Sustainable by Design: Health Care Solutions in a Warming World

OCTOBER 3RD, 2025

An Official Event Partner of Toronto Climate Week

Delivery Partners

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

PEACH

Hamilton Family Health Team
Better care, together.

Event Sponsor

Deloitte.

Venue Partner

WCHH Women's College Hospital

Project Sponsor

Peter Gilgan Foundation

Agenda

MORNING:
8am – 9am: Registration & Breakfast
9am – 10am: Opening Session (Keynote Presentations)
10m – 10:45am: *Embedding Sustainability in Hospital Accreditation* (Panel)
10:45am – 11am: Break
11am-12pm: *Lightning Talks*
12pm-12:45pm: *Every Dose Counts: An Interactive "Hot Seat" Simulation on Sustainable Health Care Supply Chains* (Interactive Session)
12:45pm – 1:30pm: Lunch

AFTERNOON:
1:30pm – 2:30pm: *Lightning Talks*
2:30pm – 3:15pm: *Feeding Decarbonization: The Food System's Role in Climate Action* (Panel)
3:15pm – 3:30pm: Break
3:30pm – 4:15pm: *Catalyzing Impact: How Funders are Shaping Climate and Health Action* (Panel)
4:15pm – 4:45pm: *When the Smoke Clears: Lessons from Yellowknife on Resilient and Sustainable Healthcare* (Presentation)
4:45pm – 5pm: Closing Session

EVENING: 5pm – 7pm, networking social at Pogue Mahone

Opening Session:
Welcome to Women's College Hospital & Land Acknowledgement

Heather McPherson
President & CEO,
Women's College Hospital

Opening Session:
Welcome from the Canadian Coalition for Green Health Care

Myles Sergeant
Executive Director,
Canadian Coalition for Green Health Care

Thank You to our Venue Partner:

WCH WOMEN'S COLLEGE HOSPITAL

Thank You to our Event Sponsor:

Deloitte.

Thank You:

Official Event Partner of:

Event Delivery Partners:

Project Sponsor:

The Canadian Coalition for Green Health Care is celebrating 25 years!

