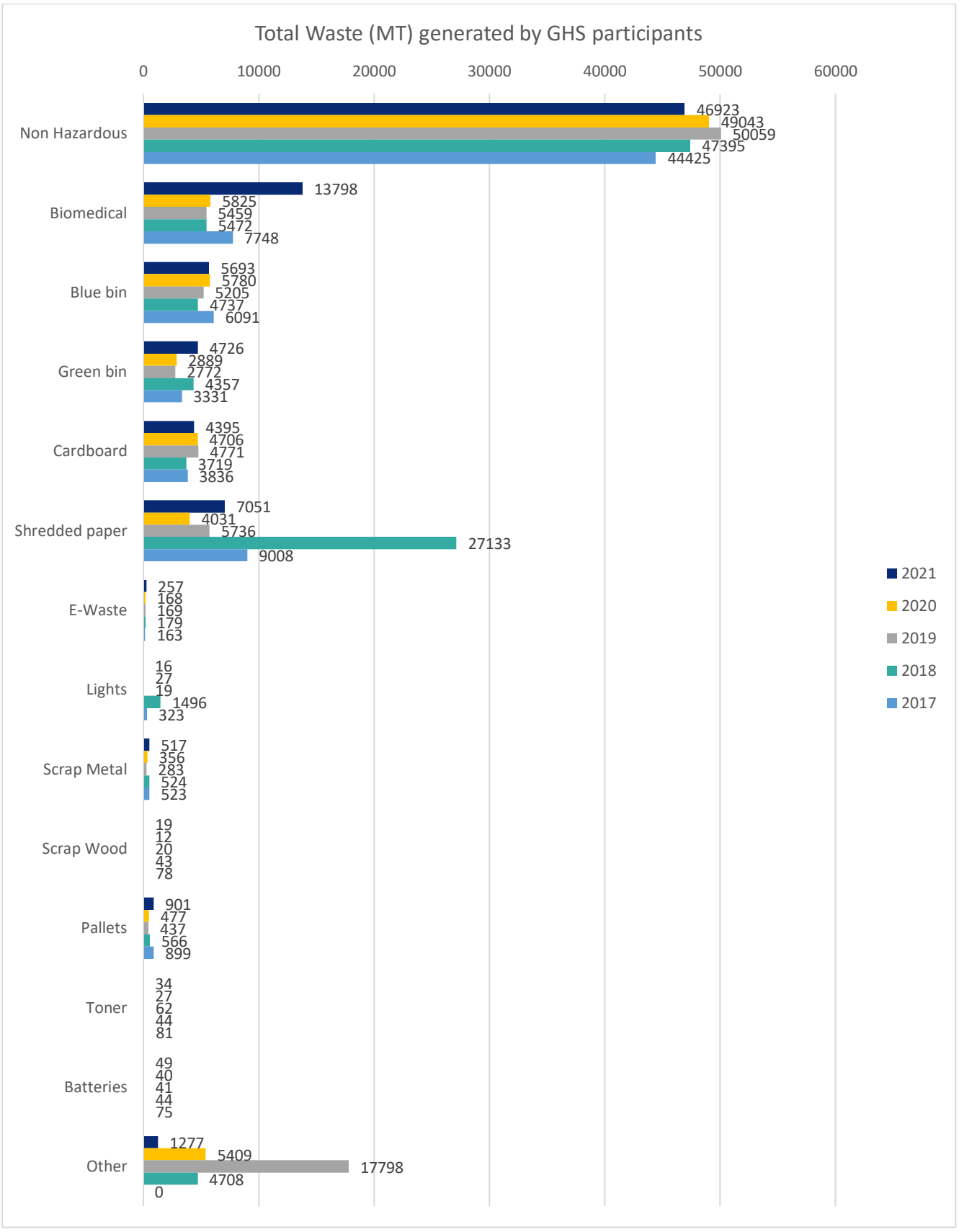
For all participants the following waste quantity information and percentage of waste type is summarized in *Table 7.1* below:

Waste Type	Total waste/ material generated (MT)	Average % of total waste
General/Non-Hazardous	46923	54.78%
Biomedical	13798	16.11%
Blue bin	5693	6.65%
Green bin	4726	5.52%
Cardboard	4395	5.13%
Shredded paper	7051	8.23%
E-Waste	257	0.30%
Lights	16	0.02%
Scrap metal	517	0.60%
Scrap wood	19	0.02%
Pallets	901	1.05%
Toner	34	0.04%
Batteries	49	0.06%
Other	1277	1.49%
Total Waste Generated	85,656	

Table 7. 1 Percentage and total waste generated by all participating hospitals (2021 data).

The summary from *Table 7.1* reveals that the average recycling rate (waste that does not include non-hazardous and biomedical) by all participants is 29% in 2021. Based on *Table 7.1* and the types of recyclable materials and their quantities shown in *Figure 7.5* shredded paper makes up the largest quantity of recyclable materials, followed by blue bin materials, and green bin (organic or food wastes), and cardboard for 2021.

The average percentage of biomedical waste is 16.1%, which is higher than the expected ten percent. The data shows that there are facilities that have improved on properly segregated materials and placed only biomedical waste in the biomedical waste containers.



Canadian Coalition for Green Health Care, 2024.

Figure 7. 5 Total waste generated by type of waste (2017-2021 data).

7.2.2 Waste Intensity

A benchmarking comparison can be made between the total waste generated by hospitals for the 2021 GHS data collected, based on similar peer groups. As the GHS participants were classified under four specific peer groups, a waste intensity comparison can be made by relating the waste for each peer group to the floor area, number of beds, inpatient days, and outpatient visits. With respect to waste management in hospitals, an EPI that is commonly used to analyze hospital waste generation is the comparison of weight of waste (MT) to number of beds. *Table 7.2* shows that participants had a total average waste intensity of 3.96 MT/bed. This is approximately 1% increase from 2020 data where the total average waste intensity was 2.955 MT/bed.

In order to display this information more clearly, *Table 7.2* outlines the average waste KPI's for each peer group. The average waste intensity is highest in academic hospitals, while the others see slight variances in their waste intensity. The average waste per bed is lowest in non-acute hospitals and greatest in academic hospitals. The average waste per in-patient day is greatest in academic hospitals and the average waste per outpatient visits is greatest in non-acute hospitals. The average waste generation is 6 kg/bed/day.

Peer Group	Average Waste Intensity (MT/m2)	Average Waste Bed	Average Waste MT/MT/ Inpatient day	Average Waste MT/ Outpatient Visit	Total Waste KG/ Bed/ Day
Community	0.031	4.39	0.035	0.018	7
Academic	0.011	4.25	0.022	0.011	6
Non-Acute	0.023	2.37	0.015	0.031	3
Small	0.005	2.31	0.010	0.003	6
All	**0.018**	**3.96**	**0.024**	**0.015**	**6**

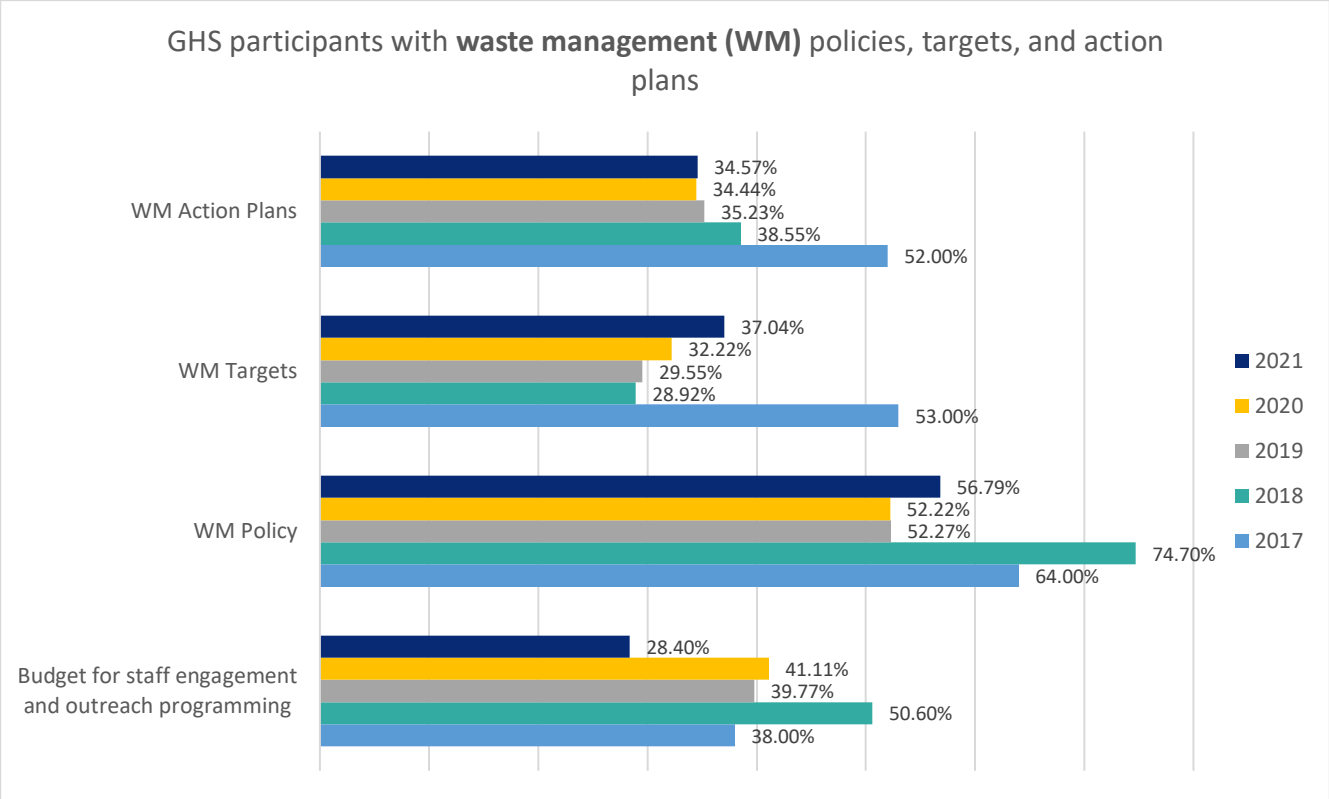
Table 7. 2 Average waste intensity by KPIs and peer group (2021 data).

7.2.3 Waste Management Leadership, Initiatives and Innovations

The purpose of a waste management policy is to clearly define the goals and objectives for hospitals with respect to their waste reduction, reuse and recycling. Hospitals with an appointed committee of waste management champions, dedicated to green initiatives (i.e. Green Team) can provide leadership in creating waste management policies. Each hospital could benefit from having an Environmental Management System (EMS) that starts off with developing policies and procedures so that hospital staff can follow them as a template for waste management.

Figure 7.6 illustrates the number of participants with waste management policies, targets and

action plans in place. Around 57% of hospitals have implemented waste management policies, which demonstrates a small increase from 52% in 2020. In 2021, around 37% of hospitals reported having waste management targets and 35% having waste management action plans in place, which is similar to the year before. Only 28% of the hospitals report that they have budgets for staff engagement and outreach programming in 2021, which is a significant decreased from 42% in 2020.



Canadian Coalition for Green Health Care, 2024.

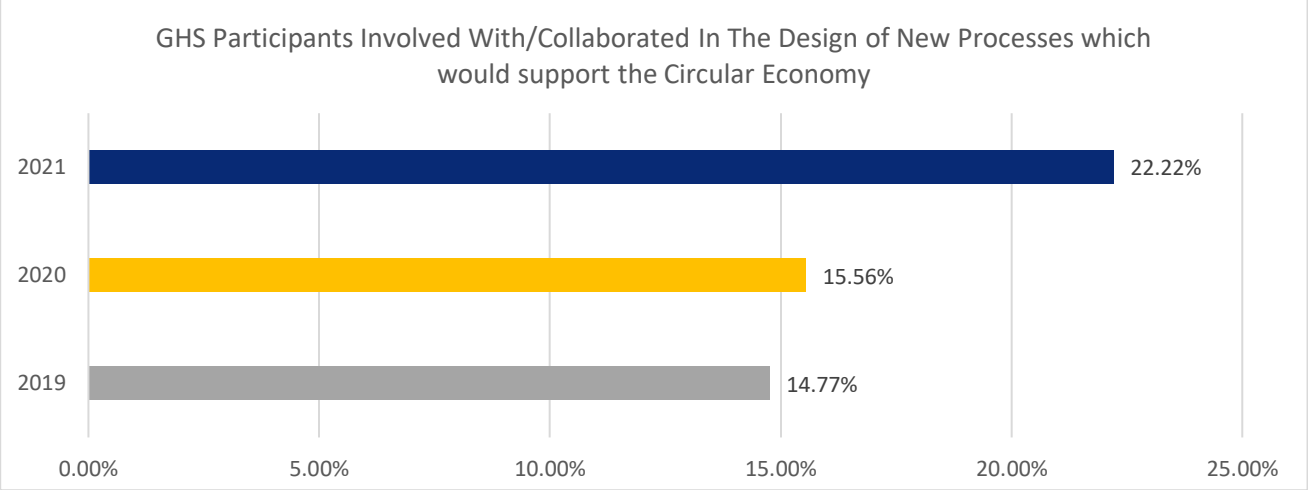
Figure 7. 6 Waste management policies, targets and action plans and budgets for staff engagement (2017-2021).

Participants provided a range in identified targets to reduce waste. These ranged from increasing waste diversion rates to increasing recycling recovery rates and decreasing use of non-recyclables.

7.2.4 Circular Economy

A circular economy is based on the principles of designing out waste and pollution, while keeping products and materials in use, and regenerating natural systems. A linear economy holds no sustainable value for health care. Health care's participation in a circular economy would provide a major opportunity to yield direct benefits to the sustainability and efficiency of the delivery of health care services and indirect benefits from reducing harmful environmental impacts of hospital- generated waste.

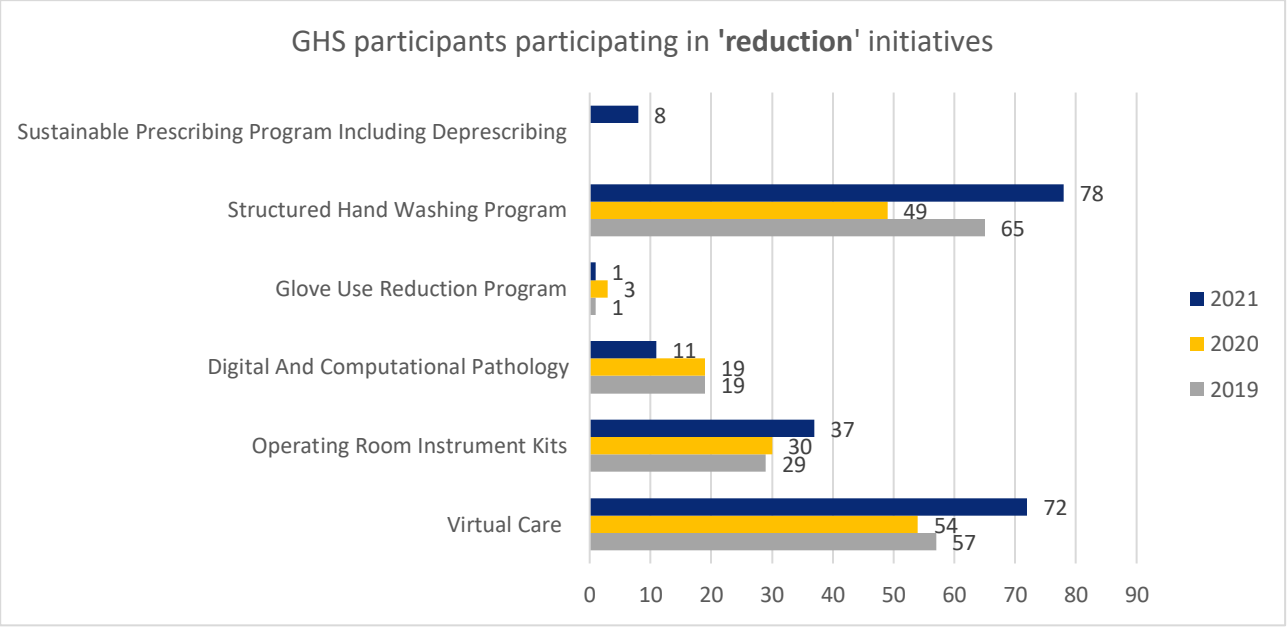
The 2019/2020 data call was the first time the GHS survey had a specific section for circular economy questions, but the survey has been asking participants questions on recycling and reuse initiatives for a number of years. *Figure 7.7*. shows the number of GHS participants involved with the design of new process which would support a circular economy.



Canadian Coalition for Green Health Care, 2024.

Figure 7. 7 GHS participants involved with/collaborated in the design of new processes which would support the circular economy (2019 – 2021 data).

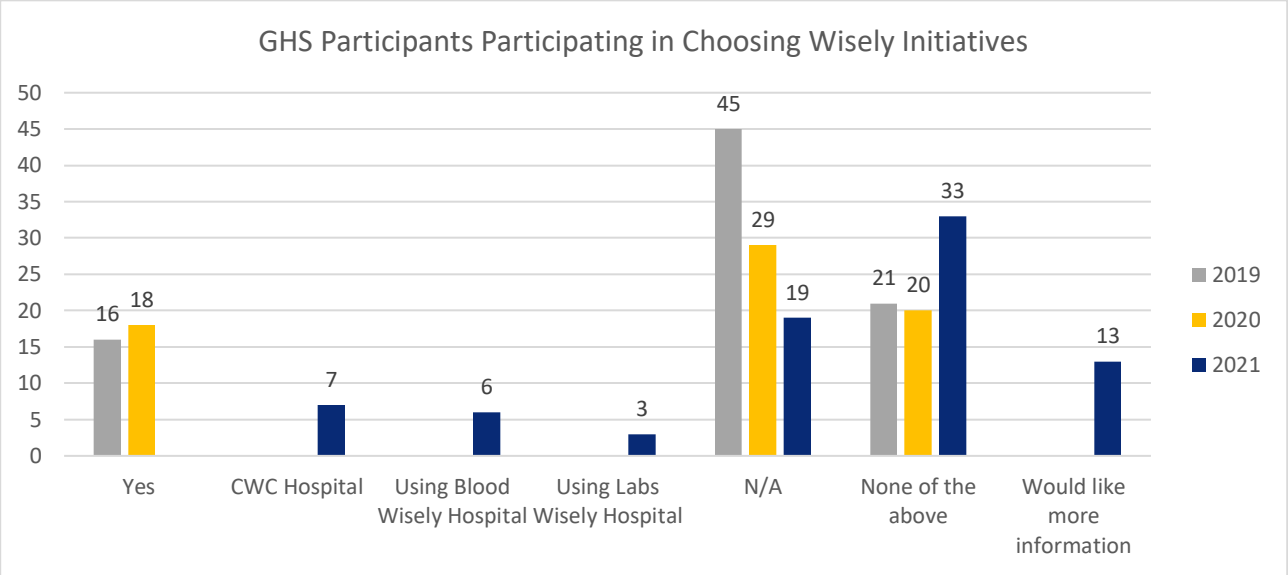
There are many opportunities for hospitals to participate in circular economy initiatives that involve reduction, reuse, and recycling, these are outlined in *Figures 7.8 - 7.10.* The most common reduction initiatives**,** shown below in *Figure 7.8***,** were structured hand washing programs (96%) and virtual care (89%) followed by optimizing operating room instrument kits (46%).



Canadian Coalition for Green Health Care, 2024.

Figure 7. 8 Participation in 'reduction' initiatives (2019-2021).

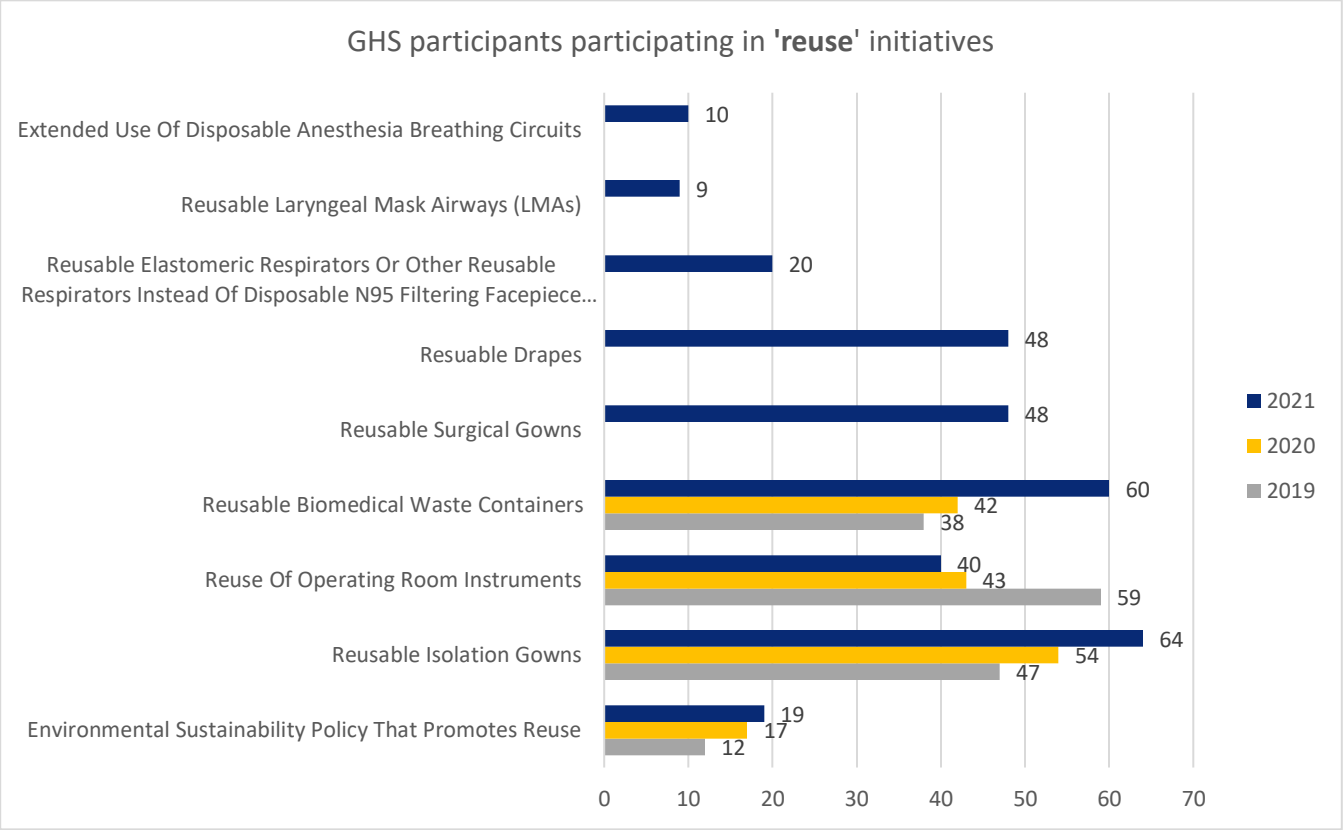
Figure 7.9 shows the number of GHS participants who participated in Choosing Wisely Canada (CWC) initiatives. For the 2019 and 2020 data call participants were only asked to identify whether or not they participated in CWC initiatives. Whereas the 2021 data call asked participants to specify whether their facility was recognized as either a “CWC Hospital”, “Using Blood Wisely Hospital”, or ”Using Labs Wisely Hospital.” In 2021, a total of 16 participants (20%) reported they were recognized by CWC in one of the forementioned categories.



Canadian Coalition for Green Health Care, 2024.

Figure 7. 9 GHS participants participating in Choosing Wisely Canada Initiatives (2019-2021 data).

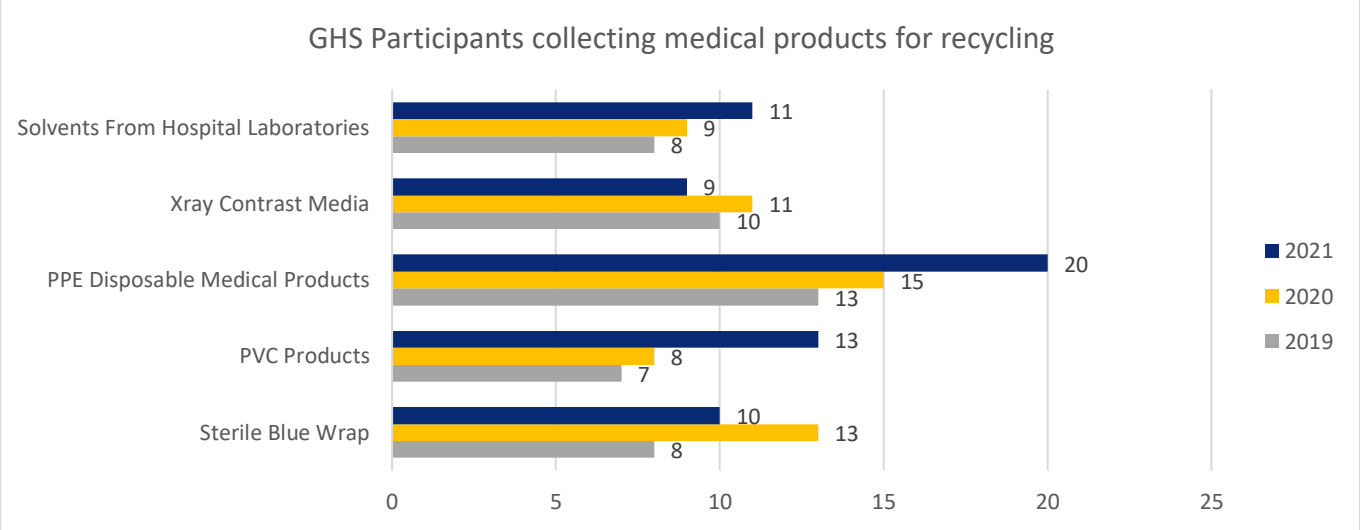
There were several reuse initiatives participants were asked to report on (see *Figure 7.9*), with the most popular initiatives being reusable isolation gowns (79%), reusable biomedical waste containers (60%), reusable surgical gowns (53%), reusable drapes (53%) and reprocessing of operating room instruments (49%). Reusable elastomeric respirators were reportedly used by 25% during the pandemic and a policy to promote reuse was reported by 23%, which is up slightly from last year at 19%.