Founding Organizations

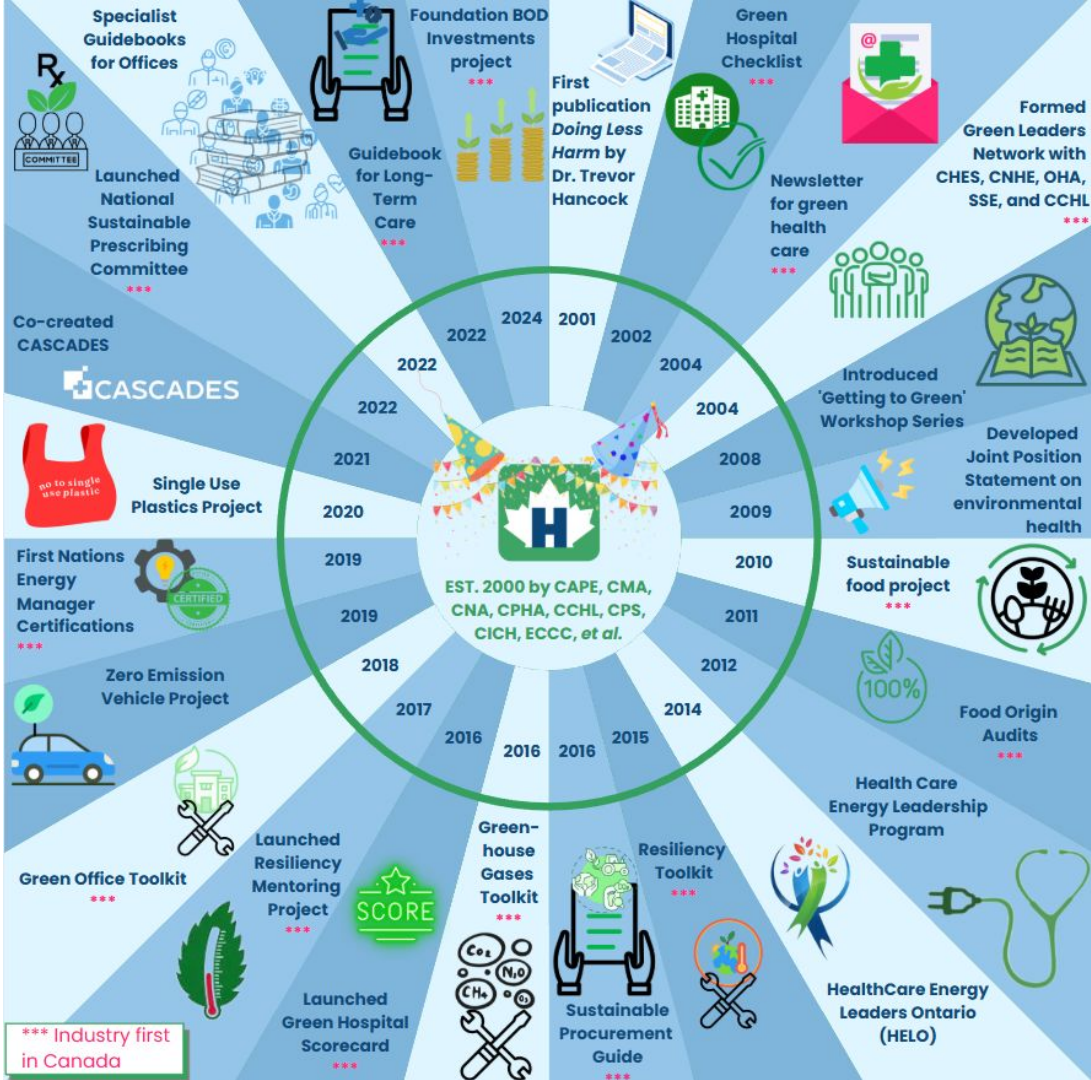
- Canadian Association of Physicians for the Environment
- Canadian Centre for Pollution Prevention
- Canadian Council of Health Service Executives
- Canadian Healthcare Engineering Society
- Canadian Medical Association
- Canadian Nurses Association
- Canadian Public Health Association
- Canadian Society for Environmental Medicine
- College of Family Physicians of Canada
- Environmental Health Clinic, Sunnybrook and Women's College Health Sciences Centre
- Hospital for Sick Children, Toronto
- Great Lakes United
- Ontario College of Family Physicians (Environmental Health Committee)
- Pollution Probe
- Toronto Environmental Alliance
- University Health Network
- University of Alberta Hospitals
- Winnipeg Regional Health Authority, Laboratory Medicine Program

Builders

- **Dr. Trevor Hancock** – Founder
- **Kent Waddington** – Founder
- **Linda Varangu** – first Executive Director
- **Kady Cowan** – first Board of Directors Chair
- Current Board of Directors and current Chair, **Jérôme Ribesse**

Coalition Milestones

Over the last 25 years, we've made an incredible impact across a range of sustainable health care initiatives!



Sponsors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Smarter Linen Solutions™


Roche


TRANE®


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GE Healthc


Medtronic


Better
Battery
Co.

Funders

Peter Gilgan Foundation

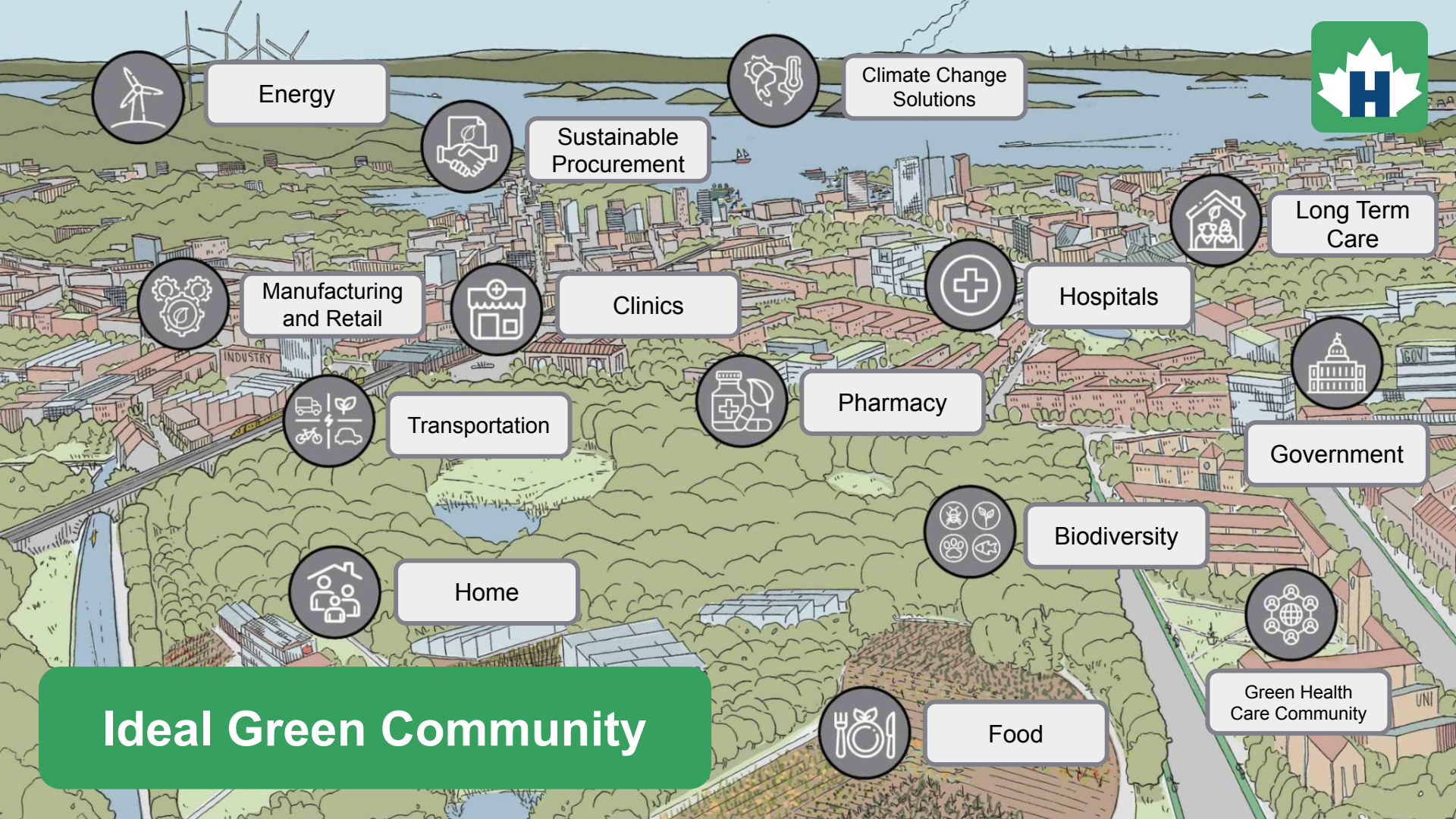
FONDATION FAMILIALE TROTTIER FAMILY FOUNDATION

McMaster University
Family Medicine

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Health Canada
Santé Canada

Passionate Staff, Volunteers & Friends of the Coalition


Energy
Climate Change Solutions
Sustainable Procurement
Long Term Care
Manufacturing and Retail
Clinics
Hospitals
Pharmacy
Transportation
Government
Biodiversity
Home
Green Health Care Community
Food
Ideal Green Community

Preparing Canada's Health Care Buildings for Net-Zero

Goal: Accelerate the readiness of the Canadian health care workforce and leadership to undertake climate change mitigation initiatives that will reduce GHG emissions.

Areas of focus:

- Low Carbon Inhalers
- Green Teams
- Nix the Nitrous
- Low Carbon Energy Planning and Baseline GHG Measurement

Key Activities:

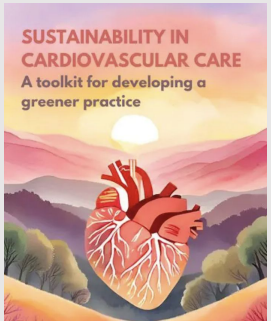
- Networking Hubs
- Guidebooks/Toolkits
- Fact Sheets
- Webinars
- Case Studies
- And more!