Canadian Coalition for Green Health Care, 2024.

Figure 7. 10 Participation in 'reuse' initiatives (2019-2021 data).

The most common recycling (not including 'blue box' or materials identified in *Figure 7.5*) initiatives include collecting disposable PPE products for recycling (25%), recycling PVC products (16%) and solvent recycling (14%).



Canadian Coalition for Green Health Care, 2024.

Figure 7. 11 Participation in medical products for recycling (2019-2021 data).

7.2 Summary

Some general conclusions include:

1. Total waste generation increased slightly in 2021 when compared with 2019 and 2020, but has trended downward since 2018.
2. In general, waste recycling rates decreased in 2019 and 2020, but have started to trend upward again in 2021.
3. Biomedical waste quantities at 16% of waste are much higher than the expected 10%.
    a. This may have been as a result of the COVID-19 pandemic, and a greater tendency to discard items as biomedical wastes.
    b. Better separation training of the health care workforce to identify biomedical from general waste will save the hospitals money.
4. Almost all the participants reported that their facilities were engaged in circular economy innovations/collaborations. Many circular economy practices are being used already by hospitals. Having reuse policies is not yet embedded in environmental policies.
5. 57% of respondents report that they have policies for waste management and conservation but fewer participants report that they have developed waste reduction targets (37%) and action plans (35%). These actions should be further encouraged.
6. Budgets for staff waste-related engagement and outreach decreased significantly (28% in 2021 compared to 42% in 2020).
    a. This may have been due to cost-cutting measures as HCFs faced higher expenses during the COVID-19 pandemic.

7.3.1 Climate Change Resilience and Waste

Reducing waste can help a HCF become more climate resilient. With less waste generated, extreme weather impacts would have fewer waste bins dispersed by floods or high winds.
Climate-related extreme weather impacts on the medical product supply chain have already happened. By choosing reusable medical products and having a reusable infrastructure in place, the health system will endure fewer supply chain interruptions.

7.3 Additional Resources

The following resources are available for guidance on HCF waste management:

1. The Canadian Coalition for Green Health Care has partnered with CASCADES on the Sustainable Perioperative Care Assessment Tool/Scorecard, which is currently being piloted across Canada. This tool can be used as a short assessment tool for your perioperative areas, to help ‘green’ your perioperative/operating room areas and reduce waste. Many of the questions asked in this assessment tool are simlar to those asked in the GHS, and can help ready the organization to respond to the next years GHS data call. This is available at: https://view.publitas.com/5231e51e-4654-42c2-accd-b722e21f3093/sustainable-perioperative-care-assessment-tool/page/1
2. CASCADES in partnership with the Canadian Coalition for Green Health Care, has assembled a **Healthcare Waste Management Community of Practice**. This network will

enhance sustainability within healthcare waste management processes in Canada by exploring the links between waste, clinical delivery of care and environment sustainability. See: https://cascadescanada.ca/action-areas/operations-and-infrastructure/

3. CASCADES has developed a Primer Series on the 'State of Hazardous Medical Waste Management in Canada. See: https://cascadescanada.ca/resources/hazardous-medical-waste-primer/

8. Pollution Prevention

8.1 Background

Pollution Prevention is a concept that focuses on selecting less toxic and more environmentally preferred materials for use within the hospital, and considering the impacts of building construction on the environment and within the hospital. In the Green Hospital Scorecard, supporting a "Do no harm" philosophy in health care recognizes a need for health care providers to reduce and phase out materials that pose a threat to human health and the environment.

Pollution Prevention consists of:

- Environmentally preferable purchasing, which aims to reduce an organisation's environmental impact upstream through the purchase of products which have environmentally preferred qualities
- Toxins management, which aims to reduce the downstream impacts caused by managing materials, products and services within hospital that are considered toxic to human health and environment, as well as the appropriate disposal of special and toxic wastes.
- Sustainable construction/renovation practices, which aim to reduce the environmental impact of hospital sites through the selection and use of sustainable construction and renovation materials and engagement of sustainable construction/renovation practices.

Some manufacturers are starting to provide products and services for the health care sector which have been redesigned to reduce the use of resources and be easily reused, while also creating safer products with lower toxicity. Some examples of lower toxicity and reusable products include:

- Use of safer cleaning products, which also reduces quantity of general cleaners, chemicals in general cleaners, chemicals of concern in general cleaners, water use and packaging waste:
    - Aqueous Ozone Cleaning System Assessment at Vancouver Coastal Health[46]
    - Stabilized Aqueous Ozone (SAO) CCGHC Case study with Chatham-Kent Alliance and North York General Hospital[47]
- Reducing endocrine disrupters in hospital products:
    - Healing without Harm: Reducing exposure to endocrine disruptors in hospitals. Pilot project at Pierre Boucher Hospital's Neonatal Unit (from

[46] Canadian Coalition for Green Health Care Case Study #2: Aqueous Ozone Cleaning System Assessment at Vancouver Coastal Health. 2018. From https://drive.google.com/file/d/1fBJsyJAlt5-SUAh5rLNWeAKhC46cT2ey/view?pli=1
[47] Canadian Coalition for Green Health Care Case Study: Stabilized Aqueous Ozon (SAO): A Cleaner Way to Clean. From https://greenhealthcare.ca/wp-content/uploads/2017/05/Ozonated-Floor-Cleaning-FINAL.pdf

slide presentation)[48]

- Some manufacturers are making products such as oxygen and nebulization therapy products without Di(2-ethylhexyl) phthalate (DEHP), which is the endocrine disrupting chemical used as a plasticizer in PVC products[49]

- Reusable anesthesia products
  - Use of reusable anesthesia breathing circuits and reusable laryngeal mask airways (LMAs) are promoted by the Ontario's Anesthesiologists Environmental Sustainability Working Group[50].

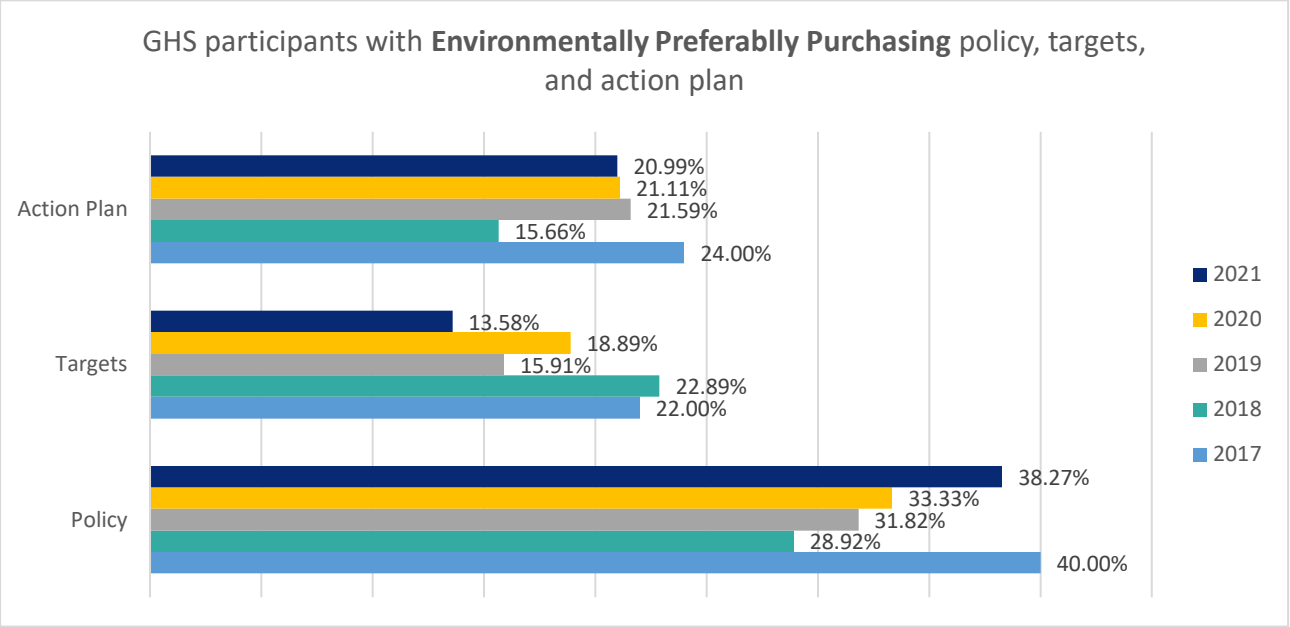
8.2 Results

As demonstrated in *Figure 8.1*, 38% of hospitals report having Environmental Purchasing Policies in 2021 slightly up from 33% in 2020. Fewer hospitals have targets (14%) and action plans (21%).

The following is an adaptation of one site's Environmentally Preferable Purchasing criteria when selecting products and services:

1. Assess the environmental impact of the product's life cycle (raw material acquisition, manufacturing, packaging, distribution, use and disposal);
2. The reusability of a product or supply (Circular Economy);
3. Product packaging and recyclability;
4. Complying and ahead of legislative, regulatory, and other requirements;
5. The toxic ingredients of a product (priority given to those with few or no toxic ingredients, especially Mercury and PVC) and;
6. Transportation involved with manufacturing and receiving products;

[48] Canadian Coalition for Green Health Care Webinar Slides: Healing without Harm: Reducing exposure to endocrine disruptors in hospitals. Pilot project at Pierre Boucher Hospital's Neonatal Unit. Available from: https://greenhealthcare.ca/wp-content/uploads/2015/05/00-Safer-Chemicals-2018-v7mai.pdf
[49] Medtronic. Oxygen and Nebulisation Therapy. From https://asiapac.medtronic.com/content/dam/covidien/library/emea/en/product/acute-care-ventilation/acute-care-images/weu-oxygen-therapy.pdf
[50] Ontario Anesthesiologists. Environmental Sustainable Working Group. From https://ontariosanesthesiologists.ca/environmental-sustainability-working-group

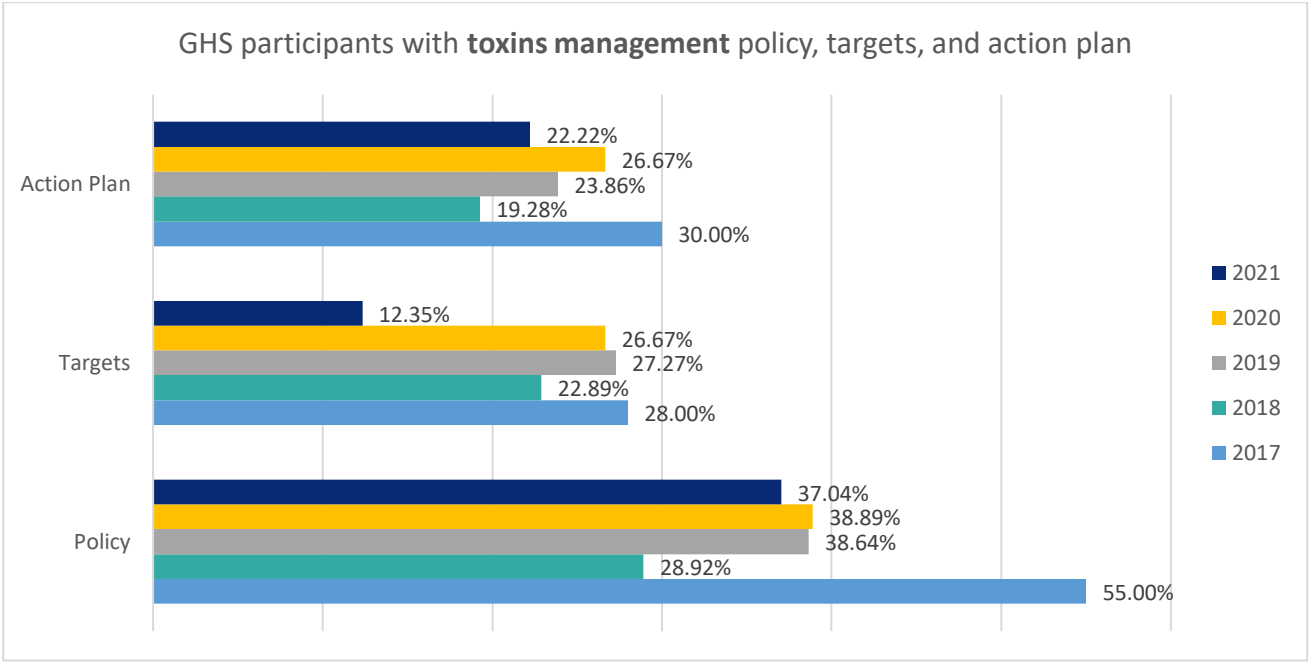


Canadian Coalition for Green Health Care, 2024.

Figure 8. 1 Environmentally preferable purchasing policy, targets and action plans (2017-2021 data).

8.2.1 Toxins Management Initiatives

With respect to Toxics Management, *Figure 8.2* illustrates that 37% have Toxins Management Policies in 2021 which was similar to that reported in 2020 (39%). In 2021, 12% of participants reported having targets compared with 27% in 2020, and 22% of participants reported action plans for toxins management, compared with 27% in 2020.



Canadian Coalition for Green Health Care, 2024.

Figure 8. 2 Toxins management policies, targets and action plans (2017-2021).

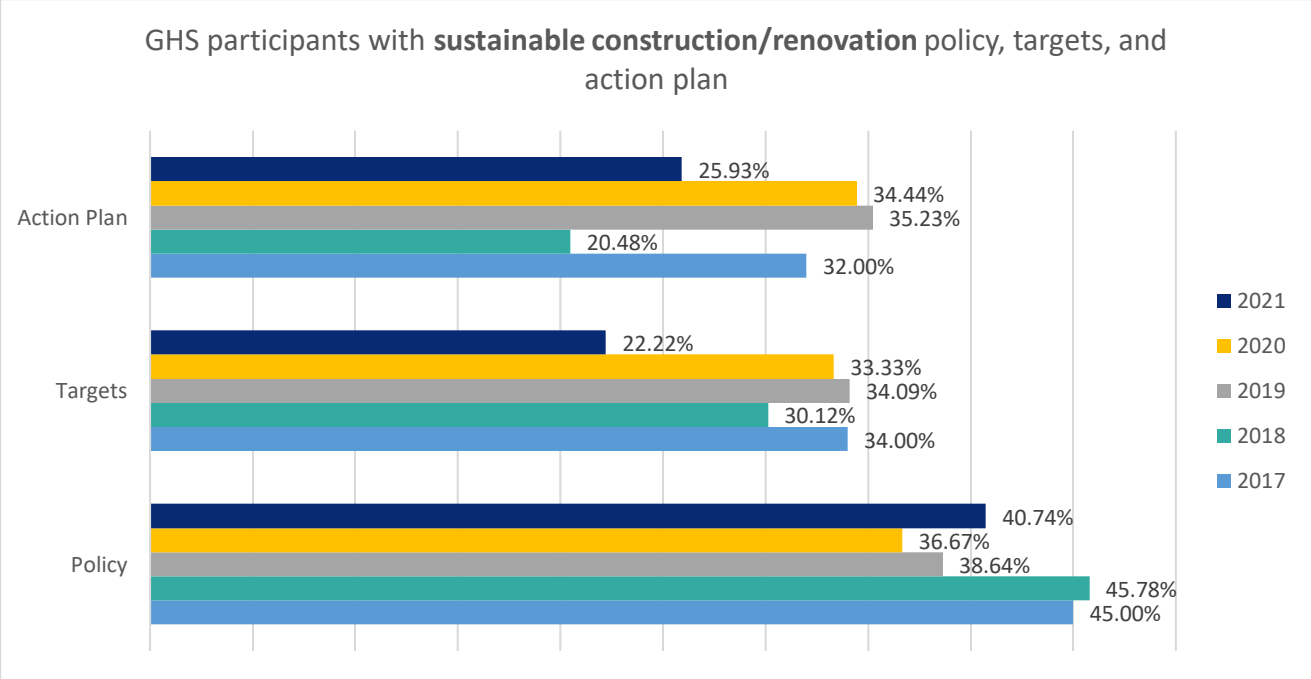
There are numerous ways hospitals can incorporate toxin reduction initiatives at their site. Every year the GHS questionnaire asks participants what new technologies or services for water efficiency and/or conservation sites have implemented. These are just a few examples of technologies and services undertaken by hospitals:

Examples of toxics reduction initiatives reported by participants include:

- Undertaking an annual internal hazardous waste manifest audit.
- Framing policies and procedures for management of cytotoxic, biomedical and pharmaceutical waste
- Having a decontamination holding tank on the exterior of the building, that acts as a holding tank for the Emergency Department, to shower patients who may have been exposed to any toxic substances. This water is contained and pumped to secure treatment to alleviate toxins from going to drain.

8.2.2 Sustainable Construction/ Renovation Initiatives

Reporting on sustainable construction and renovations policies, targets and action plans are found in *Figure 8.3*. 41% of participants reported having sustainable construction policies in place in 2021 which is similar to years before. Fewer participants report having targets (22% in 2021 compared to 33% in 2020) and 26% of participants reported having action plans in 2021 compared to 34% in 2020.



Canadian Coalition for Green Health Care, 2024.

Figure 8. 3 Sustainable construction and renovations policies, tagets and action plans (2017-2021 data).

Examples of sustainable construction and renovations initiatives reported by participants include:

- Recycling construction materials when possible.
- Preferential procurement of materials with recycled content, products made from renewable resources, energy efficient lighting and mechanical systems, and low-flow water fixtures.
- Tree and pollinator garden planting, with a particular focus on native species and pollinator plants.
- Implementation of energy efficient hot water heaters, roofing, windows, and air handlers.

8.2.3 Other Pollution Prevention Initiatives

Examples of other Pollution Prevention initiatives reported by participants include:

- Switching to environmentally friendly paper that has been certified by the Forest Stewardship Council.
- Implementation of policies which requires the end user to find a "home" for equipment or furniture, either through resale or donation.
- Energy efficiency projects.
- Switching from single-use Styrofoam cup and containers to compostable cups and containers.
- One site made an organizational switch from single use Styrofoam cups and containers to compostable cups and containers.
- Installation of direct flue gas heat recovery systems for heating hospital plant, increasing plant efficiency by over 96% during winter months.

8.3 Summary

Some general conclusions include:

1. Only 38% of hospitals report having Environmental Purchasing Policies and fewer hospitals have targets (14%) and action plans (21%).
2. Only 37% of hospitals have Toxins Management Policies and fewer hospitals have targets (12%) and action plans (22%).
3. Only 41% of participants reported having Sustainable Construction Policies in place in 2021 and fewer hospitals report having targets (22%) action plans (26%).

8.3.1 Climate Change Resilience and Pollution Prevention

Environmental Purchasing Policies, and Toxic Management Policies can help a HCF become more climate resilient through a greater emphasis on products and services that create less harm, and supply chains that include more reusable critical products.

Sustainable Construction Policies can also help facilities become more resilient by choosing construction materials which are more suited for extreme weather events of concern for the HCFs geographic area.

Hospital/health authority purchasing departments are important partners for shifting the vender community to more environmentally sustainable, low carbon and resilient products and services. Hospital/health authority purchasing departments are starting to issue Requests for Proposals (RFPs) which are including sustainability and GHG emissions as part of their evaluations. This will mean that venders will be required to identify how their products are more sustainable and how they are helping the health system reduce GHG emissions and how their products/services support resilience and adaptation to climate change. The many benefits of this approach include:

- By starting to ask for GHG emission information on RFPs, venders will need to measure their climate emissions and developing mitigation plans within their own companies and follow up within their own supply chains.
- Engaging with the health care venders/manufacturers to make sustainable, and climate-resilient products, helps build sustainable communities with good local jobs which are well paying and have healthy working environments.
- Manufacturers of lower toxic chemical medical products will generate less toxic waste and release less harmful by-products during their use thereby supporting healthier environments and healthier populations.

8.4 Additional Resources

The following resources are available for guidance on HCF waste management:

1. The Canadian Coalition for Green Health Care has partnered with PEACH Health Ontario and Hamilton Health Sciences on the Sustainable Procurement Working Group. Contact Dr Myles Sergeant for more information (Myles@greenhealthcare.ca)

9. Corporate Leadership, Planning and Management

9.1 Background

Corporate leadership, planning and management, measure an organisation's commitment to a culture of environmental sustainability and integration of green objectives into corporate planning and regular business. The presence or absence of a policy justifies a corporate commitment, while it may lack a holistic view on the level of commitment and engagement from hospital staff. Corporate commitment focuses on the following three areas:

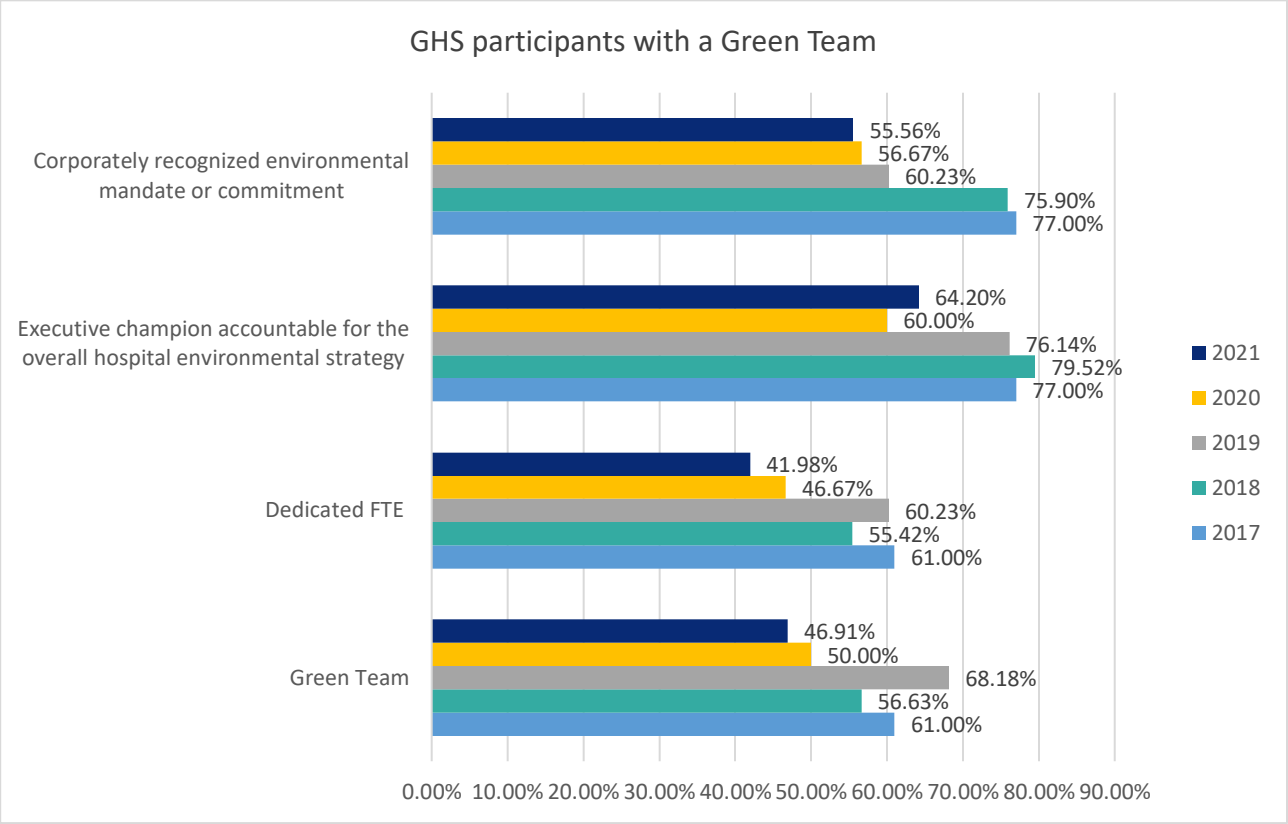
1. Leadership: A measure of corporate commitment to environmental sustainability as gauged by the presence of formalized organisation-wide support and outreach for green initiatives;
2. Planning: A measure of a hospital's progress in environmental planning and target-setting with action plans; and
3. Monitoring & Management: A measure of a hospital's commitment to tracking and monitoring regular resource expenditures.

9.2 Results

9.2.1 Corporate Leadership

The GHS measures corporate leadership qualitatively, through the presence of formal commitments, corporate-level programs, and policies that support green initiatives within hospitals.