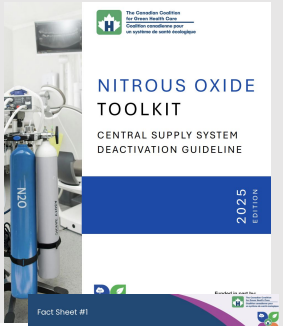
Funding:

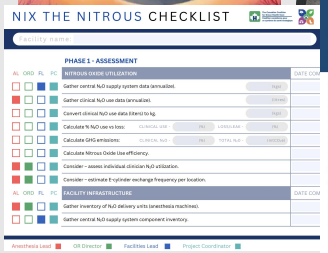
Government of Canada's Low Carbon Economy Implementation Readiness Fund.

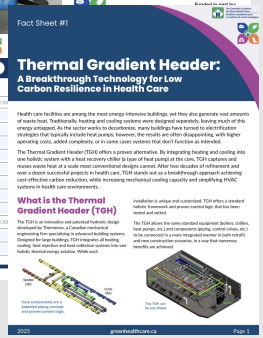
Available Resources/Opportunities

Guidebooks/Toolkits

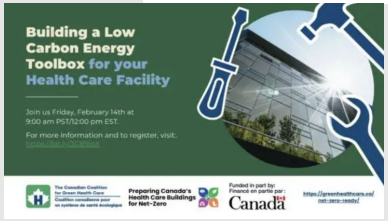




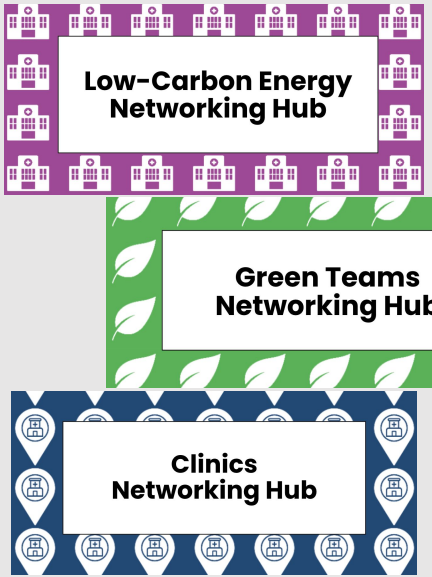




Webinars



Networking Hub



Decarbonization in Action: Implementing Climate Solutions at Canadian Hospitals

Goal: Empower hospitals to reduce greenhouse gas emissions across buildings, clinical operations, and procurement through tailored tools, knowledge, and connections. The first year of the project will focus on the GTHA.

MaRS

Peter Gilgan Foundation

More to come in our* Lightning Talks *session!

Healthy Capital: Sustainable Investment for Hospital Foundations

Goal: A two-year program to empower hospital foundation boards to integrate sustainable investing into financial strategies by demonstrating how environmental, social, and governance (ESG)-aligned investments can:

- Safeguard long-term returns
- Uphold their mission of promoting health and well-being
- Enhance community impact
- Build trust and goodwill with a range of stakeholders

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

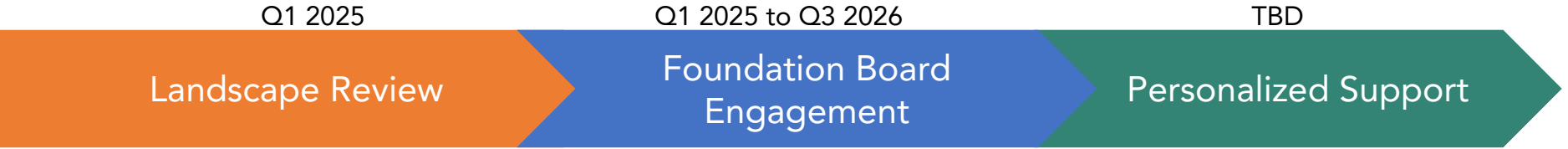
PEACH

Fondation familiale Trottier
Trottier Family Foundation

Canada Climate Law Initiative
L'Initiative canadienne de droit climatique

Quinn + Partners

Benefits for Foundations



Collect data on Canadian hospital foundation board sustainability practices to create a benchmark report

Participate in industry evaluation

Access anonymized results of foundation survey

Educate foundation boards on sustainable investing and ESG integration

Raise awareness and educate board members

Join a community of practice

Co-create sustainable investing tools

Consult interested boards and provide diagnostic and advisory services

Receive tailored support to integrate sustainable and environment, social and governance (ESG) factors

Sustainable Prescribing

Goal: Studies suggest we over-prescribe some drug classes by 20-30 percent, which has wellbeing, financial, and environmental costs. By encouraging deprescribing and finding alternatives, we could improve human health, reduce health care spending, and reduce greenhouse gas emissions.