As provided in *Figure 9.1*, in 2021, 56% of hospitals had a corporately recognized environmental mandate or commitment. This figure is consistent with the 57% reported in 2020 but demonstrates a sharp decline from the 76% reported in 2018. Additionally in 2021, 64% of hospitals reported having an executive champion accountable for hospital environmental strategy, 47% of hospitals reporting having a green team while only 42% reporting having dedicated green FTE. These figures represent a drop from 51% and 47%, respectively, as reported in 2020.



Canadian Coalition for Green Health Care, 2024.

Figure 9. 1 Corporate green initiatives and green teams (2018-2021 data).

9.2.2 Programming

The following programming areas were revealed in the data analysis in 2021:

Participants were asked if they offer staff engagement and outreach programming for the following areas:

- Energy conservation - 62 participants (77%)
- Waste management – 58 participants (72%)
- Water conservation – 46 participants (57%)
- Green events such as Earth Day – 60 participants (74%)

Participants were asked if they allocate a budget for staff engagement for the follow areas:

- Energy conservation - 26 participants (32%)
- Waste management – 23 participants (28%)
- Water conservation – 24 participants (30%)
- Green events such as Earth Day – 28 participants (35%)

9.2.3 Planning

A hospital's corporate commitment to environmental performance improvements include creating policies, setting clearly defined targets and having an action plan in place stating how that target will be achieved. Through the 2021 data call, 81 participants provided responses to questions for policies, targets and action plans which were in place for energy, water and waste.

9.3 Summary

Some general conclusions include:

1. 56% of hospitals had a corporately recognized environmental mandate or commitment. 64% of hospitals have an executive champion accountable for hospital environmental strategy, 47% of hospitals have a green team while only 42% have dedicated green FTE.

9.3.1 Climate Change Resiliency and Leadership

Leadership can set the stage for giving the health care workforce permission to start addressing climate-related resilience initiatives.

Health care-related organizations are increasingly embracing planetary health, where the concept of planetary health is based on the 'understanding that human health and human civilisation depend on flourishing natural systems and the wise stewardship of those natural systems. However, natural systems are being degraded to an extent unprecedented in human history'[51]. The Association of Faculties of Medicine (AFCM) have advanced a 'Declaration on Planetary Health'[52] with signatories from all the faculties of medicine in Canada and abroad. Planetary Health representatives have been appointed at several Canadian Medical Schools (i.e. Universities of Ottawa, Toronto and British Columbia (UBC)).

A Planetary Healthcare Lab has been created at UBC, which is the first of its kind in Canada, designed to examine environmental effects of healthcare delivery and services in B.C. and generate solutions to chart a path forward to net zero emissions. Vancouver Coastal Health researchers and experts, including doctors, health economists, and business experts, are key partners[53].

9.4 Additional Resources

The following resources are available for guidance on green Leadership:

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[51] Whitmee S, Haines A, Beyrer C, Boltz F, Capon AG, de Souza Dias BF, Ezeh A, Frumkin H, Gong P, Head P, Horton R, Mace GM, Marten R, Myers SS, Nishtar S, Osofsky SA, Pattanayak SK, Pongsiri MJ, Romanelli C, Soucat A, Vega J, Yach D. Safeguarding human health in the Anthropocene epoch: report of The Rockefeller Foundation-Lancet Commission on planetary health. Lancet. 2015 Nov 14;386(10007):1973-2028. doi: 10.1016/S0140-6736(15)60901-1. Epub 2015 Jul 15. Erratum in: Lancet. 2015 Nov 14;386(10007):1944. PMID: 26188744.

[52] The Association of Faculties of Medicine of Canada. The Academic health Institutions' Declaration on Planetary Health. From https://www.afmc.ca/initiatives/planetaryhealthdeclaration/

[53] The University of British Columbia. Faculty of Medicine. UBC launches new lab to combat healthcare's environmental impact. From https://www.med.ubc.ca/news/planetary-healthcare-lab/

1. The Canadian Coalition for Green Health Care has partnered with PEACH Health Ontario to develop the green leadership guide '*Environmental Stewardship: An Implementation Guide for Boards, Execcutive Leaders, and Clinical Staff*'. See https://greenhealthcare.ca/guidebooks/

2. The Green Office Toolkit for Clinicians and Office Managers was co-developed by the Canadian Coalition for Green Health Care, PEACH Health Ontario, the Pegasus Institute, McMaster Family Medicine, Synergie Santé Environnement, and CAPE. See https://greenhealthcare.ca/green-office-toolkit/

10. Transportation

10.1 Background

According to the Government of Canada, active transportation is using your own power to get from one place to another and includes walking, jogging and biking, whereas, clean transportation includes public transit, car-polling, shuttles, battery-powered micro-mobility (BPMM), and low- or zero- emission vehicles[54]. BPMM references small, low-speed, light-weight vehicles, powered by a battery, usually travelling at speeds below 32 kilometres per hour[55]. A low-emission vehicle is a motor vehicle that emits relatively low levels of motor vehicle emissions. Zero emission vehicles (ZEVs) are those vehicles that can operate without tailpipe emissions and include battery electric, plug-in hybrid electric and hydrogen fuel cell electric vehicles.

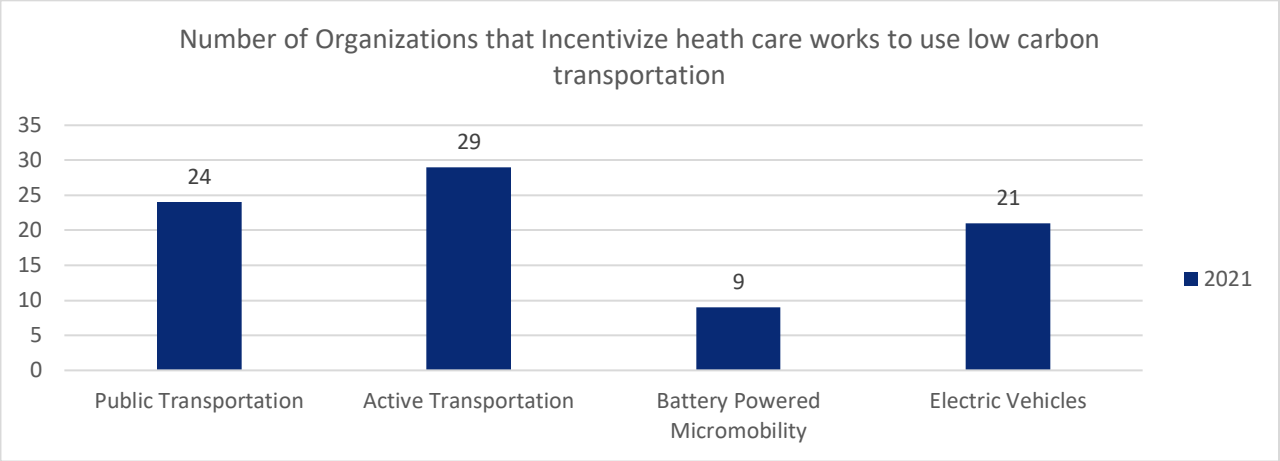
The Canadian transportation sector is responsible for the second largest source of greenhouse gas (GHG) emissions in Canada with light duty vehicle (LDV) emissions accounting for approximately 50% of Canada's transportation-related GHG emissions, and 25% of the country's total emissions. Canada is committed to decarbonizing the transportation sector and leading the transformation with zero emission vehicles.

Furthermore, the target has been set at having 100% of light-duty vehicles sold to be zero emission by 2035. Based on Transport Canada’s analysis of data, the ZEV share of light-duty vehicles sales was 8.9% in 2022, up from 5.6% in 2021, 3.8% in 2020 and up from 3.1% in 2019[56].

10.2 Results

According to 2021 data reported, 41% of participants have a program in place to promote alternative transportation to replace privately owned vehicles. Of the types of low carbon transportation options promoted, active transportation was the most promoted at 35%, followed by use of public transportation at 30%, electric vehicles at 26%, and BPMM at 11% (*Figure 10.1*).

[54] Government of Canada. Active Transportation Webpage: https://www.canada.ca/en/public-health/services/being-active/active-transportation.html
[55] Canadian Coalition for Green Health Care (2024). Introduction to Battery-Powered Micro-Mobility: https://greenhealthcare.ca/wp-content/uploads/2024/01/55-23-BPMM-Introduction-Fact-Sheet-FINAL.pdf
[56] Government of Canada. Canada Zero-Emission Vehicle Sales Target. Web page: https://tc.canada.ca/en/road-transportation/innovative-technologies/zero-emission-vehicles/canada-s-zero-emission-vehicle-sales-targets

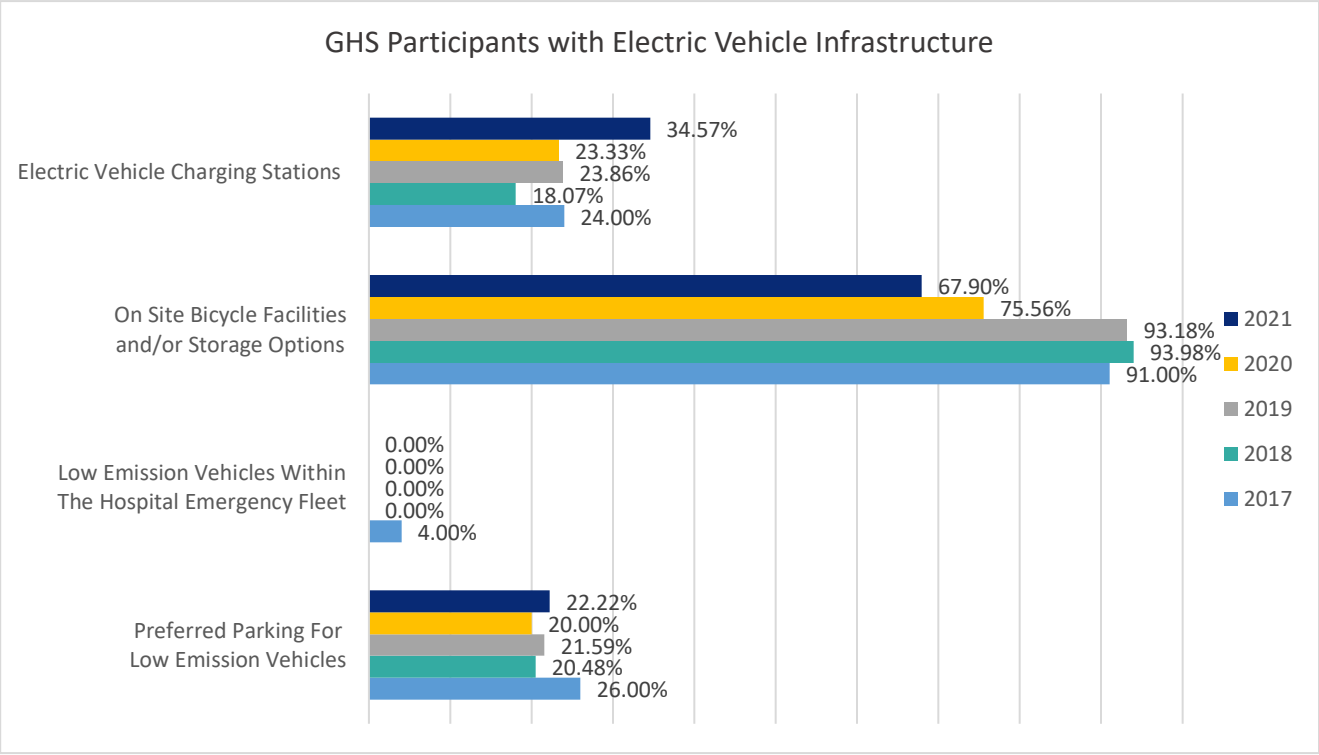


Canadian Coalition for Green Health Care, 2024.

Figure 10. 1 Incentivizing health care workers to use low carbon transportation (2021 data).

10.2.1 Clean and Active Transportation

With the expected increase in demand for electric vehicles, hospitals have an opportunity to support low emission technology. Since 2018, hospitals have steadily implemented more electric vehicle infrastructure. About 35% of facilities reported that they have electric vehicle charging stations and about 22% offer preferred parking for low emissions vehicles (*Figure 10.2*). Unfortunately, none of the respondents reported that their hospital fleets include low emissions vehicles.



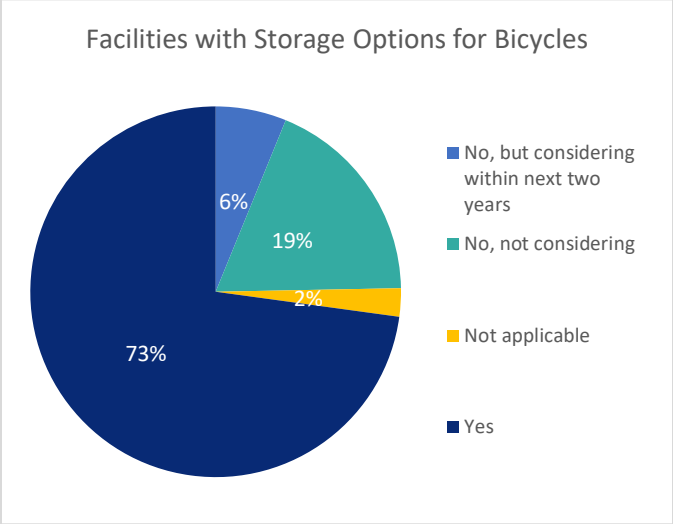
Canadian Coalition for Green Health Care, 2024.

Figure 10. 2 Electric vehicles infrastructure (2018-2021 data).

Other active and clean transportation Initiatives reported by participants include:

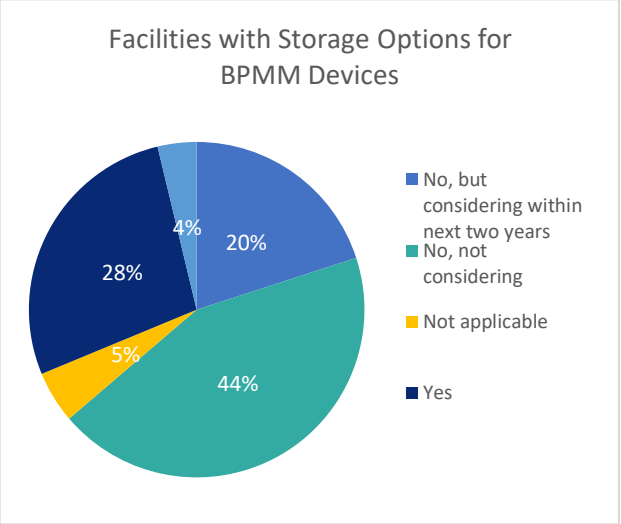
- Switching passenger buses to smaller buses for shuttle services.
- Offering shower facilities and bicycle tune-up stations.
- Discounted public transportation passes.
- Free electric vehicle charging station.
- Installation of secure cages for micro-mobility devices and additional bike racks.
- Holding bike tune-up days in the spring,
- Making transit subsidies available to staff.
- Providing a shared commute option for intercampus travel (shuttle).
- Partnerships with local companies to promote Bike Month, host electric vehicle test driving events, and various clean commuter challenges.

To support an increase of bicycles and BPMM devices, facilities will have to consider increasing storage options to promote further use of alternative forms of transportation. *Figure 10.3* reveals that the majority or facilities (73%) offer storage options for their workforce who ride their bikes to work. Fewer facilities (28%) offer storage for BPMM devices *(Figure 10.4).*



Canadian Coalition for Green Health Care, 2024.

Figure 10. 4 Facilities with storage options for bicycles (2021 data).



Canadian Coalition for Green Health Care, 2024.

Figure 10. 3 Facilities with storage options for BPMM devices (2021).

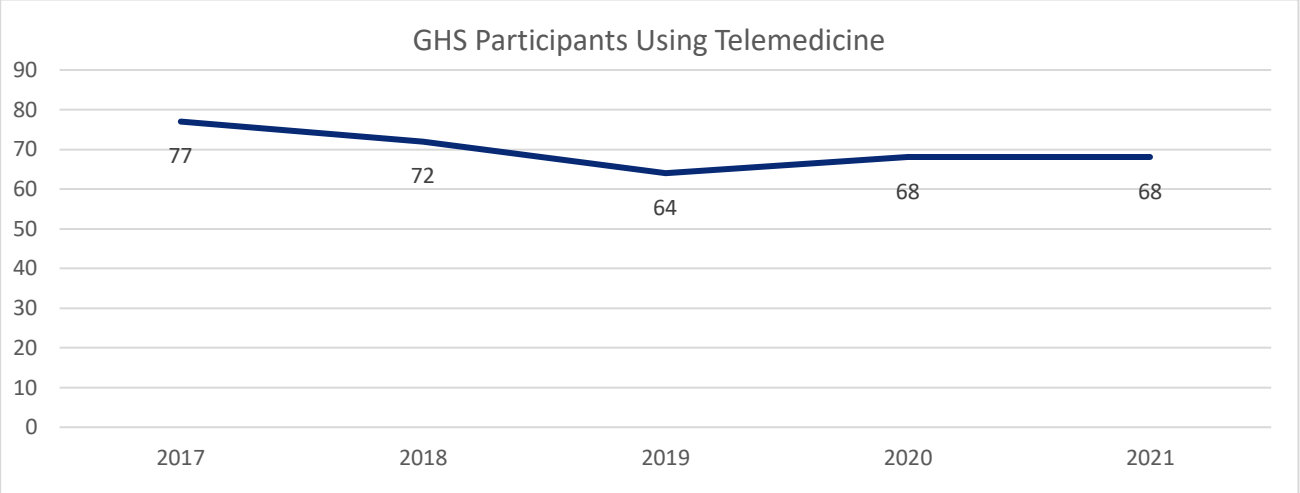
Types of storage options at participant facilities for micro-mobility include standard bicycle cages, locked or access-controlled cages and storage garages for staff only. For BPMM users some facilities reported to offer power source options for charging.

Reasons for not considering storage options for BPMM devices included having no space available, no users or low number of users of micro-mobility devices, concerns over cost, and lack of executive interest/support.

10.2.2 Telemedicine

According to the Ontario Telemedicine Network, telemedicine (also known as virtual care) uses

telecommunications technology to provide clinical health care at a distance. This helps improve access to medical services that often would not be available consistently in distant rural communities[57]. According to the data shown in *Figure 10.5*, 84% of GHS participants in 2021 reported that their site uses telemedicine. This was an increase since 2020 despite the reopening of many outpatient services at the end of the COVID-19 pandemic, indicating that this type of service is of high interest.



Canadian Coalition for Green Health Care, 2024.

Figure 10. 5 Telemedicine utilisation (2017-2021 data).

10.3 Summary

Some general conclusions include:

1. 46% of participants report having a program in place to promote alternative transportation to replace privately owned vehicles.
2. Since 2018, hospitals have implemented more electric vehicle infrastructure. About 35% of facilities reported that they have electric vehicle charging stations and about 22% offer preferred parking for low emissions vehicles.
3. 73% of facilities offer storage options for their workforce who ride their bikes to work, while 28% offer storage for BPMM devices.
4. 84% reported that their site uses telemedicine or virtual care.

10.3.1 Climate Change Resilience and Transportation

Low carbon transportation options support resilient health systems by providing environmentally preferred options for staff and visitors to commute to health care facilities, and become healthier by using active transportation modes.

[57] Ontario Telemedicine Network (OTN), https://otn.ca/

Numerous co-benefits of low emission and active transport systems have been identified, including healthier populations through active travel, lower air pollution from vehicle emissions, more equitable and livable communities and reduced GHG emissions, A series of case studies on active travel, zero-emissions vehicles and public transit are available from the Canadian Health Association for Sustainability and Equity (CHASE), the Canadian Public Health Association and the Ontario Public Health Association[58].

10.4 Additional Resources

The following resources are available for guidance low carbon transportation and virtual care:

1. Cascades offers guidance on estimating Virtual Care Carbon Accounting by providing a step-by-step guide on carbon accounting in virtual care. See: https://cascadescanada.ca/resources/virtual-care-carbon-accounting-playbook/

[58] Canadian Health Association for Sustainability and Equity (CHASE). Transportation and Planning – Climate, Health and Health Equity. From https://chasecanada.org/transportation-health-and-climate/.

11. Food

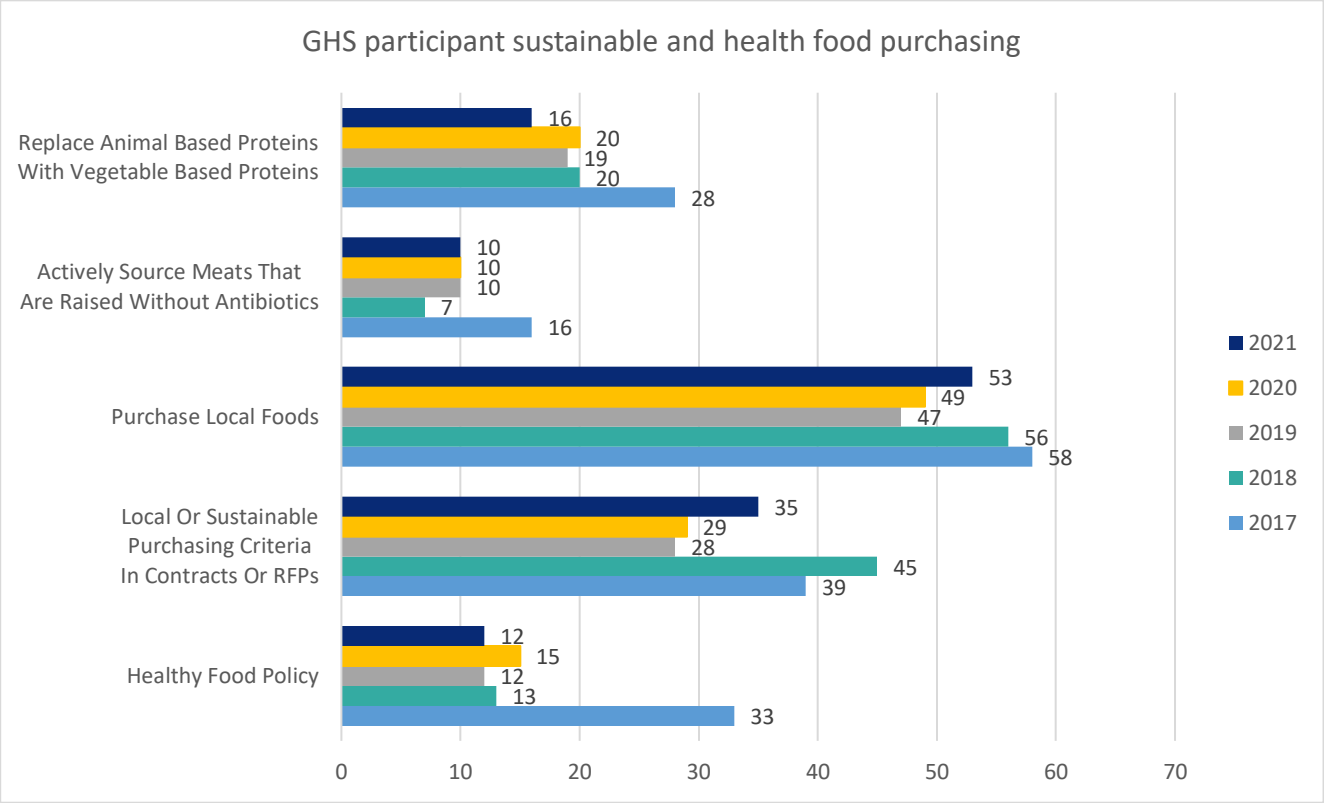
In the past few years, health care facilities have begun to adopt policies and practices to support a healthy food system. This is an effort that includes environmental sustainability, improves nutritional quality, supports a shift to low- carbon foods, builds healthy communities, and supports culturally appropriate and sustainable foods. The Nourish Program was developed with the belief that food is fundamental to patient, community and planetary health and well-being, and is one of the health care targeted healthy and sustainable food initiatives in Canada.

11.1 Results

This section of the GHS will demonstrate how hospitals policies and programming are attempting to support a healthy food system. While acting as a significant purchaser of food products, health care has the opportunity to shape sustainable food systems.

11.1.2 Food Policies

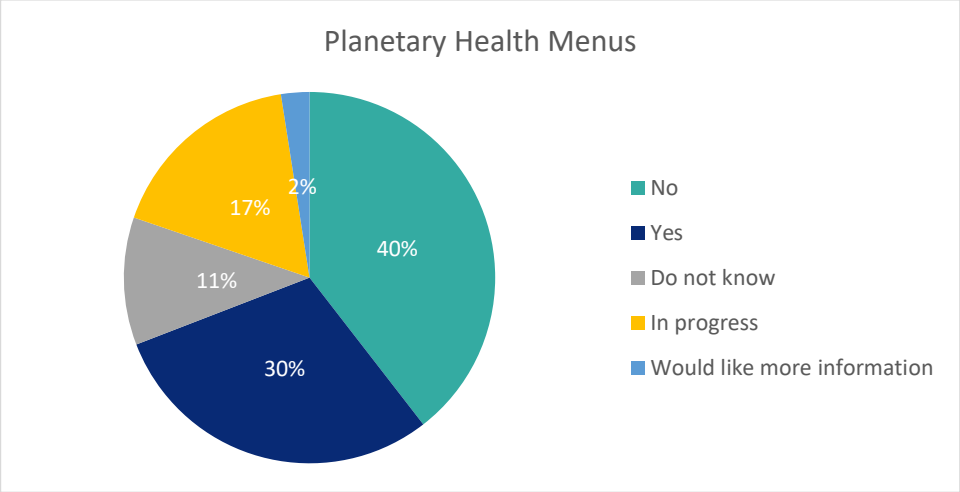
As shown in *Figure 11.1, w*hile hospitals had high levels of food waste and food educational programming, only 15% of the participants reported having formalized healthy food policies. However, 65% of GHS participants purchase local food for their site. 43% of the sites have local or sustainable purchasing criteria within their contracts or RFPs, but fewer facilities report replacing animal proteins with vegetable-based proteins (20%) and only 12% actively source meats that are raised without antibiotics.



Canadian Coalition for Green Health Care, 2024.

Figure 11. 1 Sustainable and healthy food purchasing initiatives (2017-2021 data).

Planetary Health Menus are sustainably sourced, plant forward, culturally diverse, seasonal, and waste minimized. As provided in *Figure 11.2,* 30% of participants in 2021 have implemented planetary health menus and 17% are in the process of implementing them.

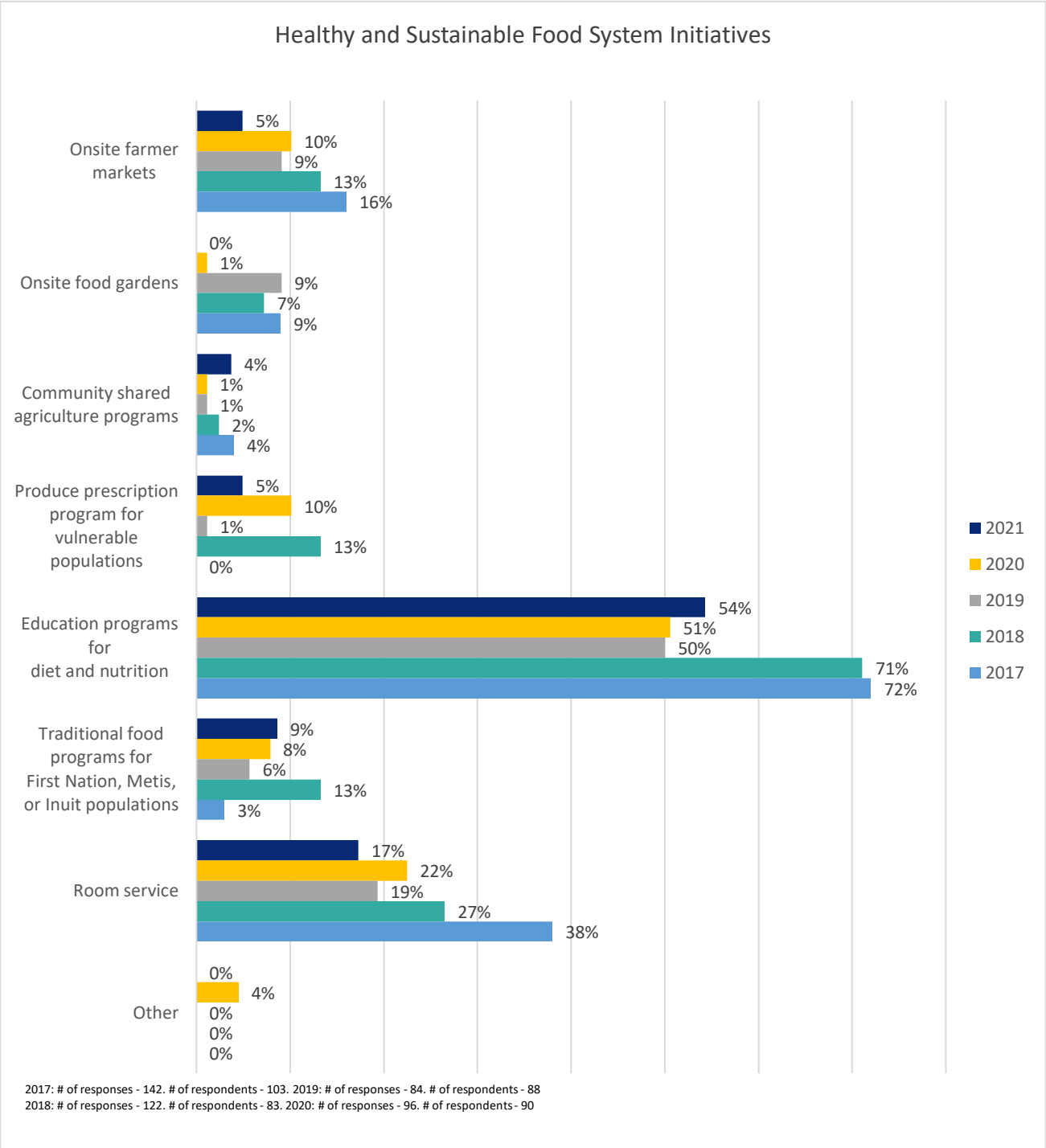


Canadian Coalition for Green Health Care, 2024.

Figure 11. 2 Planetary Health Menus (2021 data).

11.1.3 Food Initiatives

In the GHS survey, hospitals provided insights into their growing number of initiatives dedicated to healthy food systems. As provided in *Figure 11.3,* 54% of respondents in 2021 stated their site offers diet and nutrition education programming, while 17% of sites are offering room service, and 5% have onsite farmers markets.

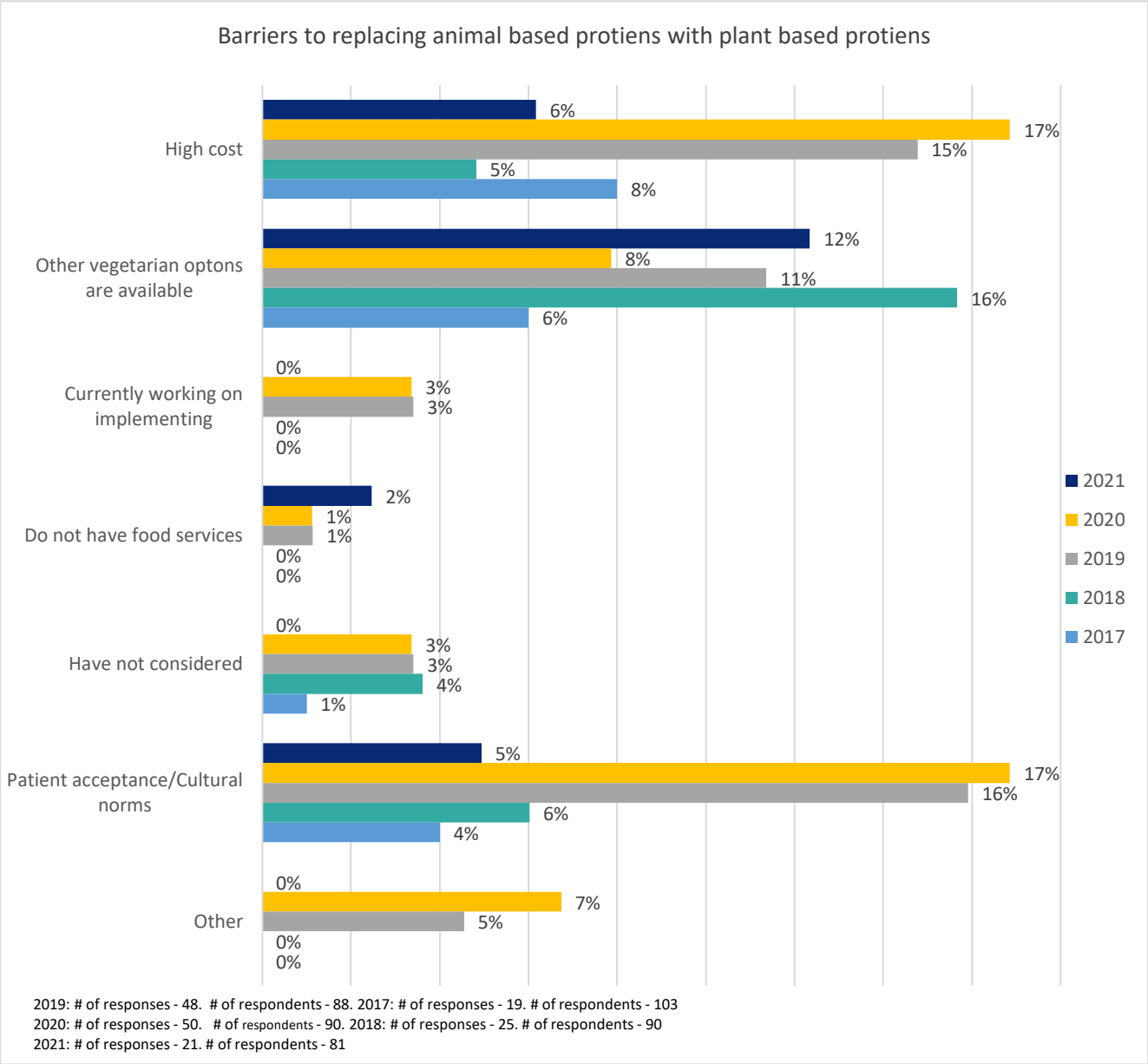


Canadian Coalition for Green Health Care, 2024.

Figure 11. 3 Hospital healthy and sustainable food system initiatives (2017-2021 data).

Along with policies and initiatives, survey respondents were also asked about perceived barriers towards replacing animal-based products with plant-based products, which can also contribute to reduction of GHGs.

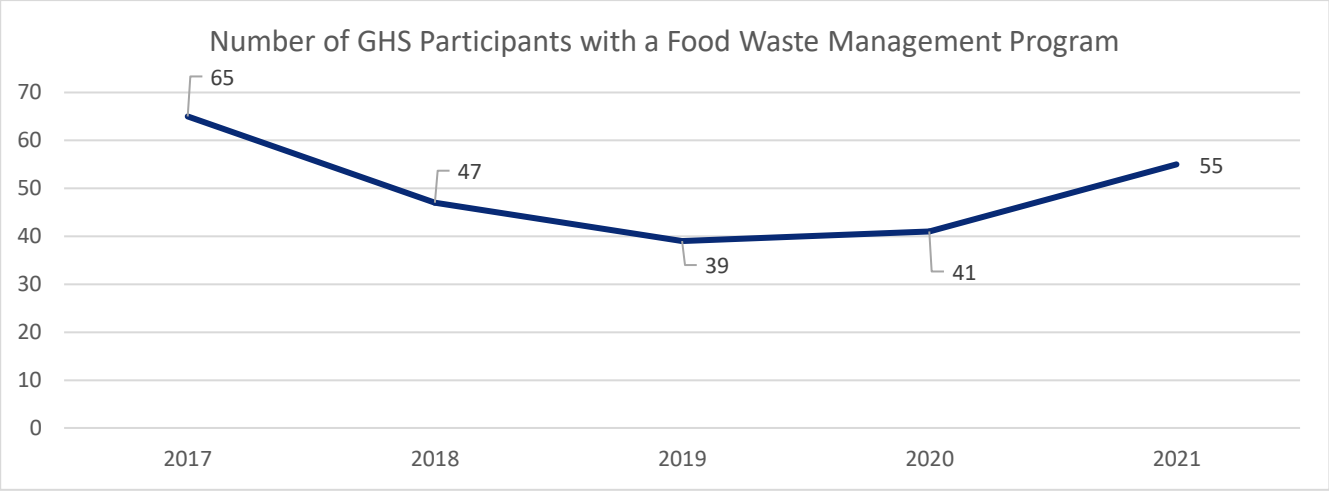
Figure 11.4 below illustrates that while patient acceptance and cultural norms and costs were the most significant barriers to replace animal protein with plant-based protein (tofu, veggie burgers etc.) last year, these barriers have been reduced significantly. While 'other vegetarian options are available' is not exactly a barrier, it was a common response to this short-answer question. Meaning many participants do cater to vegetarians but still do not offer plant-based proteins as an option.



Canadian Coalition for Green Health Care, 2024.

Figure 11. 4 Perceived barriers to replacing animal products with plant-based products (2017 – 2021 data).

As shown in *Figure 11.5*, 68% of participants reported having a food waste management program, which was an increase from 2020 (46%).



Canadian Coalition for Green Health Care, 2024.

Figure 11. 5 Hospitals with food waste management programs (2018-2021 data).

11.3 Summary

Some general conclusions include:

1. Only 15% of the participants reported having formalized healthy food policies. However, 65% of GHS participants purchase local food for their site and 43% of the sites have local or sustainable purchasing criteria within their contracts or RFPs. Fewer facilities report replacing animal proteins with vegetable-based proteins (20%) and only 12% actively source meats that are raised without antibiotics.
2. 30% of participants in 2021 have implemented planetary health menus and 17% are in the process of implementing them. 40% report not having planetary health menus.
3. 54% of respondents in 2021 stated that their site offers diet and nutrition education programming, with 17% of sites are offering room service, and 5% have onsite farmers markets.
4. Patient acceptance and cultural norms and costs were no longer the most significant barriers to replace animal protein with plant-based protein. The greatest barrier reported is related to the vegetarian options available.
5. 68% of participants reported having a food waste management program, which was an increase from 2020 (46%).

11.3.1 Climate Change Resilience and Food

Climate change can affect all components of the food system and finding resilient actions to support local concerns is a primary objective. Food supply chains should be examined to determine how likely climate change will impact food sources. Food systems can also be a

significant source of GHG emissions and a driver of climate change. It is estimated that 21% to 37% of total global GHG emissions originate from food systems[59].

11.4 Additional Resources

The following resources are available for guidance on healthy sustainable and resilient food supplies:

1. Nourish is a national initiative that fosters the transition toward health care systems that are more preventatives, equitable and sustainable. Nourish provides many resources including: The Cool Food Pledge, Sustainable Menus and Values Based Procurement. See: https://www.nourishleadership.ca/

2. Berry, P., & Schnitter, R. (Eds.). (2022). Health of Canadians in a Changing Climate: Advancing our Knowledge for Action. Chapter 8. Climate Change Impacts on Food Systems in Canada. https://changingclimate.ca/health-in-a-changing-climate/

[59] Berry, P., & Schnitter, R. (Eds.). (2022). Health of Canadians in a Changing Climate: Advancing our Knowledge for Action. Chapter 8. Climate Change Impacts on Food Systems in Canada. https://changingclimate.ca/health-in-a-changing-climate/

12. Anesthetic Gases

12.1 Background

Anesthetic gases are an important part of surgical procedures and are meant to remove associated patient pain or discomfort. While highly beneficial for the patient, anesthetic gas emissions contribute to global warming and ozone depletion. There are opportunities to minimize the impact of these emissions, many of which are being adopted by anesthesiologists and health care facilities around the world.

Halogenated anesthetic gases are purchased as liquids and are introduced into the anesthesiology machine through a vaporizer into a gaseous state. A carrier gas, which has traditionally been a mixture of oxygen and nitrous oxide, is used to transport the anesthetic gas to the patient via a mask or breathing tube from the anesthesia machine. The large majority (over 95%) of the anesthetic gases are not metabolized by the patient. Waste anesthetic gases (WAGs) are exhaled by the patient through a scavenger to remove these gases from the operating room and vented outside unabated to protect the workers in the operating room[60].

The climate impacts of using anesthetic gases have been summarized in the work by the Intergovernmental Panel on Climate Change 2021 report which provides the atmospheric lifetime of the anesthetic gases and the global warming potential values for 100-year time horizon[61]. These are reproduced in *Table 12.1* below. Nitrous oxide is also identified as an ozone depleting substance[62].

[60] Yasny JS, White J. Environmental implications of anesthetic gases. Anesth Prog. 2012 Winter;59(4):154-8. doi: 10.2344/0003-3006-59.4.154. PMID: 23241038; PMCID: PMC3522493.

[61] Smith C, Nicholls ZRJ, Armour K et al.**The Earth's energy budget, climate feedbacks, and climate sensitivity supplementary material.** in: Masson-Delmotte V Zhai P Pirani A Climate change 2021: the physical science basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK and New York, NY2021

[62] Ravishankara AR, Daniel JS, Portmann RW. Nitrous oxide (N_2O): the dominant ozone-depleting substance emitted in the 21st century. *Science.* 2009;326:123–125. [PubMed] [Google Scholar]

	Sevoflurane $(CF_3)_2CHOCH_2$	Isoflurane $CF_3CHClOCGHF_2$	Desflurane $CF_3CHFOCHF_2$	Nitrous oxide N_20
Lifetime in atmosphere (years)	1.9	3.5	14.1	109
Global Warming Potential (GWP)100 year time horizon	195	539	2,590	273

Table 12. 1 Climate impacts of using anesthetic gases.

In England, the National Health Service (NHS) discovered the following[63]:

1. Being commonly used as a part of everyday surgeries, anesthetic gases alone are responsible for over 2% of all NHS emissions.
2. Amongst the anesthetic gases, Desflurane is one of the most common, but also one of the most harmful.
3. It has 60 times the environmental impact of other less harmful greenhouse gases and using a bottle has the same global warming effect as burning 440 kg of coal.

Measuring, monitoring and reporting carbon dioxide equivalent emissions is crucial for reducing emissions. The anesthetic gases section is a recent addition to the Green Hospital Scorecard survey. Although the anesthetic gases data gathered is of paramount importance, this kind of data has not previously been collected in Canada. Consequently, we still don't fully know the quantity or usage of these products by health care professionals.

12.2 Results

The number of participants that reporting using anesthetic gases in their facilities since the data has been collected are as follows:

- 2018: 50
- 2019: 63
- 2020: 56
- 2021: 55

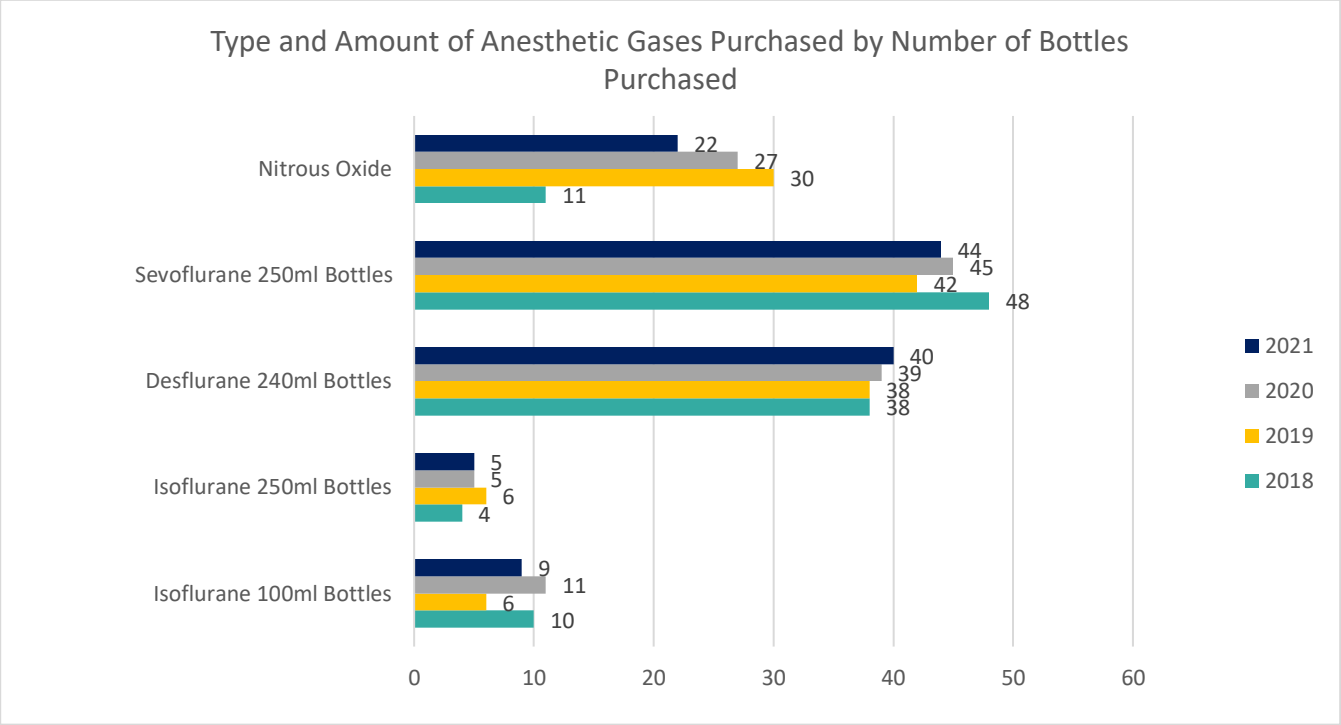
12.2.1 Anesthetic gas usage

The survey collected data pertaining to the number of bottles purchased for the most common

[63] Greener NHS. Putting anaesthetic-generated emissions to bed. Available from: https://www.england.nhs.uk/greenernhs/whats-already-happening/putting-anaesthetic-generated-emissions-to-bed/#:~:text=Across%20the%20NHS%2C%20anaesthetic%20gases,one%20of%20the%20most%20harmful.

anesthetic gases: isoflurane, sevoflurane, and desflurane. *Figure 12.1* illustrates the responses provided by the participating sites, showing the number of participants responding to usage of these anesthetic gases.

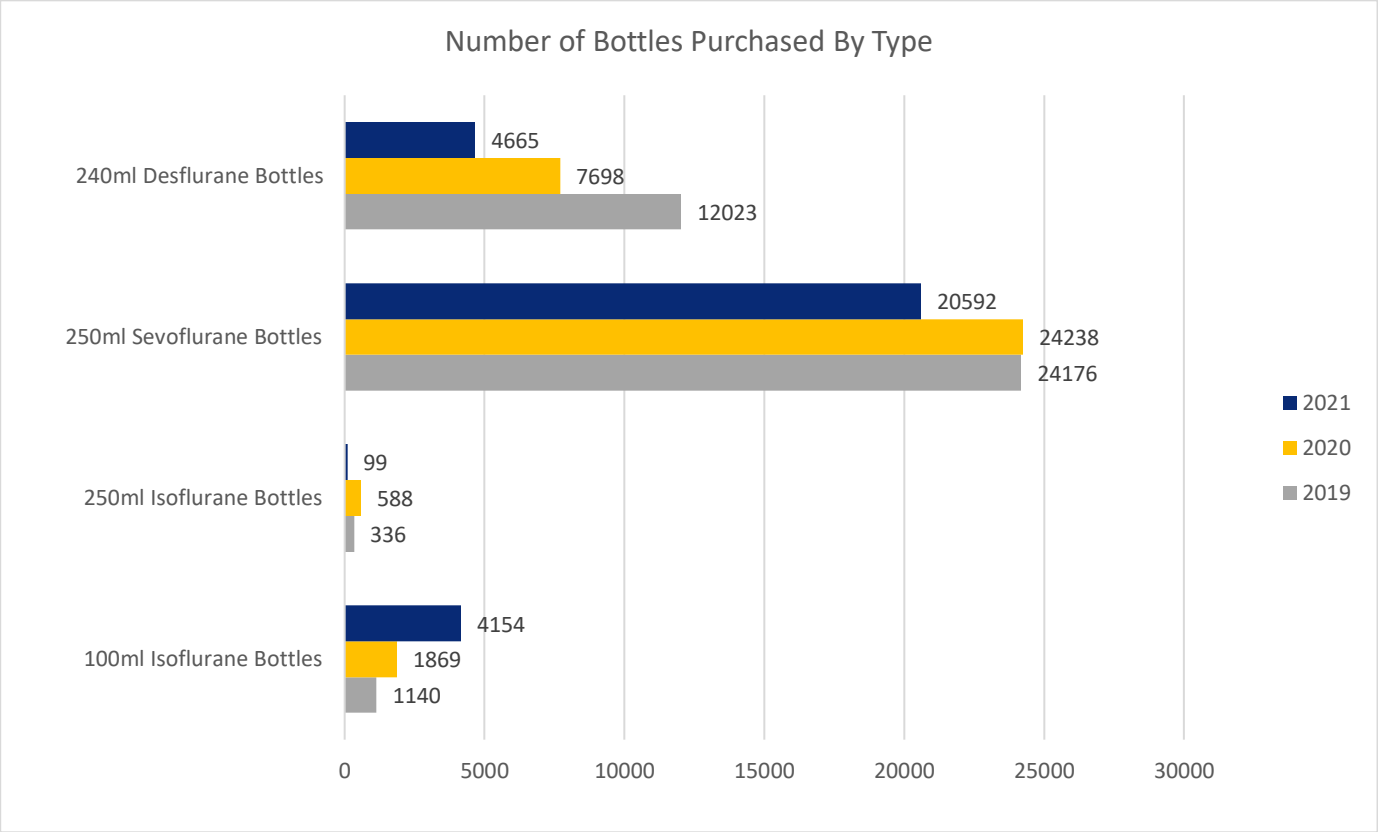
Isoflurane saw the least usage by participants, with only 11% of participants using 100mL isoflurane bottles in 2021, and 6% participants using 250mL isoflurane bottles. However, sevoflurane and desflurane had relatively higher usage among the participants. A little over half (54%) of the participants indicated that they used the 250mL bottles of sevoflurane and 49% of the participants indicated usage of 240mL desflurane bottles. This usage has not changed significantly over the four years of data collecting. While information on nitrous oxide was collected, the data collected was not able to be used for comparison purposes. It is evident that there needs to be more guidance on how to collect and report nitrous oxide usage.