Key Activities:

- Papers and other resources
- Webinars
- Canadian Sustainable Prescribing Working Group

Sustainable Procurement

Goal: To enable health care purchasing focused on goods and services whose environmental impacts have been analyzed and determined to be less harmful to human health and the environment.

Key Activities:

- Sustainable Procurement Working Group
- Papers and other resources
- Webinars

The Sustainable Procurement Working Group is a joint initiative of the Coalition and Supply Ontario. **Please reach out to our team if you would like to join the Working Group!**

OVERVIEW

CIRCULAR CLINICAL CARE: PLASTICS REDUCTION

- This project was undertaken with the financial support of Environment and Climate Change Canada (ECCC)
  - Project Manager: Sandra Alexander
  - Research Associate: Tipu Sultan Islam
  - Project Advisors: Dr. Myles Sergeant and Linda Varangu
- Interdisciplinary team committed to sustainably reducing single-use plastic waste in health care
  - Food-Related, Perioperative Care, Textiles, Packaging
- Partners
  - Hamilton Health Sciences (HHS)
  - McMaster University Postgraduate Medical Education
  - PEACH Health Ontario
- Three-year initiative
  - **Year One:** Pilot at Hamilton Health Sciences
  - **Year Two:** Transition to National Campaign
  - **Year Three:** National Campaign

"Every $1 invested in public health interventions brings a median return of over $14 saved in costs to health and economic sectors."

Canadian Public Health Association, 2022

This project was undertaken with the financial support of:
Ce projet a été réalisé avec l'appui financier de :

Environment and Climate Change Canada | Environnement et Changement climatique Canada

CASE STUDIES & BUSINESS CASES

DIRECT IV PUSH.

ONTARIO

Reducing waste by providing medications through direct IV administration. Inspired by Alberta Health Services

ENDOSCOPY TAP WATER

ONTARIO

Switching from bottled water to tap water. Collaborating with Hamilton Health Sciences & McMaster University Postgraduate Medical Education

REUSABLE MASKS

QUÉBEC

Reusable surgical masks in hospitals within Quebec. Collaborating with Synergie Santé Environnement

URINARY INCONTINENCE

ONTARIO

Promoting multidisciplinary urinary incontinence treatment within hospitals. Inspired by National Health Services

BYOB DAY SURGERY

ONTARIO

Encouraging patients to bring their own reusable bag for day surgery

GLASS BOTTLES

MULTI-PROVINCE

Switching from plastic bottles to glass bottles in outpatient pharmacies

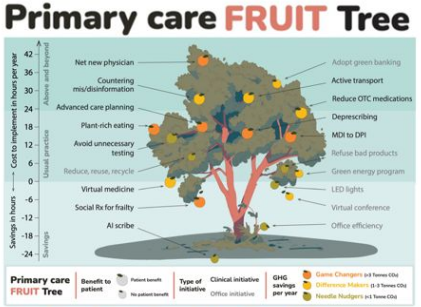
The Canadian Coalition for Green Health Care
Coalition canadienne pour un système de santé écologique

Primary Care

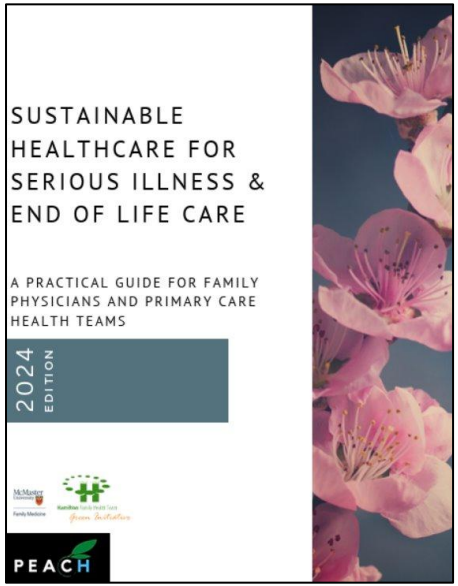
Goal: Provide primary care practitioners with the support and tools for care that is environmentally sustainable and leads to improved health outcomes. This is a partnership between the Coalition, PEACH Health Ontario, Hamilton Family Health Team and McMaster University.

Key Activities:

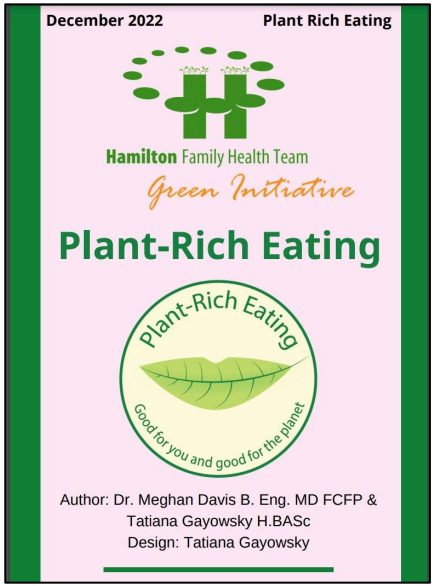
- Understanding the space – Primary Care Fruit Tree
- Measuring impact – Green Office Challenge
- Sustainability initiatives – Green Initiative Guided Leadership in Sustainability
- Building a network – Clinics Networking Hub



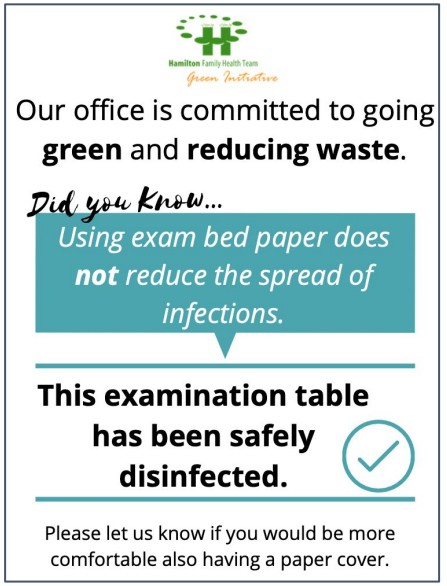
Our Tools: Physician and Patient facing



Toolkits



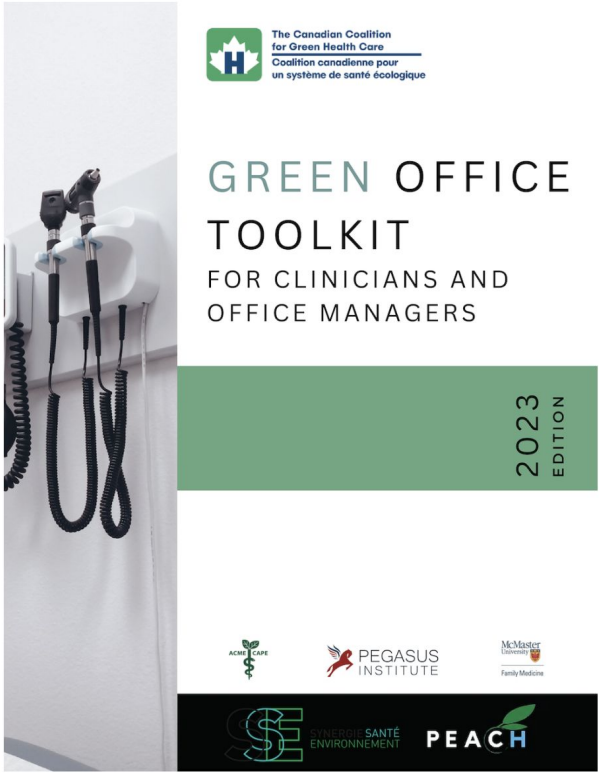
Information guides



Posters

Green Office Toolkit

Goal: Tool designed to simplify and inspire the ‘greening’ of health care practices and offices/buildings. The resource contains practical and affordable ideas to make eco-friendly office improvements, with the ultimate goal of helping health professionals support the health and wellbeing of patients, while respecting the foundations of health for present and future generations.