Canadian Coalition for Green Health Care, 2024.

Figure 12. 1 Type of anesthetic gas purchased (2018-2021 data).

In addition to collecting information on the types of anaesthetic gas used, *Figure 12.2* illustrates number of bottles of the different anesthetic gas types. Sevoflurane is the primary anaesthetic gas used, more than double the amount of desflurane, which is the second highest volume gas purchased, followed by isoflurane as a distant third. Desflurane purchases have reduced significantly (2.5 times) over the three years of data collection. It is also the anesthetic gas of greatest concern as it has the greatest global warming potential.



Canadian Coalition for Green Health Care, 2024.

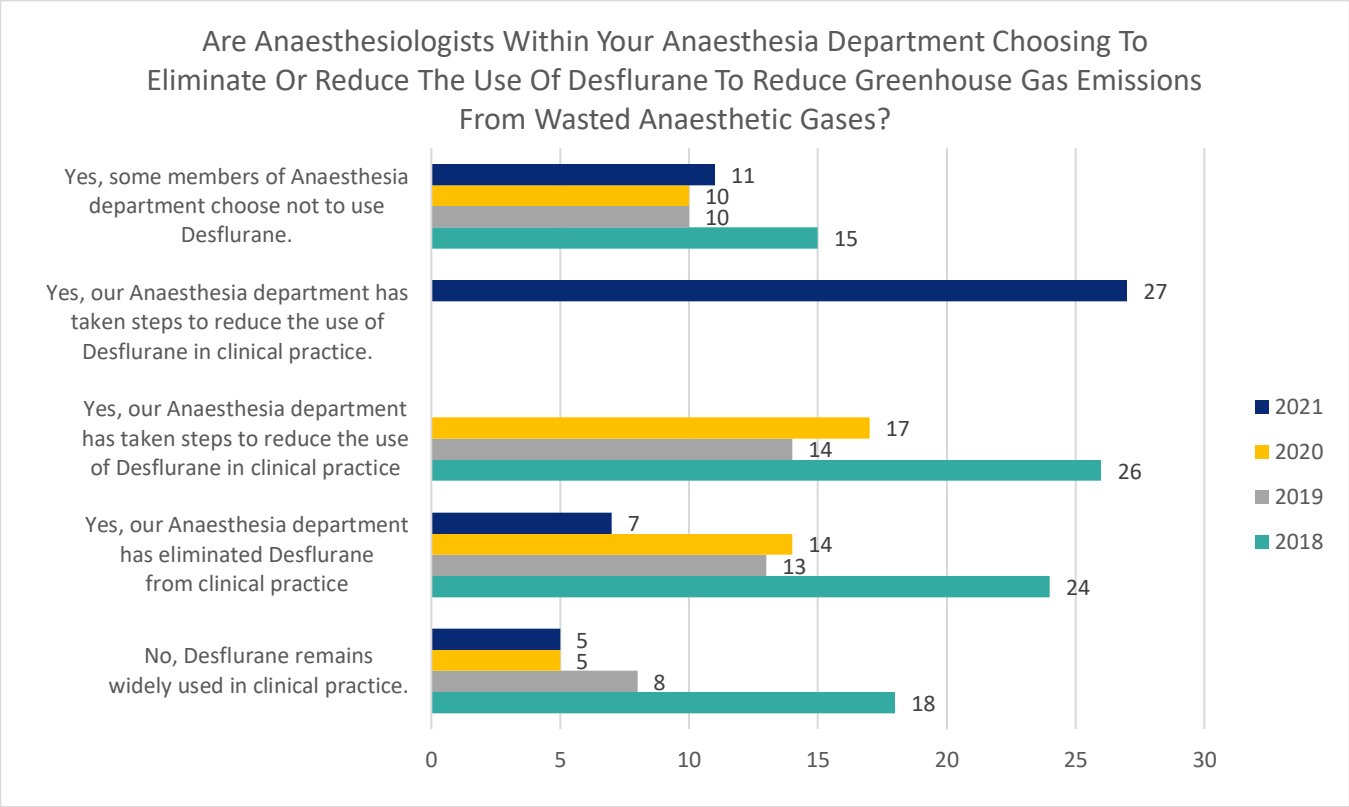
Figure 12. 2 Number of anesthetic gas bottles purchased by type of anesthetic (2019-2021 data).

Figure 12.3 below provides anesthesia departments' varying responses to eliminating (or reducing) desflurane at hospitals. In 2021, 50 participants responded out of a total of 81.
Of the 50 facilities that did respond, the large majority are taking action to reduce their use of desflurane:

- 14% of participants have eliminated desflurane from clinical practice
- 54% are taking steps to reduce desflurane usage
- 22% have some anesthesiologists who choose not to use desflurane
- From the above, 90% of facilities are choosing to reduce/eliminate desflurane use
- 10% reported that desflurane is still in wide usage in 2021.

The following shows the trend over the four years of collecting data to reduce desflurane use:

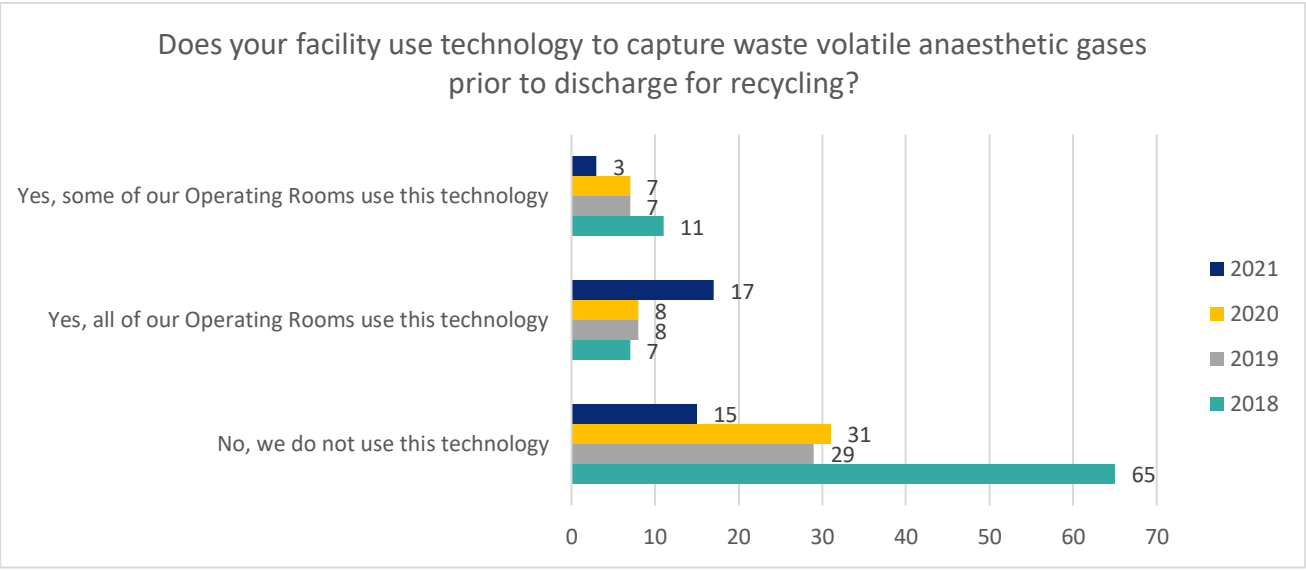
- Total in 2021 – 90% reducing (out or 50)
- Total in 2020 – 89% reducing (out of 46)
- Total in 2019 – 82% reducing (out of 45)
- Total in 2018 – 78% reducing (out of 83)



Canadian Coalition for Green Health Care, 2024.

Figure 12. 3 Deflurane gas usage (2018-2021 data).

Some participants indicated that they are aware of a technology that is used to capture waste volatile anesthetic gases prior to discharge, for the purpose of recycling. 21% percent of the participants used this technology in all operating rooms, an increase from 9% in 2020, and 3% used it in some operating rooms, shown in *Figure 12.4.*



Canadian Coalition for Green Health Care, 2024.

Figure 12. 4 Anesthetic gas collection and recycling practices (2018-2021 data).

There are alternative solutions for anesthesiologists to use instead of the anesthetic gases. Total intravenous anesthesia (TIVA) is one example of a technique that can replace gaseous anesthetics. In 2021, 28% of participants reported that some of their members use TIVA.

Some facilities are using medical air instead of nitrous oxide as a carrier gas. In 2021, 25% of participants have taken steps to eliminate nitrous oxide while 5% have already eliminated nitrous oxide.

12.3 Summary

Some general conclusions include:

1. Sevoflurane and desflurane are the primary gaseous anesthetic gases used.
2. Desflurane use has been decreasing in use over the four data years.
3. 21% percent of the participants used a technology to collect and ultimately recycle anesthetic gases in all operating rooms, an increase from 9% in 2020.
4. With respect to nitrous oxide, 25% of participants have taken steps to eliminate nitrous oxide, and 5% have already eliminated it.

12.3.1 Climate Change Resilience and Anesthetic Gas

Anesthetic gases are significant contributors to climate change with high global warming potentials. Practices to reduce use of anesthetic gases can increase the resilience of the health system can include some of the following practices, where details can be found in the resources section in 12.4 below:

- Using less anesthetic gas per patient by removing patient carbon dioxide through new technologies enabling reuse of the same anesthetic gas within the same patient
- Use lower flow rates of anesthetics
- Eliminating desflurane use
- Reducing use of nitrous oxide
    - use of small cylinders of nitrous oxide instead of relying on centralized sources of nitrous oxide
    - eliminating nitrous oxide as a carrier gas
- Explore alternative anesthesiology strategies:
    - Regional and spinal anesthesia
    - Total intravenous anesthesia (TIVA) where appropriate

Halogenated anesthetic gases are not listed as reportable GHG emissions due to international agreements which had recognized the medical value of these gases. There has been an increase in efforts globally to ban desflurane from clinical use. Scotland has become the first country in the world to ban desflurane. The NHS England plans to stop using desflurane completely by early 2024 except in exceptional circumstances, and the EU plans to ban the use of desflurane from January 1st, 2026, except in exceptional circumstances[64].

[64] EuroNews.green. Scotland becomes the first country to ban the high-emissions anaesthetic desflurane. March 3, 2023. From https://www.euronews.com/green/2023/03/03/scotland-becomes-the-first-country-to-ban-the-high-emissions-anaesthetic-desflurane

In Canada, HealthPro reports that the use of desflurane is decreasing across all provinces and territories. Decreased usage has been reported in Newfoundland (39%) Ontario (27%) and BC (23%). The Northwest Territories have eliminated desflurane entirely. HealthPro also reports that sevoflurane is the preferred anesthetic in clinical settings[65].

Reduction of desflurane use is reported by the Ontario Anesthesiologist Environmental Working Group, where 27 Ontario hospitals that have eliminated desflurane use (in 2023) and are listed on their website[66].

12.4 Additional Resources

The following resources are available for guidance on more sustainable anesthetic gas use:

1. GUIDELINES TO THE PRACTICE OF ANESTHESIA Revised Edition 2023 Canadian Journal of Anesthesia Volume 70, number 1. 10 Guidelines for Environmental Sustainability https://www.cas.ca/CASAssets/Documents/Practice-Resources/Guidelines/2023-Guidelines-to-the-Practice-of-Anesthesia.pdf
2. Ontario's Anesthesiologists' Environmental Sustainability Working. Reducing/Eliminating Desflurane.https://ontariosanesthesiologists.ca/reducing-eliminating-desflurane
3. Andersen MPS, Nielsen OJ, Sherman J. Assessing the potential climate impact of anaesthetic gases. Lancet Planet Health 2023; 7: e622–29. https://www.thelancet.com/action/showPdf?pii=S2542-5196%2823%2900084-0
4. American Society of Healthcare Engineers. Greenhouse Gas Management of Anesthetic Gases web page: https://www.ashe.org/sustainability/decarbonization/management-anesthetic-gases

[65] HealthPro Canada News. Canada's ORs make the switch to greener gases. November 2023. From: https://www.healthprocanada.com/article/canadas-ors-make-the-switch-to-greener-gases-1#:~:text=HealthPRO%20Canada%20is%20pleased%20to,have%20eliminated%20its%20use%20entirely.

[66] Ontario Anesthesiologists. Reducing/Eliminating Desflurane. From https://ontariosanesthesiologists.ca/reducing-eliminating-desflurane

13. Climate Change

13.1 Background

Climate-related events are already impacting hospitals in Canada[67]. The frequency and magnitude of severe weather events such as extreme heat, cold, rain, ice, snow, winds and storms have increased, as forecast by the Intergovernmental Panel on Climate Change (IPCC)[68]. Increasing, global temperatures will also result in rising sea levels, melting permafrost and droughts and dry conditions which will spur on wildfires. To help reduce the catastrophic effaces of climate change, Canada has committed to an economy-wide target for GHG emissions reductions of 30% relative to 2005 levels by 2030[69].

Canada's health care sector is a significant contributor to GHGs. A 2018 study reported that GHGs emitted from Canada's health care sector life-cycle, which includes direct emissions from hospital buildings and indirect emissions from their supply chain, represented an estimated 4.6% of the total national GHG emissions in 2015 or 0.0330 Gigatonnes (GT) CO2 eq[70]. Given the health system's annual contribution to Canada's total GHG output, targeted support programs to reduce emissions in the health sector could play an important role in national climate change mitigation efforts. Eckelman et al. (2018) also report that the most significant GHG emissions in the health sector are from: prescribed and non-prescribed pharmaceuticals (25%); hospitals (24%); and physician services (13%).

The primary sources of GHG emissions from the health system have been identified as coming from Scope 3 activities includes many elements of the GHS sections in this report:

- Waste disposal
- Water supply and disposal
- Staff travel (business)
- Staff travel (commuting)
- Patient/visitor travel
- Supply chain (pharmaceuticals)
- Supply chain (medical devices)
- Supply chain (food)
- Supply chain (construction)
- Supply chain (other - general)
- Investments

[67] Berry, P., & Schnitter, R. (Eds.). (2022). Health of Canadians in a Changing Climate: Advancing our Knowledge for Action. https://changingclimate.ca/health-in-a-changing-climate/

[68] Intergovernmental Panel on Climate Change. 2018. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/05/SR15_SPM_version_report_HR.pdf

[69] Government of Canada. 2030 Emissions Reduction Plan: Clean Air, Strong Economy https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/climate-plan-overview/emissions-reduction-2030.html

[70] 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 (2018) 15(7): e1002623. https://doi. org/10.1371/journal.pmed.1002623

Examples of GHG emission analysis from hospitals in Canada show that the sources of GHG emissions can vary considerably from different facilities or organizations. For example, a GHG emission analysis conducted at the CISSS de Laval in Quebec, found that Scope 3 GHG emissions constituted 90% of the total emissions[71], while an analysis of the Canadian Health System GHG emissions conducted by Health Care Without Harm and Arup in 2019 found that Canada's health system Scope 3 emissions were 61%[72].

There are many resources for hospitals on how to prepare for and adapt to the impacts of climate change. ClimateData.ca provides high-resolution climate data that can help decision makers better understand the types of climate change impacts predicted in different areas across Canada, Vulnerability and adaptation assessments have been supported in the health sector through Health Canada's HealthADAPT program and guidance documents are available on how to undertake these. A vulnerability assessment of hospital infrastructure was undertaken at Nanaimo Regional General Hospital in BC hospital which focused on what new vulnerabilities caused by climate change are projected from climate models out to the year 2050. The Health Care Facility Climate Change Resiliency Toolkit was developed by the Canadian Coalition for Green Health Care and Health Canada. International resources for the health sector on climate change mitigation, resilience and sustainability are available through the Alliance for Transformative Action on Climate and Health (ATACH). Additional information and guidance on climate change for health care professionals can be found in 'Taking Action on Climate Change at Health Facilities' and the related chapters of that report[73]. All these resources and more available in the resources section 13.4.

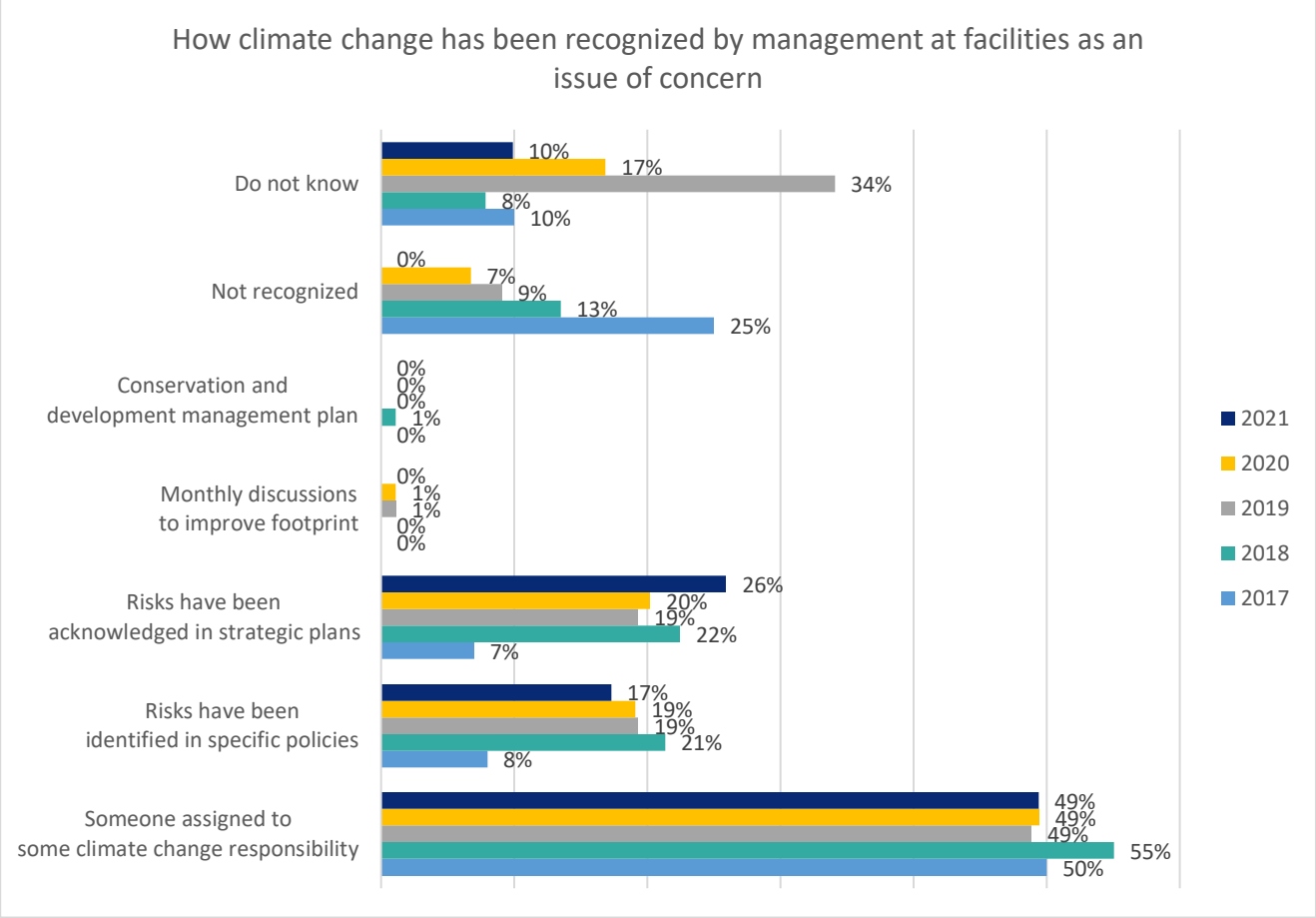
13.2 Results

13.2.1 Recognition of climate change as an issue of concern

The first step to action at a health care facility is recognition of climate-related impacts as an issue of concern by senior management. *Figure 13.1* reveals that one half of the sites have some level of recognition of climate change as an issue of concern by assigning at least one person with some climate change responsibility. Data shows that 26% have included climate change risk in their facility Strategic Plan, and 17% have included it in specific policies. 10% of respondents did not know whether climate change was recognized by management at their facility, which is less than in both 2019 and 2020. Not one participant in the 2021 data call reported that climate change

[71] Synergie Santé Environnement, Primum non nocere, Centre intégré de santé et de services sociaux de Laval. Bilan de Émissions de Gaz À Effect de Serre. Générés par les activities du CISSS de Laval (Scope 1, 2 et 3). Juin 2022.
[72] Health Care Without Harm (HCWH) and ARUP, Health care's climate footprint report. How the health sector contributes to the global climate crisis and opportunities for action. 2019. Available from: https://noharm-uscanada.org/ClimateFootprintReport
[73] CAPE. Taking Action on Climate Change for Health Professionals. https://cape.ca/wp-content/uploads/2019/05/Climate-Change-Toolkit-for-Health-Professionals-Updated-April-2019-2.pdf

was not recognized at their facility. Also notable is the number of facilities which do not recognize climate change has been significantly decreased since 2017.

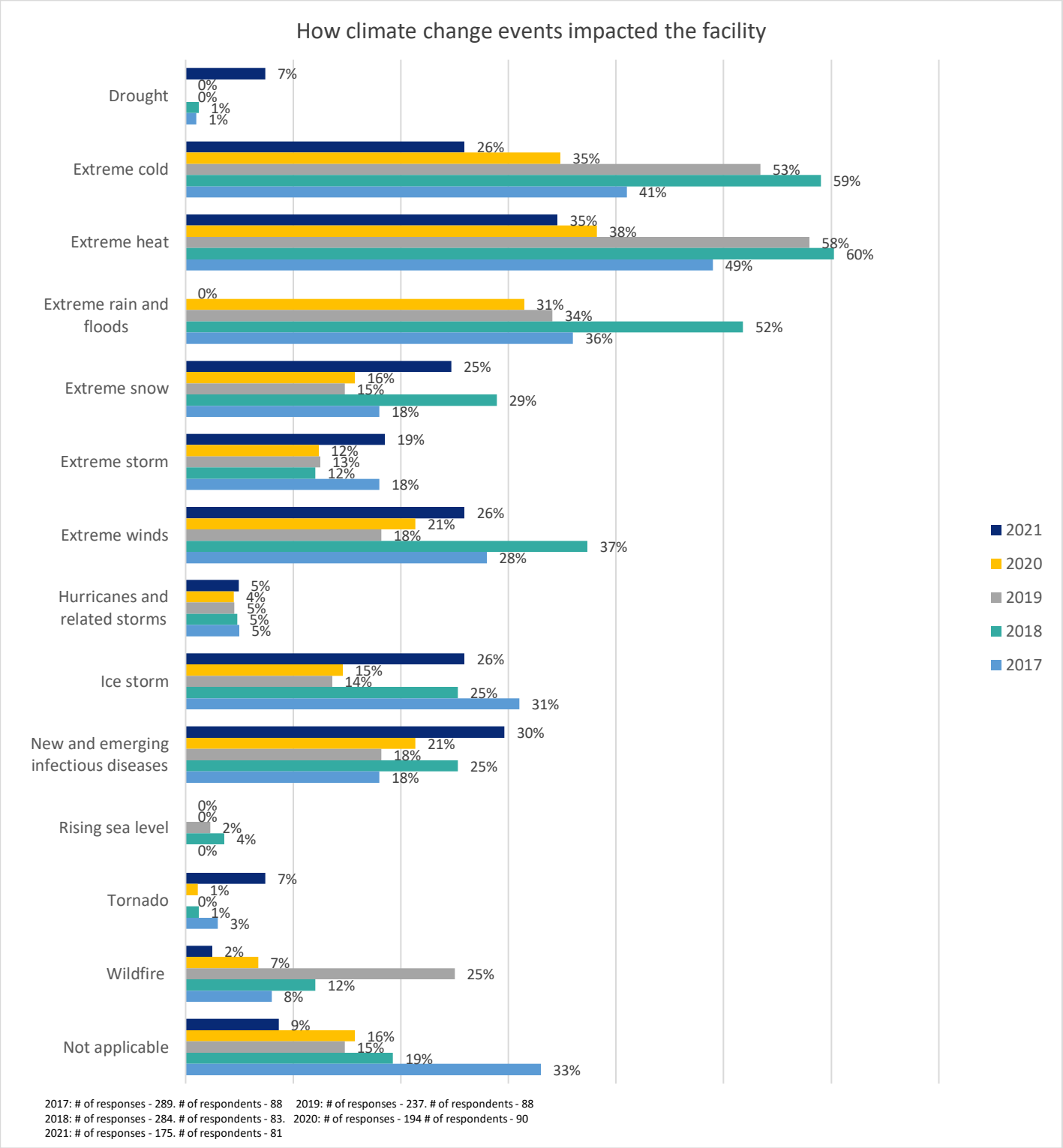


Canadian Coalition for Green Health Care, 2024.

Figure 13. 1 Management recognition of climate change as an issue of concern (2017-2021 data).

13.2.2 Climate-related events affecting hospitals

Figure 13.2 provides details on what kinds of climate-related events the hospitals have experienced. Many participants reported more than one type of event. In 2021 that most common climate-related events hospitals experienced were extreme heat (35%), including extended periods of heat, extreme cold (26%), and new and emerging infectious diseases (30%). Of note is that in 2017, 33% reported that climate change impacts were ‘not applicable’, while in 2021 this number has decreased to 9%, indicating a trend toward greater impacts of climate change on health care facilities.