Low-Carbon Heat-Health Solutions in Care Settings

Goal: Enhance the resilience of Canadian health care systems and protect vulnerable populations from extreme indoor heat through practical, scalable, and low-cost adaptation interventions.

Areas of focus:

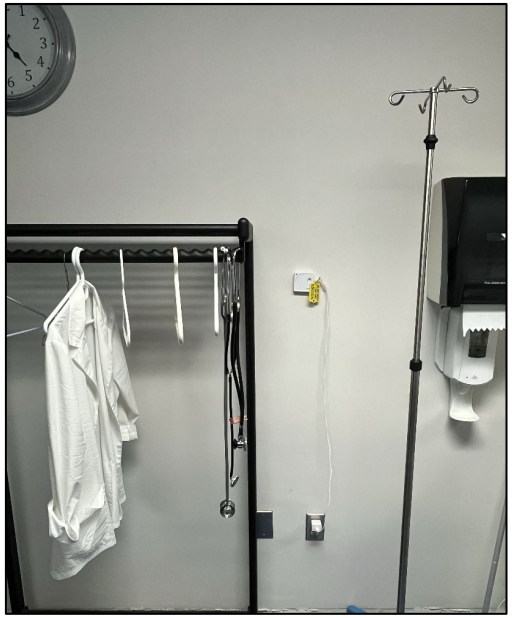
- Indoor heat assessments in select care settings in NS, ON and BC
- Low-cost, non-AC heat mitigation
- Healthcare worker training
- Scenario planning
- Vulnerable populations

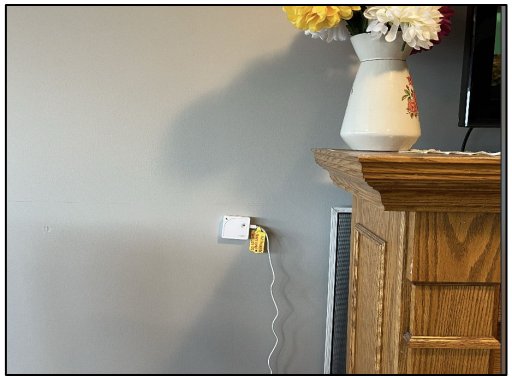
Key Activities:

- Heat/humidity monitoring and data collection
- Interviews with patients, caregivers, etc.
- Intervention testing and re-assessment
- Community-based workshops
- Webinars, infographics, posters, etc.

Ongoing Activities

- Established a cross-sectoral **National Advisory Committee** to provide advice and subject-matter expertise throughout the program
- Qualitative data collection: across the 3 provinces, **65+ interviews** have been conducted and **195+ surveys** completed
- Quantitative data collection: **200+ data loggers** have been set up across our sites
- Working with experts to **identify heat mitigation solutions** that will implemented in Summer 2026 in our partner sites





Food Committee

Launched in 2022

Representatives from all areas of health care including physicians, food services managers, leadership, nurses, researches, suppliers

Monthly meetings

2024 project: Business Case and Implementation Guide

2025 project: Sustainable event guide for health care

Business Case and Implementation Guide

- Created in partnership with:

  McMaster University

  Canadian Coalition for Green Health Care

  Halton Healthcare

  Mohawk Medbuy

  Nourish

- Purpose: provide an easy-to-follow guide that lays out the **how and why** health care facilities need to assess their food services and switch to more sustainable options
- Intended audience:

  C-suite Leadership

  Food service managers and their teams

  Health care sustainability managers

Vancouver Costal Health Chickpea curry with Cashews and Mango chutney

Biodiversity

Goal: As an important part of local communities, supporting healthcare facilities – including hospitals, long-term care homes, and clinics – to increase biodiversity by planting trees.