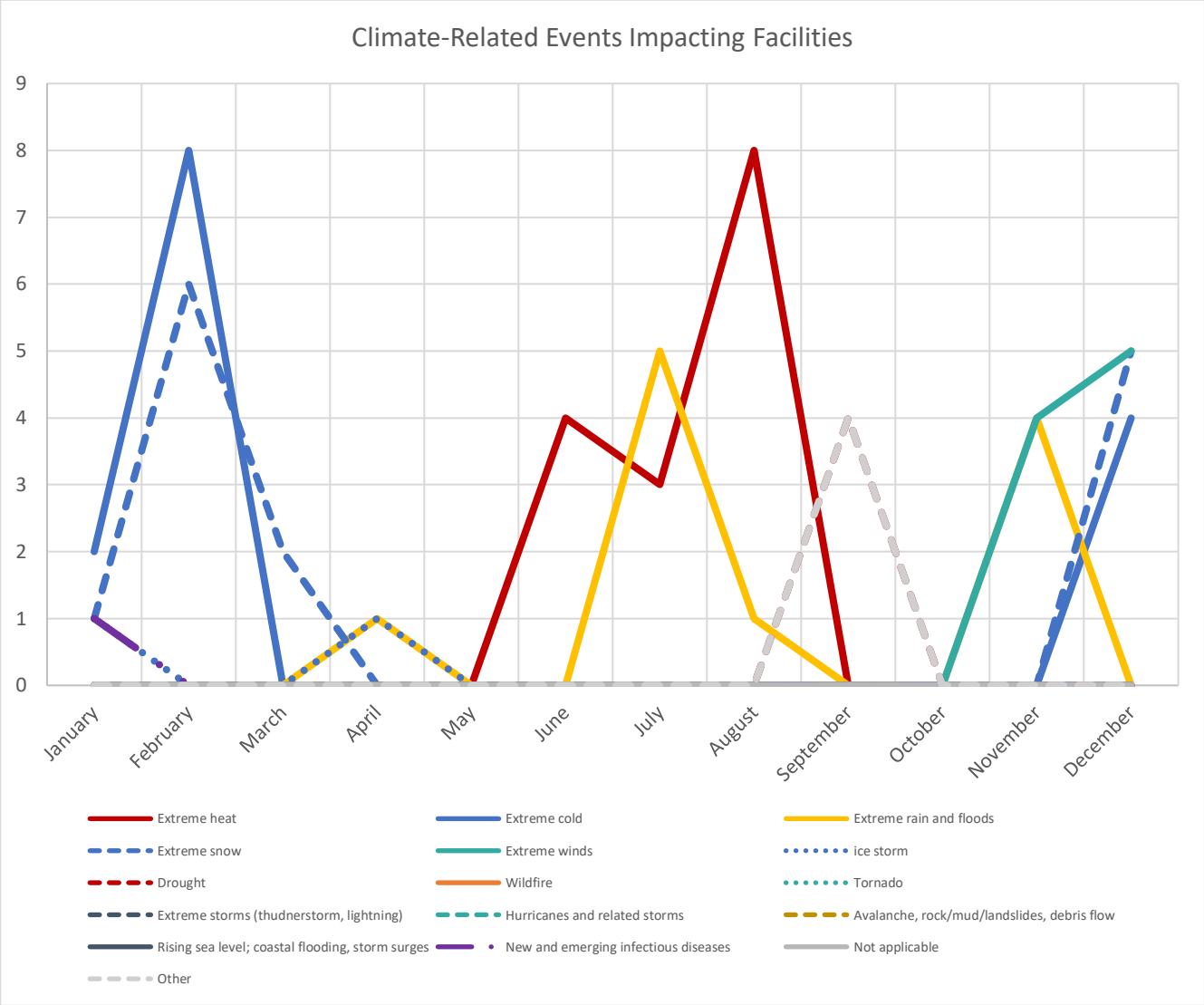


Canadian Coalition for Green Health Care, 2024.

Figure 13. 2 Climate change-related events impacting hospitals (2017-2021 data).

The survey also asked participants which month each climate-related event occurred. *Figure 13.3* displays when each climate-related event occurred for an organisation. February saw the most facilities impacted by extreme cold, and August saw the most facilities impacted by

extreme heat. A number of facilities also experienced extreme rain and floods in the month of July. It is important to note that not all facilities who reported experiencing climate-change related events, attributed a month to those events.



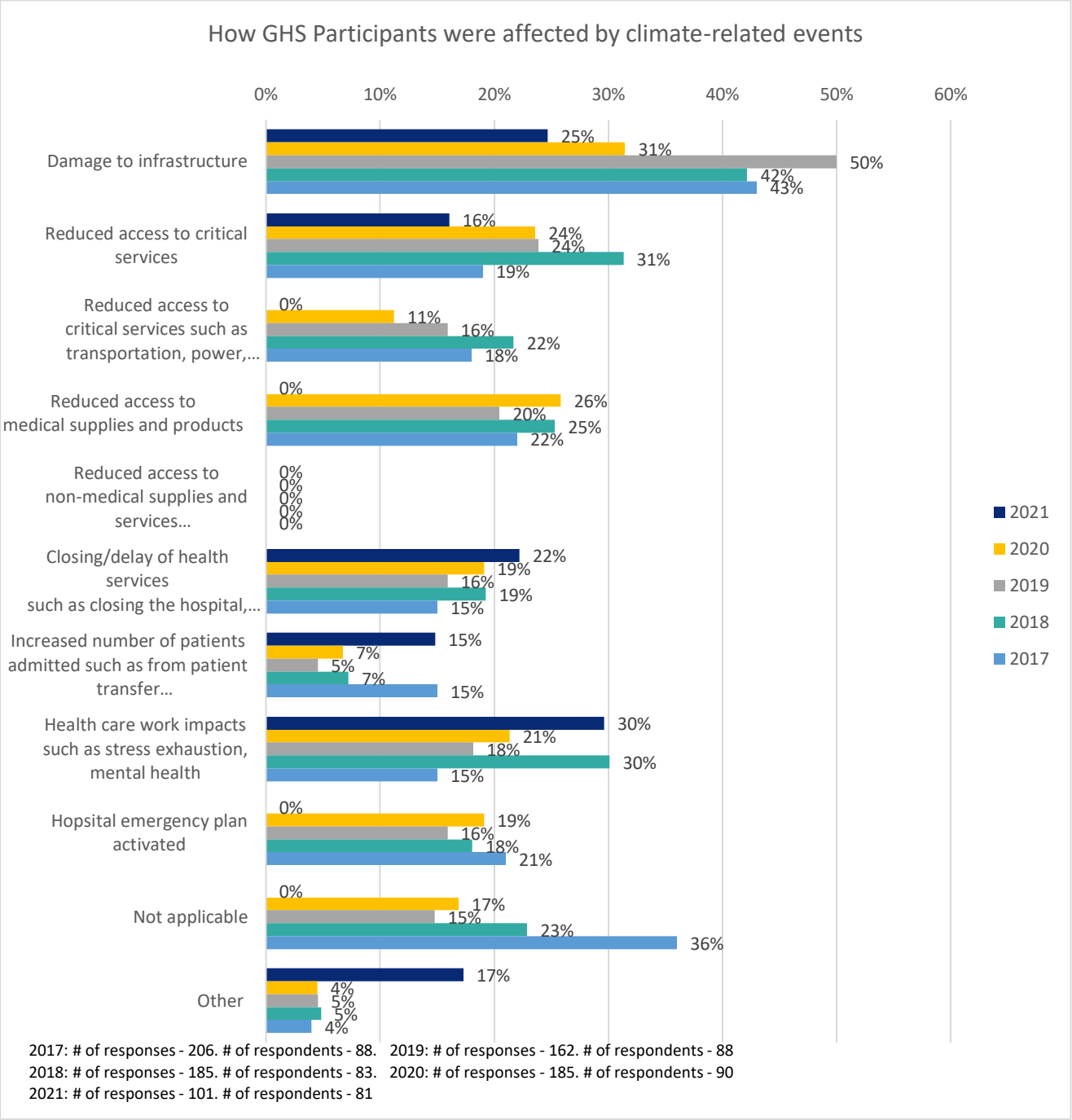
Canadian Coalition for Green Health Care, 2024.

Figure 13. 3 Timing of climate change-related events impacting hospitals (2021 data).

In the survey, participants were also asked whether any of the reported climate change-related events occurred simultaneously. The most common response was new and emerging infectious disease and extreme weather events, such as extreme heat and extreme cold. This response can be attributed to the COVID-19 pandemic, which occurred over many months and seasons during 2021. Other common events occurring simultaneously included extreme cold and extreme snow, as well as extreme rain, flooding and winds. B.C participants in particular reported experiencing a series of extreme weather events simultaneously which affected their facilities. Most notably, extreme heat, drought and wildfires.

13.2.3 Climate-related impacts on hospitals

Figure 13.4 illustrates how hospitals have been impacted by climate change-related events, with many participants reporting experiencing more than one type of shock to their facilities. Health care workforce impacts, such as stress exhaustion and poor mental health, was reported by 30% of participants; 25% reported damage to infrastructure; 22% reported closing/delay of health services; followed by 16% having experienced reduced access to critical services and 15% having experienced an increased number of patients admitted. Of note is that in 2017 36% reported that climate change impacts were ‘not applicable’, while in 2021 this number has decreased to 0%, indicating a trend toward greater impacts of climate change on health care facilities.



Canadian Coalition for Green Health Care, 2024.

Figure 13. 4 How a facility was affected by climate change-related events (2017-2021 data).

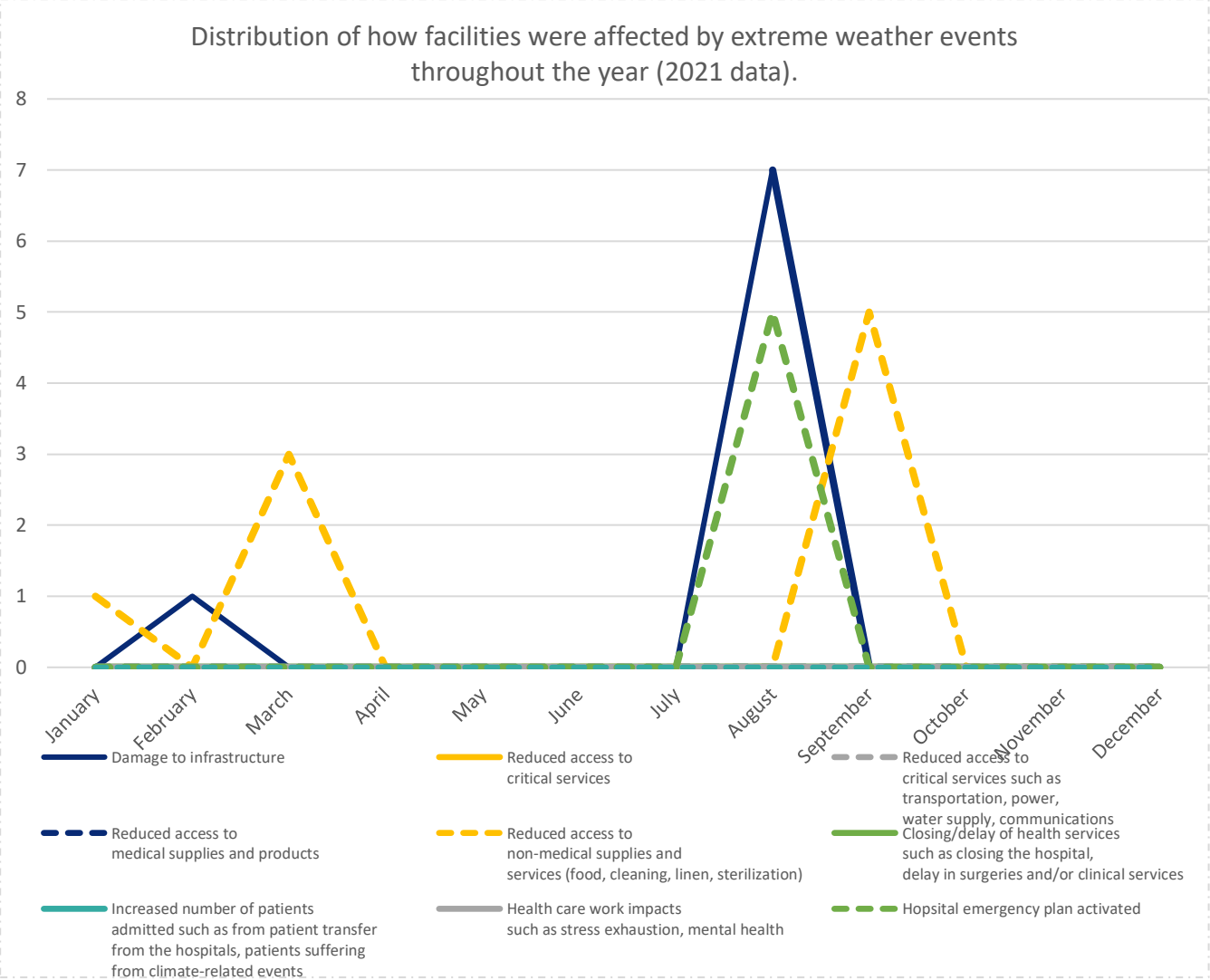
Other impacts on facilities caused by climate change-related events included:

- Highway closures resulting in delivery delays and patients not being able to travel to the facility.
- Power-outages causing reduction in available health services.
- Disruptions in supply chain and delivery of critical services due to the COVID-19 pandemic
- Risks for staff and patient commuting due to extreme weather.

Figure 13.5 illustrates the distribution of how and when facilities were affected by extreme weather

GHS Report (2021 data)

events throughout the year. August saw the greatest number of facilities impacted by damage to infrastructure, and a number of facilities having to activate their hospital emergency plan. Reduced access to non-medical supplies and services was most common in March and September 2021. It is important to note that not all facilities who reported how they were affected by extreme weather events, attributed a month to those affects.



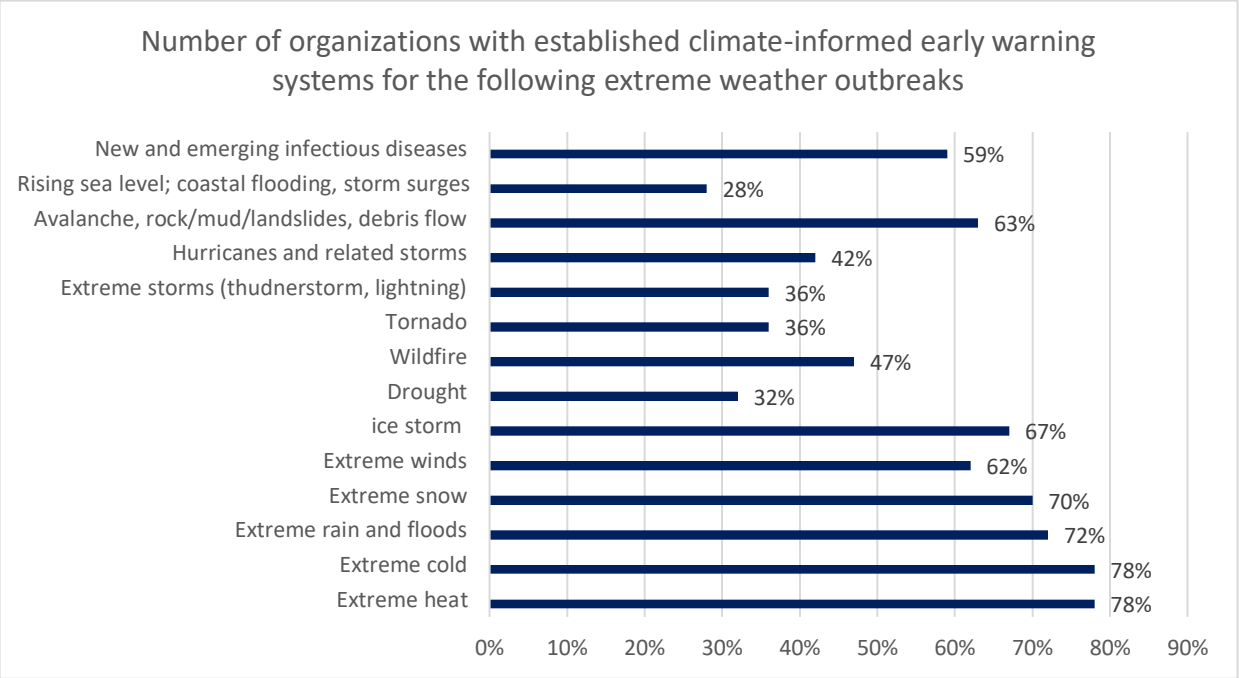
Canadian Coalition for Green Health Care, 2024.

Figure 13. 5 Distribution of how facilities were affected by extreme weather events throughout the year (2021 data).

In the survey, participants were also asked whether any of the reported affects caused by climate change-related events occurred simultaneously. The majority of responses indicated multiple impacts to their facilities caused by the COVID-19 pandemic such as disruptions in the supply chain resulting in reduced access to medical supplies, health worker impacts such as stress and exhaustion, closing/delay in health services and an increased number of patient admissions. Other responses included damage to infrastructure resulting in reduced access to critical services such as power, and heavy rain fall and flooding resulting in damage to infrastructure and delay of

health services.

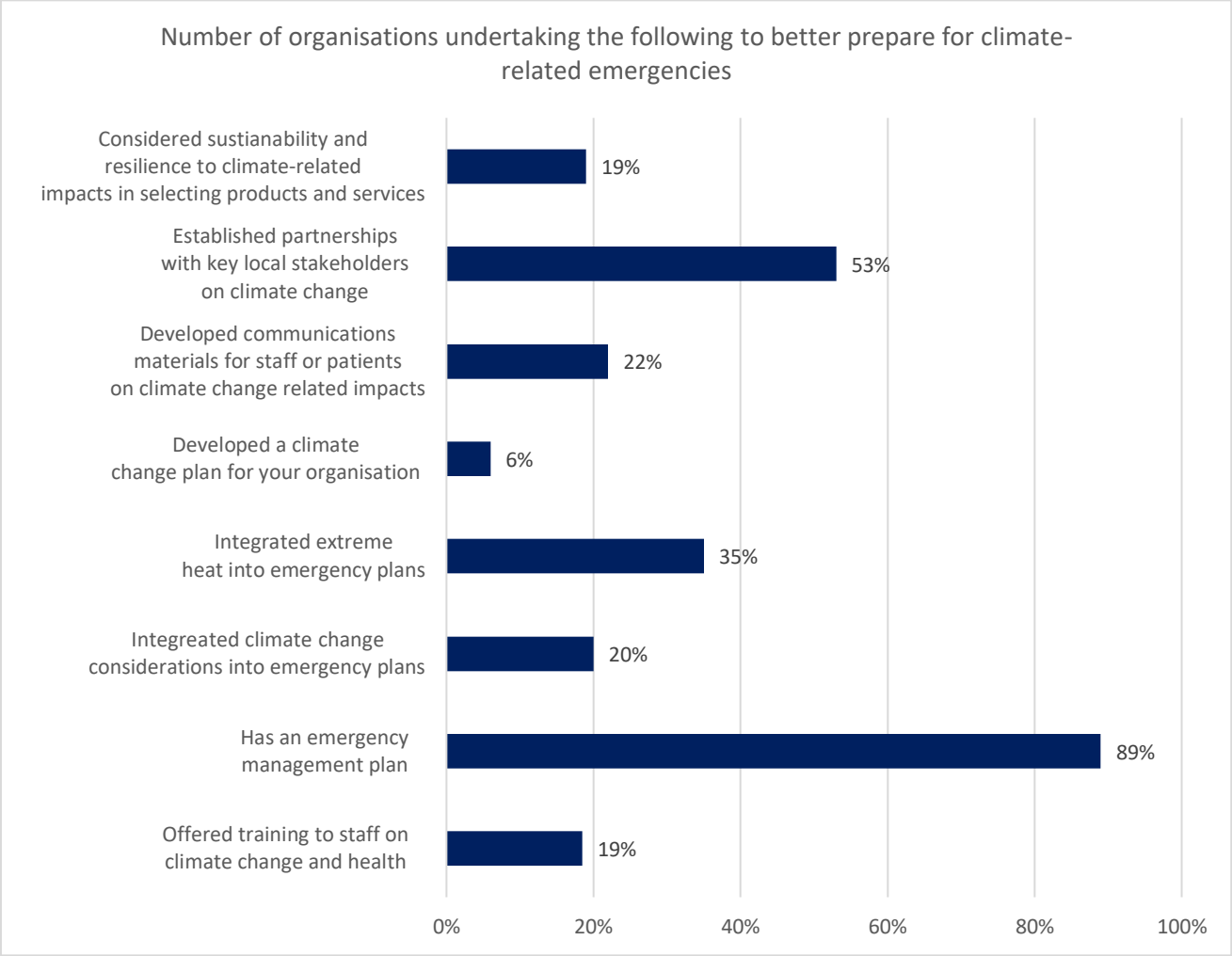
In preparation for climate-related emergencies, a number of organizations have established early warning systems for extreme weather outbreaks including extreme cold, extreme heat, extreme snow, and extreme rain and floods (*Figure 13.6).*



Canadian Coalition for Green Health Care, 2024.

Figure 13. 6 Organization with early warning systems for extreme weather outbreaks (2021 data).

In addition to early warning systems, most organizations (89%) have emergency management plans, and 35% have integrated extreme heat into these plans, but only 20% have integrated climate change into these plans generally. Data also show that 53% have established partnerships with key local stakeholders on climate change. However, there are a number of actions which could be undertaken to improve resilience and adaptation planning including: development of climate change plans (6% reported having one), offering training on climate change and health (19% are doing that now), considering sustainability and resilience to climate-related impacts in selecting products and services (19% reporting doing that) and having communications materials for staff or patients on climate change replated impacts (22% reporting having done that) (*Figure 13.7*).

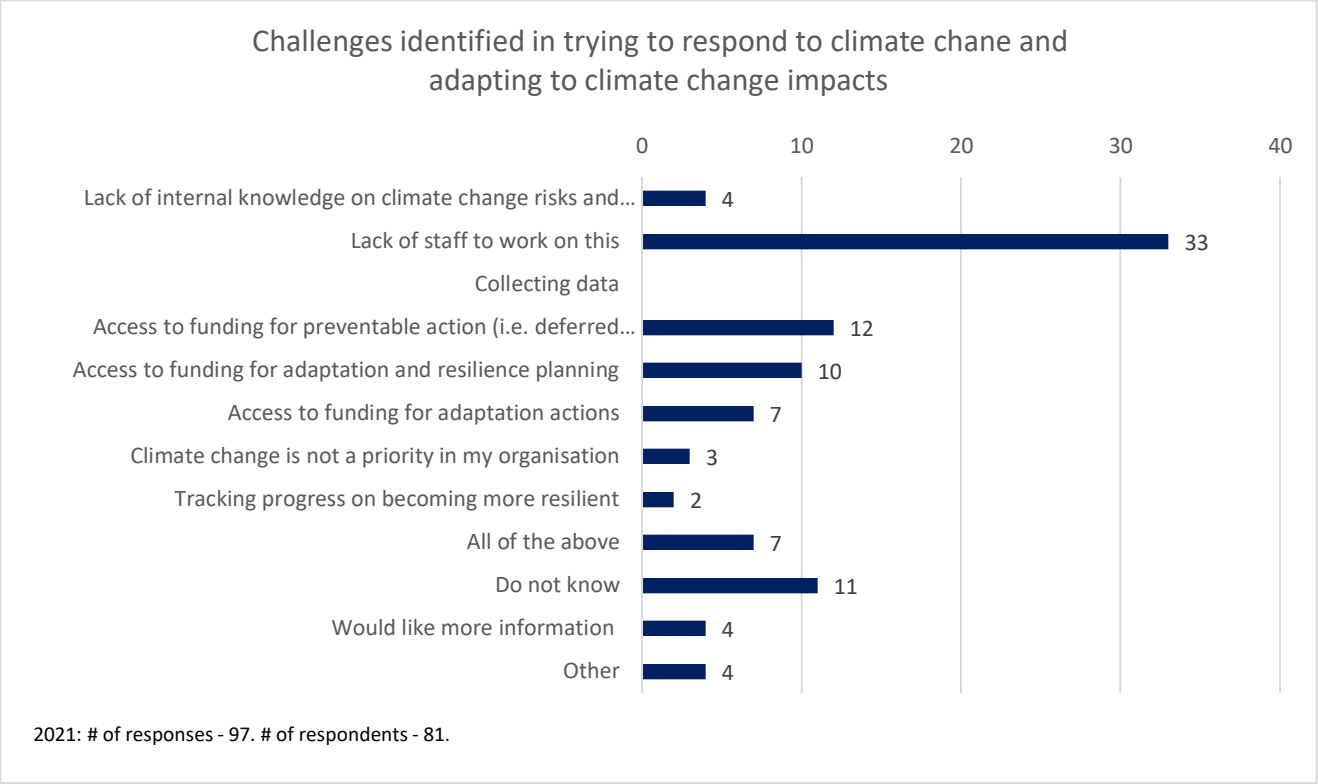


Canadian Coalition for Green Health Care, 2024.

Figure 13. 7 Organisational preparedness for climate-related emergencies (2021 data).

13.2.4 Challenges with Climate change adaptation and response

Figure 13.8 shows the challenges organisations are facing in trying to respond to climate change and adapt to climate change impacts. The most significant challenge identified by participants was lack of staff (41%). Also high on the list was access to funding, in particular, access to funding for preventable action (15%), for adaptation and resilience planning (12%), and for adaptation actions (9%). Those participants that answered 'other' did not identify the challenges they were experiencing.



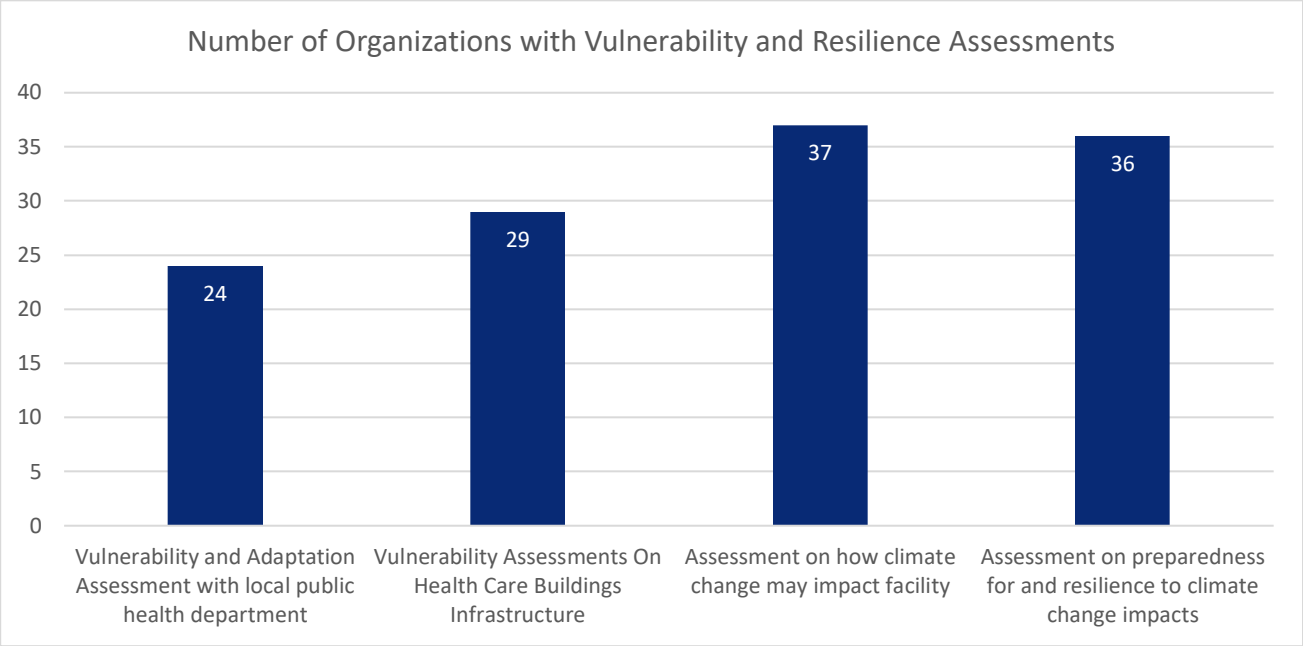
Canadian Coalition for Green Health Care, 2024.

Figure 13. 8 Organisational preparedness for climate-related emergencies (2021 data).

13.2.5 Resiliency and Vulnerability Assessments

Respondents were asked if they had completed assessments on facility preparedness, vulnerability and resilience to climate change. The responses reveal that a significant portion of participants have not yet taken action to assess their vulnerabilities to climate change. *Figure 13.9* shows:

- 70% still need to develop vulnerability and adaptation assessments.
- 65% have not yet completed vulnerability assessments on health care infrastructure / buildings.
- More than 50% have not examined climate modeling data to identify what types of climate change events are likely to take place in their area in the future.
- Approximately 60% have not yet assessed their preparedness for and resilience to climate change impacts.

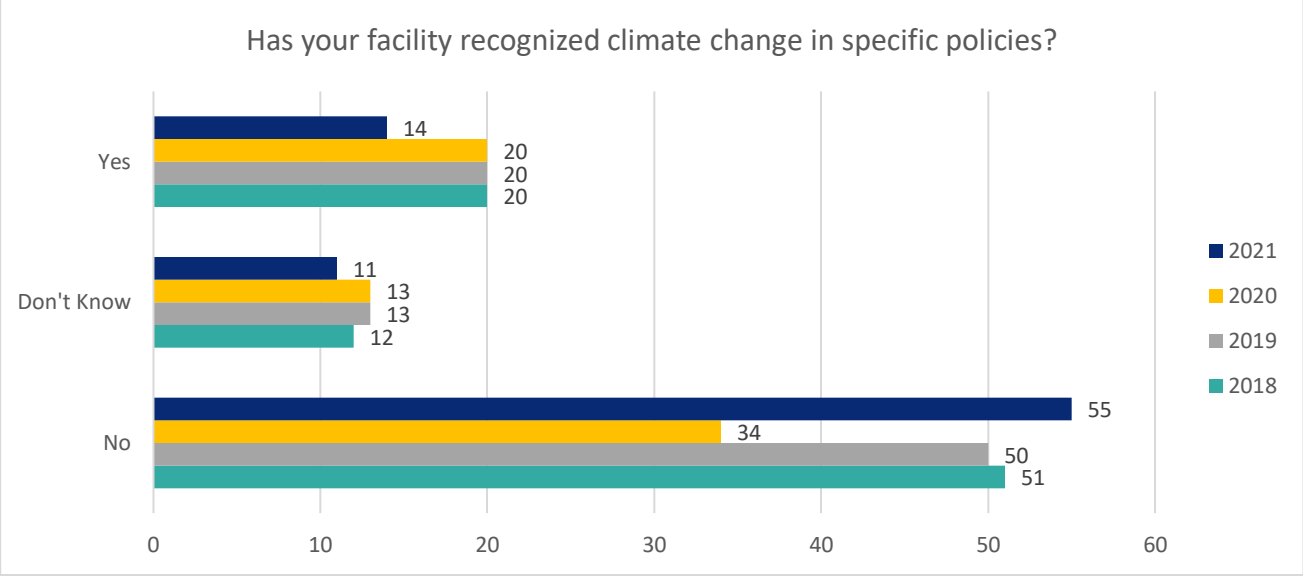


Canadian Coalition for Green Health Care, 2024.

Figure 13. 9 Vulnerability and resiliency assessments 92021 data).

13.2.6 Policy

Figure 13.10 shows the number of participants which have climate change recognized in specific policies. Every participant that has claimed to have a policy has provided either an attachment or link to their said policy for verification. Changes can in-part be attributed to changes in GHS participants year over year.



Canadian Coalition for Green Health Care, 2024.

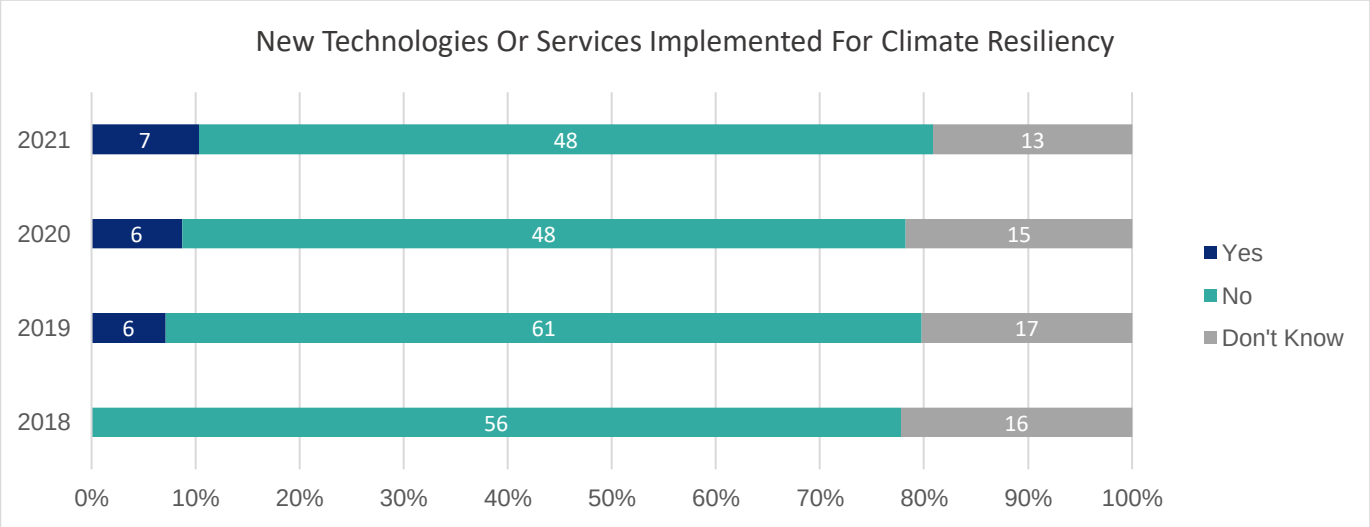
Figure 13. 10 Climate change in specific policies (2018-2021 data).

13.2.7 Climate Resilience Initiatives

There are numerous ways hospitals can incorporate climate change resilience measures at their site. Every year the GHS questionnaire asks participants what new technologies or services for climate change resiliency they have implemented. In 2021, seven participants claimed to have implemented new technologies (*Figure 13.11*).

Technologies or services implemented by facilities include:

- Inclusion of a Climate Resiliency Policy
- Ordering a hold on non-essential work during extreme climate change-related events
- Upgrades to infrastructure such as HVAC systems.
- Implementation of Deep Lake Water Cooling



Canadian Coalition for Green Health Care, 2024.

Figure 13. 11 New technologies or services implemented for climate resiliency (2018-2021 data).

13.3 Summary

Some general conclusions include:

1. Almost half of respondents (49%) have someone at their facility assigned to some climate change responsibility
2. In 2021 the most common climate-related events hospitals experienced were extreme heat (35%), including extended periods of heat, extreme cold (26%), and new and emerging infectious diseases (30%).
3. New and emerging infectious disease and extreme weather events were the most common climate change-related events reported to occur simultaneously. This can be attributed to the COVID-19 pandemic, which occurred over many seasons in 2021.
4. The most common impacts on HCFs caused by climate-related events include staff stress, exhaustion, and poor mental health (30%), damage to infrastructure (25%), closing/delay of health services (22%), and reduced access to critical services (16%).
    a. The portion of participants that indicated that climate change impacts were not applicable has dropped to 0% in 2021, from 36% in 2017.
5. A number of organizations reported having established early warning systems for extreme

weather outbreaks, most notable extreme cold (78%), extreme heat (78%), extreme snow (70%), and extreme rain and floods (72%).

6. The majority of respondents reported having an emergency management plan (89%) but fewer have incorporated climate change-related concerns (20%) into these emergency plans, while only a small percentage have developed a climate change plan (6%).
7. The largest reported challenge organisations are facing in trying to respond to climate changes is lack of staff (41%) and access to funding (36%).
8. Only 14% of respondents have recognized climate change in specific policies.
9. The responses reveal that a significant portion of participants have not yet taken action to assess their vulnerabilities to climate change.
    a. 70% still need to develop vulnerability and adaptation assessments.
    b. 65% have not yet completed vulnerability assessments on health care infrastructure/buildings.
    c. More than 50% have still not identified what types of climate change events are likely to take place in their area.
    d. Approximately 60% have not yet assessed their preparedness for and resilience to climate change impacts.

13.3.1 Climate Change Resilience

As has been identified in all the sections in this GHS report, sustainability initiatives can also be seen as contributing to resilience. Many of the items identified in this section can help guide a health care facility on their journey to become more resilient to the impacts of climate change, but this is something that needs to be continually prioritized alongside other health care delivery practices to ensure progress. For greater effectiveness, combining mitigation activities with resilience activities helps ensure that neither effort compromises the other, and can save time, effort and costs.

13.4 Additional Resources

The following resources are available for guidance on climate-resilience, adaptation and vulnerability and GHG mitigation for health care facilities:

1. Health Care Facility Climate Change Resiliency Toolkit. Canadian Coalition for Green Health Care in partnership with Health Canada: https://greenhealthcare.ca/climatechange/climate-change-resiliency-toolkit/
2. Berry, P., Enright, P., Varangu, L., Singh, S., Campagna, C., Gosselin, P., Demers-Bouffard, D.,Thomson, D., Ribesse, J., & Elliott, S. (2022). Adaptation and Health System Resilience. In P. Berry & R. Schnitter (Eds.), *Health of Canadians in a Changing Climate: Advancing our Knowledge for Action*. Ottawa, ON: Government of Canada. https://changingclimate.ca/health-in-a-changing-climate/
3. Health Canada and the World Health Organizations. Climate Change and Health. Vulnerability and Adaptation Assessment. 2021. https://www.who.int/publications/i/item/10665345968
4. Canadian Institute for Climate Choices. THE HEALTH COSTS OF CLIMATE CHANGE

HOW CANADA CAN ADAPT, PREPARE, AND SAVE LIVES. 2021. https://climateinstitute.ca/reports/the-health-costs-of-climate-change/
5. WHO. Checklists to Assess Vulnerabilities in Health Care Facilities in the Context of Climate Change. 2021. https://www.who.int/publications/i/item/9789240022904
6. WHO. Guidance For Climate Resilient and Environmentally Sustainable Health Care Facilities. 2020. https://www.who.int/publications/i/item/9789240012226
7. PAHO. Climate Change for Health Professionals. A Pocket Book. 2020. https://iris.paho.org/handle/10665.2/52930
8. Bush, E. and Lemmen, D.S., editors (2019): Canada's Changing Climate Report; Government of Canada, Ottawa, ON. 444 p. https://changingclimate.ca/CCCR2019/
9. Alliance for Transformative Action on Climate and Health (ATACH) website and resources. From: https://www.atachcommunity.com/
10. Health Canada. HealthADAPT web page. From: https://www.canada.ca/en/health-canada/programs/health-adapt.html
11. Climate Data for a Resilient Canada. https://climatedata.ca/
12. Nanaimo Regional General Hospital (NRGH) Climate Change Vulnerability Assessment Report. 2019. Prepared by RDH Building Science. From: https://pievc.ca/2019/03/24/climate-change-vulnerability-assessment-for-nanaimo-regional-general-hospital-nrgh/

14. Conclusion

Over the past seven years, the Canadian Coalition for Green Health Care has been a part of generating a total of 828 individualized scorecards for hospitals. In addition to the scorecards, hospitals have been celebrated during the Green Hospital Scorecard Awards, and have helped outline current trends within health care and sustainability.

The past two years of the GHS data collection also represent hospitals affected by the COVID-19 pandemic, which resulted in different impacts at each hospital. Reductions in some sustainability initiatives did take place (i.e. lower number reporting green teams, and lower support for green activities), and lower recycling of rates were seen in some hospitals.

The GHS for 2021 data showed that the average energy use intensity (EUI) across all hospitals was calculated to be 2.9 GJ/m^2/year. Hospitals have an average water use intensity (WUI) of 1.4 m^3/m^2/year. In terms of waste, participating hospitals generated a total of 24,935 MT and diverted a total of 24,935 MT recyclable and other forms of waste from the landfill, accounting for 29% of total waste generated. The average waste generation for all the hospitals types is 6 kg/bed/day. In addition to recycling, initiatives are also taking place to reduce and reuse medical devices and other products used in the health system, supporting the transition to a circular economy.

Many hospitals are increasing their green initiatives in the following areas: preferable purchasing, toxins management, sustainable construction/ renovation, energy conservation, water conservation and waste management policies, targets and action plans. Some hospitals also have an increased interest in clean transportation, healthy and sustainable foods and a reduction of anesthetic gas usage. The latest GHS saw the introduction of additional questions related to the circular economy and climate change mitigation and resilience.

At the end of every GHS survey, participants are asked about their experience with the survey itself. 78% of the participant in the 2021 data call identified their overall experience with the survey as good, very good or excellent. 78% claimed they participate in the survey to make their organisation more sustainable and 65% said they use their participation to track site performance. 72% of participants claimed the survey was of suitable length. Of those that were concerned over the length of the survey, 32% cited lack of time as the reason for their concern. Additional information on the possible evolution of the GHS can be found in Annex 1.

While results of the GHS survey show a huge step in the right direction, changes are not happening fast enough. From the Canadian Coalition for Green Health Care, we invite you to get involved and continue greening Canada’s health care system. Through nine years of providing this free resource to hospitals, the GHS acts as a key tool supporting the transition towards environmental sustainability, low carbon and climate resilience in the health care sector.

Annex 1. Presentation summary to Health Canada on the possible evolution of the Green Hospital Scorecard.

In January 29th, 2024 the Canadian Coalition for Green Health Care gave a presentation to Health Canada on user needs related to future monitoring efforts to reduce GHGs and building climate resilience, learnings related to best practices for measuring GHG emissions reductions in health facilities and advice on moving forward with a national approach. Presentation slides can viewed below, as presented to Health Canada.

PRESENTATION IS A REQUIREMENT OF OUR CONTRACT

DEVELOP A PRESENTATION (10-20 SLIDES) ON RESULTS TO CCIB THAT INCLUDES INFORMATION ON:

a) USER NEEDS RELATED TO FUTURE MONITORING EFFORTS TO REDUCE GHGS AND BUILDING CLIMATE RESILIENCE

b) LEARNINGS RELATED TO BEST PRACTICES FOR MEASURING GHG EMISSIONS REDUCTIONS IN HEALTH FACILITIES

c) ADVICE ON MOVING FORWARD WITH A NATIONAL APPROACH

INFORMATION GATHERING

- SURVEYS OF GHS CURRENT AND PAST USERS
  - SURVEY #1
  - SURVEY #2
- SUSTAINABILITY BENCHMARKING OF HCFS IN OTHER JURISDICTIONS:
  - PRACTICE GREEN HEALTH (US)
  - NHS
  - STATE OF VICTORIA, AUSTRALIA
- NRCAN, ENERGY STAR PORTFOLIO MANAGER (ESPN) STAFF
- ECCC, BEHVIOUR CHANGE AND SURVEY DESIGN EXPERT
- HEALTH SERVICE ORGANISATION (HSO)
- CASCADES GHG MEASUREMENT WORKING GROUP AND REPORT
- CASCADES: OR SCORECARD – FILLABLE 2023 SUSTAINABLE PERIOPERATIVE CARE ASSESSMENT TOOL
- ONTARIO ANESTHESIOLOGISTS/OMA
- NOURISH
- NEW HEALTH SYSTEM GROUPS TO ADD

1. USER NEEDS RELATED TO FUTURE MONITORING EFFORTS TO REDUCE GHGS AND BUILDING CLIMATE RESILIENCE

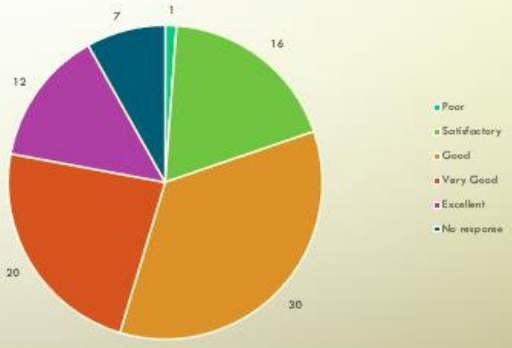
- SURVEY # 1: QUESTIONS IN THE GHS DATA CALL FOR 81 CURRENT USERS
  - RESPONSES FROM 81
  - 100% RESPONSE RATE
- SURVEY # 2: SENT TO 45 CURRENT/PAST USERS OF THE GHS TO ASSESS SPECIFIC ISSUES
  - RESPONSES FROM 18
  - 40% RESPONSE RATE

SURVEY #1: OVERALL EXPERIENCE

Results
N=79 (taking out No Responses)

41% - very good & excellent
78% - good, very good, & excellent
20% - satisfactory
1% - poor

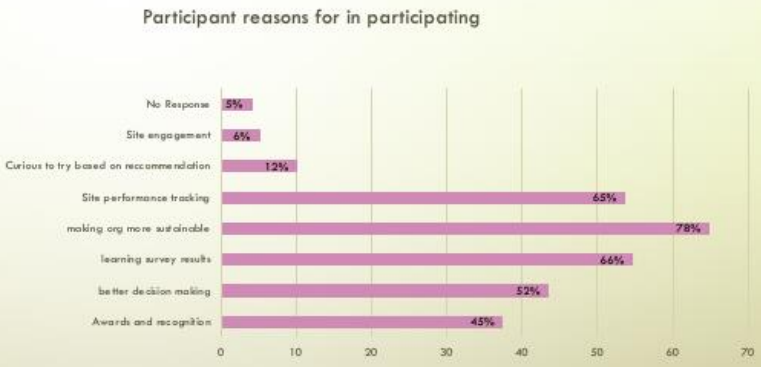
How participants rated their overall experience with the GHS survey



SURVEY #1: WHY THEY PARTICIPATE

Results
N=81

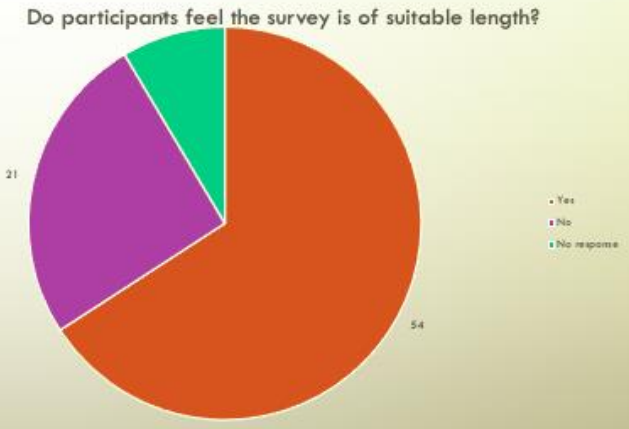
78% - Making organization more sustainable
66% - Learning survey results
65% - Site performance tracking
52% - Better decision making
45% - Awards and recognition



SURVEY #1: LENGTH OF SURVEY IS GOOD

Results
N= 75 (taking out No Responses)

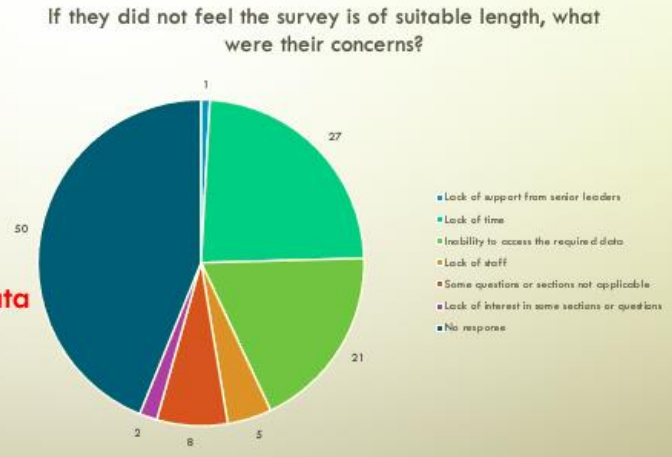
72% - Yes
28% - No



SURVEY #1: SURVEY LENGTH CONCERNS

Results
N= 32 (taking out No Responses)
N= 85 (multiple responses)

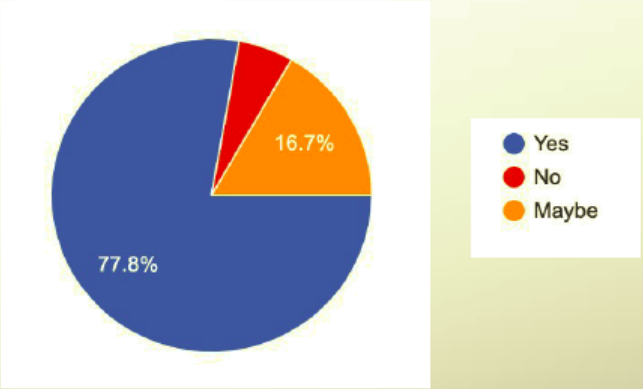
Primary Concerns:
32% - lack of time
21% - inability to access required data
8% - some questions/sections N/A



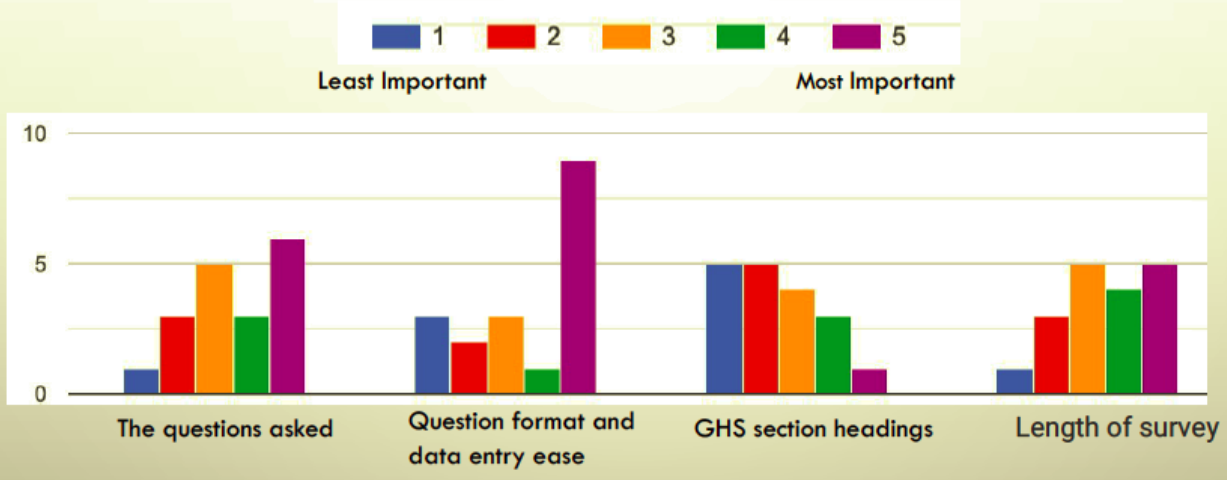
SURVEY #2: NEED TO UPDATE GHS SURVEY?

Results
N= 18

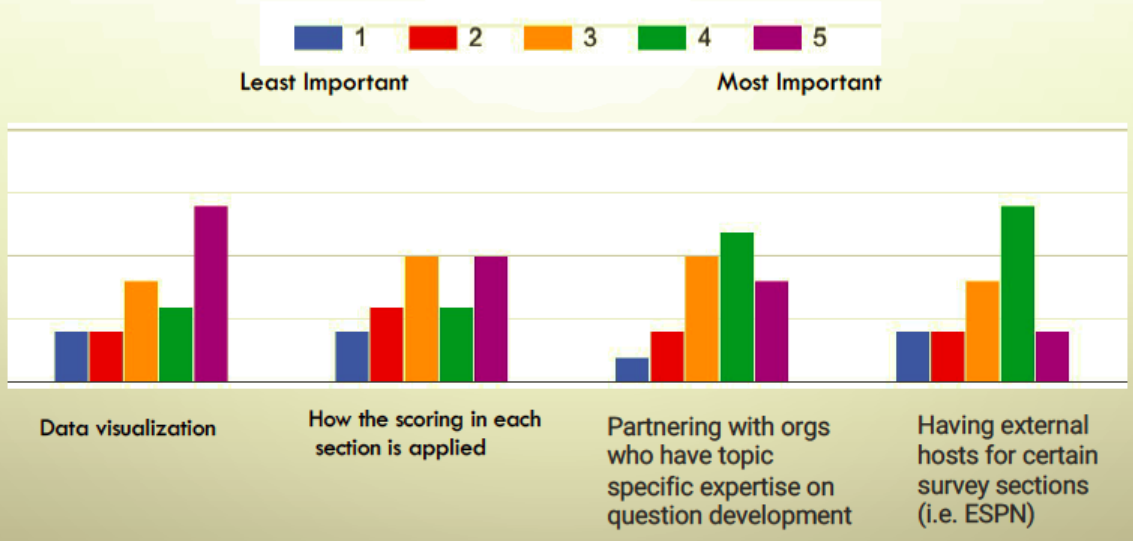
78% - YES
17% - MAYBE
6% - NO



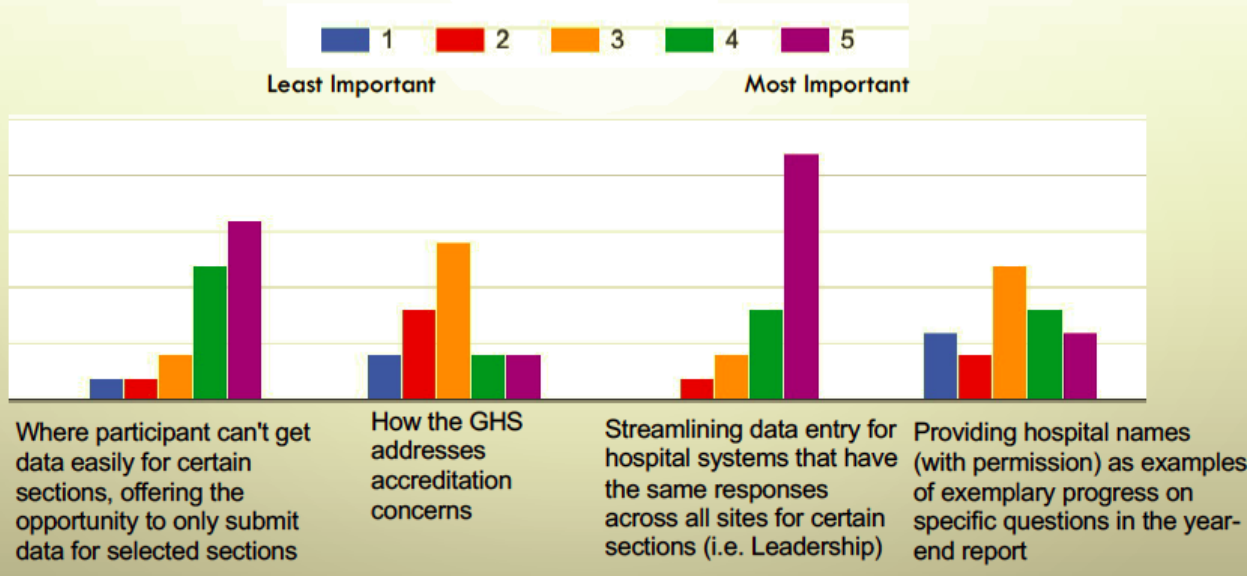
SURVEY #2. ITEMS TO BE REEVALUATED. N=18



SURVEY #2. ITEMS TO BE REEVALUATED



SURVEY #2. ITEMS TO BE REEVALUATED



SURVEY #2. USERS: OTHER ISSUES TO ADDRESS

RESULTS: N= 18

- REDUCE QUALITATIVE QUESTIONS
- PARTICIPANTS ONLY TO PROVIDE WHAT HAS CHANGED YEAR TO YEAR.
- ALLOW PARTICIPANTS TO SHARE DATA ON ENERGY STAR PORTFOLIO MANAGER. IF PARTICIPANTS DON'T USE ESPM, WE CAN USE EXISTING FORMAT.
- EXPAND ON NON-BUILDING ENERGY USE RELATED GHG EMISSIONS: REFRIGERANTS, DIESEL/GAS IN EMERGENCY VEHICLES
- cORPORATE POLICIES ARE WEIGHTED TO HEAVILY. THE RESULTS MATTER MOST AND NOT THE PAPERWORK BEING THEM.
- NEED TO HAVE THE ABILITY TO SEPARATE THE SURVEY SO IT CAN BE SENT TO DIFFERENT PEOPLE, ALSO PROVIDE THE SURVEY WITH THE RESPONSES FROM THE PREVIOUS YEAR, SOME DATA DOES NOT CHANGE. HAVING US FILL IN THE SAME DATA AGAIN IS A WASTE OF RESOURCES

SURVEY #2. USERS: OTHER ISSUES TO ADDRESS

RESULTS CONT.

- THE ONLINE PLATFORM WAS CHALLENGING TO WORK COLLABORATIVELY ON. FOR EACH OF THE SECTIONS WE HAVE A DIFFERENT PERSON WORKING IN THAT AREA ON OUR TEAM AND COORDINATING HOW TO HAVE IT FILLED WAS A BIG TASK WITH A LOT OF REDUNDANCY, AS SOME HAD TO FILL OUT THEIR INFO IN SEPARATE DOCS THAT I THEN INPUT BACK IN MANUALLY. IF WE COULD HAVE A SURVEY PLATFORM WHERE MULTIPLE PEOPLE CAN WORK ON AT THE SAME TIME, IT WOULD BE EXTREMELY HELPFUL TO STREAMLINE THE PROCESS AND IMPROVE THE EXPERIENCE.
- THE TIMELINE FOR PRE, DURING AND POST WAS VERY TIGHT: HAVING MORE NOTICE BEFORE THE DATA CALL, AND MORE TIME BETWEEN RECEIVING THE SCORECARDS, AWARDS AND AWARD CEREMONY TO BE ABLE TO PREPARE. THANK YOU.

SURVEY #2. USERS: PREFERRED START/END DATES

Results
N= 18

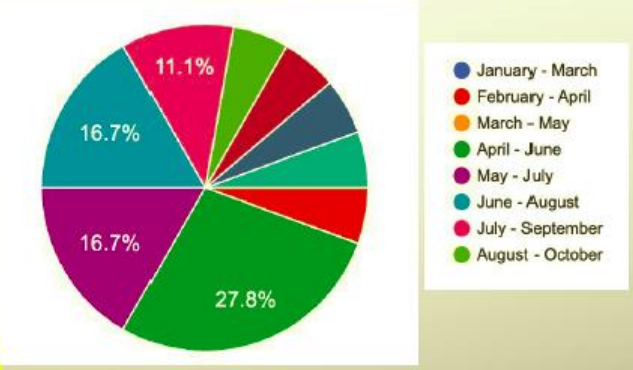
Q: What is your preferred start/end dates for the data call.

<u>Best</u>
28% - April - June
17% - May - July
17% - June-August

<u>Low support:</u>
Sept - Nov
Oct – Dec
Dec – Feb

<u>No support:</u>
Jan - March
Feb – April
March – May
Aug – Oct
Nov – Jan

This years survey period

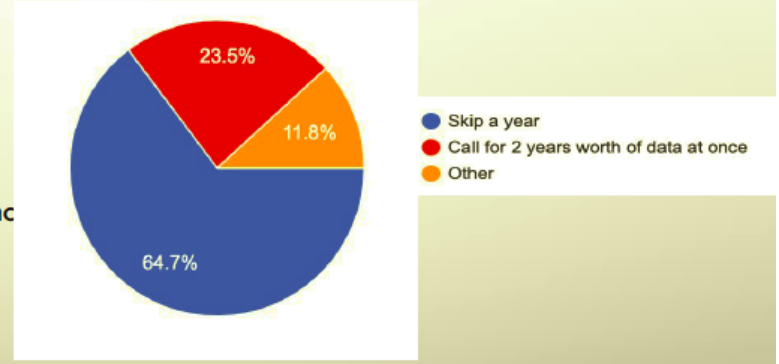


SURVEY #2. USERS: REDUCING LAG TIME OF GHS

Q: In order to resolve the issue of time lag in data collection and catch up to the most recent year, would you rather the data collection process:

Results
N= 17

65% - Skip a year
24% - Call for 2 yrs of data at onc
12% - Other

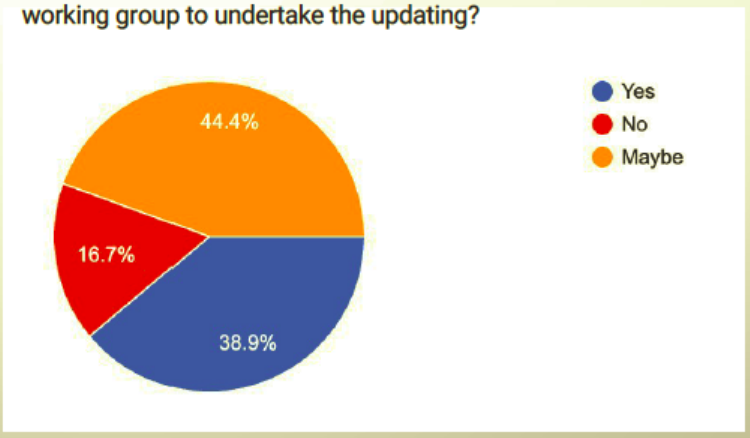


SURVEY #2. USERS: INTEREST HELPING UPDATE GHS

Q: Should the GHS undergo updating, would you (or your representative) be interested in being part of a working group to undertake the updating?

Results
N= 18

39% - Yes
44% - Maybe
17% - No



INFORMATION GATHERING

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- NOURISH
- NEW HEALTH SYSTEM GROUPS TO ADD

Canada: GHS	USA: PGH Survey[1]	England: NHS[2]	Australia: State of Victoria[3]
Energy	Energy	Carbon emissions – buildings/infrastructure	Energy GHGs
Water	Water	Water	Water
Waste & recycling	Waste	Waste	Waste & recycling
Pollution Prevention	Chemicals Green Building		
Leadership	Leadership	Workforce & system leadership	
		Sustainable care models	
		Digital transformation	
Circular economy	Environmentally Preferable Purchasing Greening the (OR)	Medicines Supply chain procurement	
Transportation	Transportation	Travel & transport	Transportation
Food	Food	Food and nutrition	
Anesthetic gases	Greening the Operating Room		Medical gases and refrigerants
Climate Change	Climate	Adaptation	

INFORMATION GATHERING

GHS reporting categories compared to other countries

1. PGH also collects some financial data
2. NHS HFs have mandatory Green Plans
3. State of Victoria has mandatory reporting either in annual report or sustainability report

INFORMATION GATHERING (CONT.)

- NRCAN, ENERGY STAR PORTFOLIO MANAGER (ESPN) STAFF
  - HAVE PROGRAMS TO COLLECT ENERGY DATA, AS WELL AS WATER AND WASTE (LESS USED)
  - FOR US TO ACCESS, THE HCF NEEDS TO GIVE US PERMISSION
  - DOES NOT COLLECT INFORMATION ON BEST PRACTICES
- ECCC, BEHAVIOUR CHANGE AND SURVEY DESIGN EXPERT
  - PROVIDE LISTS OF BEST PRACTICES TO MONITOR PROGRESS
  - USE PROGRESS INDICATORS – I.E., RED/YELLOW/GREEN
- HEALTH SERVICE ORGANISATION (HSO)
  - HSO LOOKING FOR INPUT INTO NEXT UPDATES ON SUSTAINABILITY AND CLIMATE CHANGE COMPONENTS
  - LOOKING FOR CASE STUDIES ON BEST PRACTICES,
  - POTENTIAL TO PROMOTE TO AC USERS
- CASCADES GHG MEASUREMENT WORKING GROUP AND REPORT
  - MANY PROVINCES AND HCFS ARE ALREADY USING ESPM FOR ENERGY DATA COLLECTION

INFORMATION GATHERING (CONT.)

- GROUPS WHO WANT TO CONTRIBUTE THEIR EXPERTISE TO GHS
  - CASCADES: OR SCORECARD – FILLABLE 2023 SUSTAINABLE PERIOPERATIVE CARE ASSESSMENT TOOL
  - ONTARIO ANESTHESIOLOGISTS/OMA
  - NOURISH
- NEW HEALTH SYSTEM GROUPS TO ADD:
  - HCF BUILDING TYPES – ADMIN, RESEARCH,
  - HEALTH CENTRES
  - LTC, RETIREMENT HOMES
  - MEDICAL CLINICS
  - OTHER CLINICS:
    - VETERINARY CLINICS
    - DENTAL

2. LEARNINGS RELATED TO BEST PRACTICES FOR MEASURING GHG EMISSIONS REDUCTIONS IN HEALTH FACILITIES

- NEED TO ASSIGN GHG VALUES TO OTHER SURVEY COMPONENTS
- GHG EMISSIONS FROM COMMON OFFSITE SERVICES CURRENTLY NOT INCLUDED:
  - LAUNDRY
  - MEDICAL DEVICE RE-PROCESSESORS
  - COMPOSTING
  - MATERIALS RECYCLING
  - LANDFILLING
- SUPPLY CHAIN (SCOPE 3) EMISSIONS - NEED GHG EMISSIONS ESTIMATES

2. LEARNINGS RELATED TO BEST PRACTICES FOR MEASURING GHG EMISSIONS REDUCTIONS IN HEALTH FACILITIES (CONT.)

- MANY PROVINCES/HCFS ARE USING ESPN FOR REPORTING ENERGY DATA
- TO MEASURE PROGRESS, NEED TO IDENTIFY BEST PRACTICES FOR EACH CATEGORY OF QUESTIONS
- NEED QUESTIONS FORMATTED FOR EASY RESPONSES EG. RED/YELLOW/GREEN
- NEED TO STREAMLINE DATA ENTRY, WITH OPTION FOR HEALTH SYSTEMS TO PUT DATA IN ONLY ONCE WHICH RELATE TO HFS IN THEIR SYSTEM
- HAVE LAST YEARS DATA PREFILLED IN SURVEY FORM

2. LEARNINGS RELATED TO BEST PRACTICES FOR MEASURING GHG EMISSIONS REDUCTIONS IN HEALTH FACILITIES (CONT.)

- HAVE OPTION AT THE END TO CLICK SAVE AND GET PDF FILE
- INCLUDE OTHER HF TYPES: ADMIN BUILDINGS, LTC, RHS AND CLINICS
- HAVE DATA CALL ALIGN WITH CURRENT PAST YEAR
  - NOT COMPLETING 2021 DATA CALL IN 2023
- UPDATE 'BENCHMARKING' SCORE FOR ALL SECTIONS
- USE GHS DATA FOR CREATING INTERNAL 'REPORTS' AND DATA VISUALIZATION
- EXPLORE OPPORTUNITIES TO EXPAND USEFULNESS OF GHS

ACADEMIC PARTNERS: UNIVERSITY OF WATERLOO

DONNA JONES, MD. PHD STUDENT (INVESTIGATOR). ADVISOR: JASON THISTLETHWAITE, PHD

SCHOOL OF ENVIRONMENT, ENTERPRISE AND DEVELOPMENT, UNIVERSITY OF WATERLOO

THIS RESEARCH WILL CONSIDER TWO OBJECTIVES:

(1) TO UNDERSTAND THE CURRENT STATE OF CLIMATE-RELATED REPORTING AND ACTIVITIES IN ONTARIO HEALTHCARE AND

(2) TO EVALUATE THE CONNECTION BETWEEN FINANCIAL PERFORMANCE AND SUSTAINABILITY PERFORMANCE IN HEALTHCARE.

- THE AGGREGATE DATA REQUIRED FOR THIS STUDY ARE THE SUSTAINABILITY INDICATORS CAPTURED IN THE GREEN HOSPITAL SCORECARD BY ALL PUBLIC ONTARIO HOSPITALS BY YEAR FROM 2016 TO 2021.
- THE OBJECTIVE OF THIS STUDY IS TO ANALYZE THE RELATIONSHIP BETWEEN SUSTAINABILITY PERFORMANCE AND THE FINANCIAL HEALTH OF ONTARIO HOSPITALS THAT VOLUNTARILY REPORT ON THEIR SUSTAINABILITY PERFORMANCE. THE PURPOSE IS TO TEST THE GOOD MANAGEMENT THEORY FROM THE PERSPECTIVE OF THE PUBLICLY FUNDED CANADIAN HOSPITAL SECTOR.

ACADEMIC PARTNERS: MACEWAN UNIVERSITY

DR. MAYA R. KALOGIROU PHD, RN, POST DOCTORAL FELLOW, MACEWAN UNIVERSITY, ALBERTA.
PRESIDENT | CANADIAN ASSOCIATION OF NURSES FOR THE ENVIRONMENT

- POST DOCTORAL FELLOW RUNNING A STUDY ABOUT GREEN TEAMS. THE MAIN RESEARCH PURPOSE IS TO BETTER UNDERSTAND THE LANDSCAPE OF CANADIAN GREEN TEAMS.
- GREEN TEAMS SEEM TO HAVE BEEN LARGELY ABANDONED BY ACADEMICS, BUT ARE CLEARLY STILL IN HIGH DEMAND BY ON THE GROUND HEALTH PRACTITIONERS. RESEARCH WILL BUILD OFF THE PROJECT THAT CANE AND THE COALITION DID TOGETHER ON MAPPING GREEN TEAMS.

ACADEMIC PARTNERS: U OF T

SOMAYEH SADAT, PH.D. ASSISTANT DIRECTOR, CENTRE FOR ANALYTICS AND ARTIFICIAL INTELLIGENCE ENGINEERING (CARTE)

FACULTY OF APPLIED SCIENCE AND ENGINEERING, UNIVERSITY OF TORONTO

SOUTH KOREA PARTNERSHIP APPLIED AI/ML/DS PROJECTS

PROJECT DELIVERABLE:

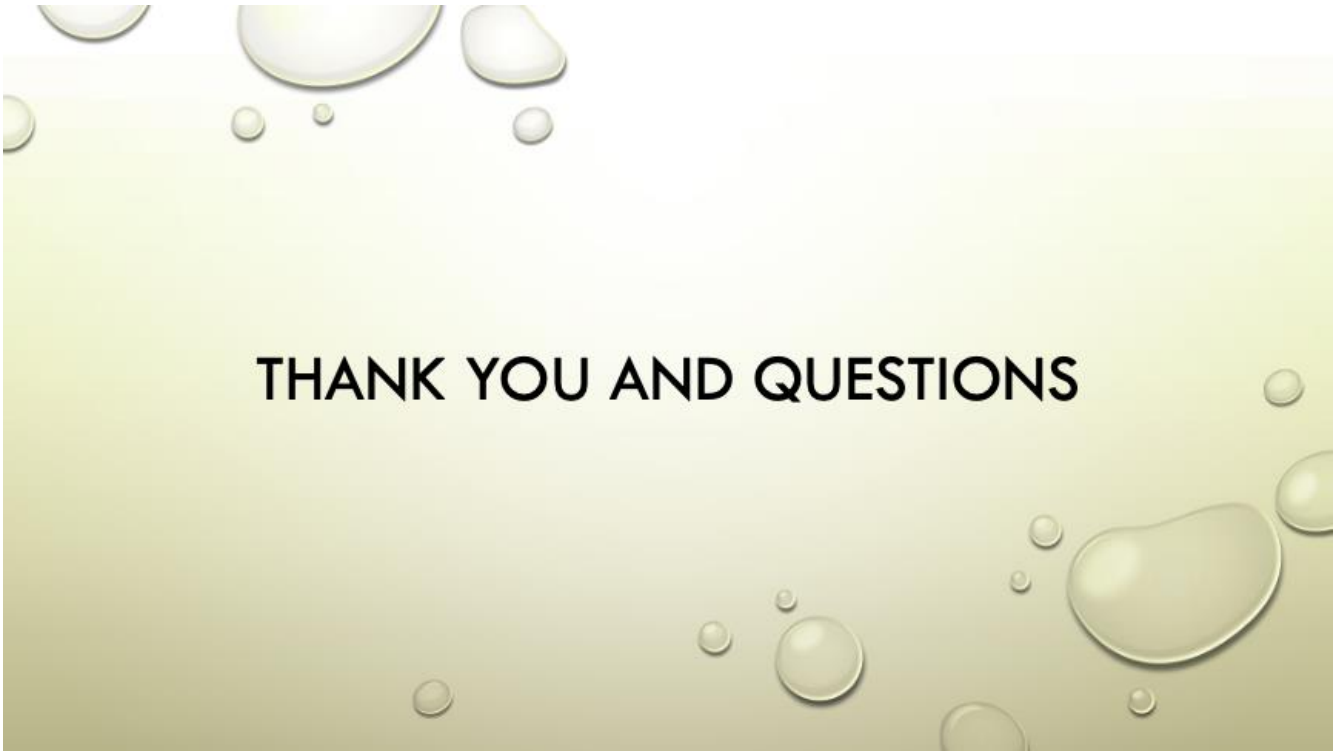
- A USER FRIENDLY TOOL THAT AUTOMATICALLY SUMMARIZES PUBLIC ANNOUNCEMENTS ON CLIMATE-RELATED IMPACTS ON HEALTH SYSTEM COMPONENTS ACROSS CANADA.

3. MOVING FORWARD WITH A NATIONAL APPROACH

- CONTINUE WITH A GREEN HOSPITAL SCORECARD WHICH MEETS THE NEEDS OF THE USERS
  - CREATE A WORKING GROUP TO OVERSEE THE CHANGES TO THE GHS AS IDENTIFIED
  - SEEK EXISTING SURVEY PLATFORM CONSISTENT WITH GHS USER NEEDS
    - WHO ATACH SUPPLY CHAIN WORKING GROUP 2022-24 WORKPLAN
- EXPAND PARTICIPATION ACROSS CANADA
  - ALLOW FOR SMALL AND MEDIUM-SIZED FACILITY PARTICIPATION WITHOUT GETTING OVERWHELMED
  - ALLOW FOR OTHER HCF TYPES
    - HC ADMINISTRATIVE BUILDINGS, LTC AND RHS, CLINICS, MEDICAL OFFICES, VETERINARY MEDICINE ETC.
  - PARTNER WITH OTHER ORGANISATIONS TO FURTHER THE REACH OF THE GHS
    - I.E. ACCREDITATION PROCESS

3. MOVING FORWARD WITH A NATIONAL APPROACH (CONT.)

- ADAPTATION/RESILIENCE
  - CLIMATE CHANGE IMPACTS AND ADAPTATION/RESILIENCE TRACKING AND MONITORING - EXPANSION AS NEEDED
  - INCLUDE BEST PRACTICES AS THEY BECOME UNDERSTOOD (I.E., NEED FOR AIR FILTERING SYSTEMS IN HCF AIR INTAKE)
- SHARE SUCCESS STORIES
  - USE DATA FROM THE GHS TO CREATE SUCCESS STORIES ON MITIGATION AND ADAPTATION/RESILIENCE TO PROMOTE BEST PRACTICES ACROSS CANADA'S HEALTH SYSTEM
- WEBINAR SERIES
  - SHARE BEST PRACTICES AND SHOWCASE HF GHG EMISSIONS REDUCTION AND ADAPTATION /RESILIENCE
- RELIABLE FUNDING
  - TO ENSURE CONSISTENT DELIVERY ON PREFERRED DELIVERY DATES FOR USERS


THANK YOU AND QUESTIONS