Through a partnership between the Coalition, PEACH Health Ontario and several regional tree planting organizations, **reach out to our team and we will help you plant trees at your facility!**

Opening Session:
A Planetary Health Perspective

Pierre Iachetti
Executive Director,
David Suzuki Foundation

Opening Session:
Accessible Primary Care as Climate Action

Senator Joan Kingston
Senate of Canada

Panel:
Embedding Sustainability in Hospital Accreditation

THE PANELISTS:

Myles Sergeant
Canadian Coalition for Green Health Care

Sandra Young
Health Standards Organization

Dr. Bhavini Gohel
Alberta Health Services & University of Calgary

Karen Langstaff
St. Joseph's Healthcare Hamilton

Climate Action Benchmarking Tool

A catalyst for change in safety practices and increased resilience in Hospitals

Sandra Young

Executive Director,
Standards and Education

HSO & Accreditation Canada

Myles Sergeant

Executive Director, Canadian Coalition for Green Health Care

Department of Family Medicine,
McMaster University

Co-lead, PEACH Health Ontario

CLIMATE ACTION

A DECLARATION OF COMMITMENT TO SUPPORT LOW-CARBON, CLIMATE-RESILIENT, AND SUSTAINABLE HEALTH CARE

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

ACCREDITATION AGRÉMENT CANADA

HSO

Today's Objectives | Collaboration is Key

1. Collaborative agreement with CCGHC and HSO
2. Integration of climate action criteria into HSO Standards/Accreditation and alignment with Climate Action Benchmarking Tool
3. Share practical examples related to the Climate Action Benchmarking Tool

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About Us | People Powered Health

1,000+
subject matter experts

40+
countries

14,000+
locations using our programs

Health Standards Organization (HSO) is the only health and social services Standard Development Organizations (SDO) in Canada **developing National Standard of Canada**.

ACCREDITATION AGRÉMENT CANADA

Accreditation Canada delivers **innovative assessment programs based on national and global standards.**

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Climate Action Approach | Collaboration

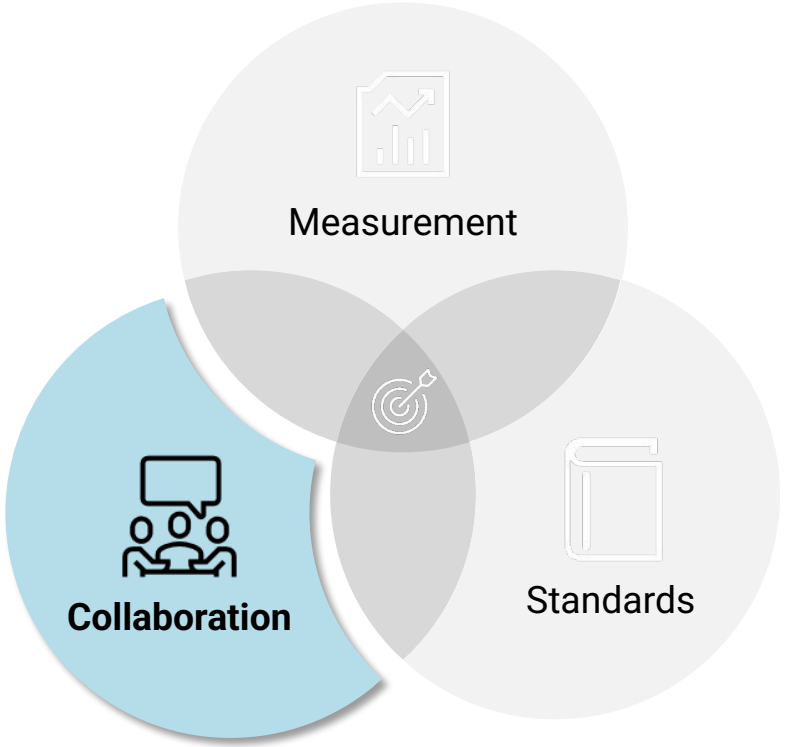
April 2025: HSO Announced Partnership with Canadian Coalition for Green Health Care

- The Canadian Coalition for Green Health Care is Canada's largest green health care organization
- 25 years of experience in greening health care

January 2025: HSO Assembles a Climate Action Advisory Committee

- 16 experts from across Canada

Summer 2025: HSO and the CCGHC pilot a Climate Action Benchmarking Tool



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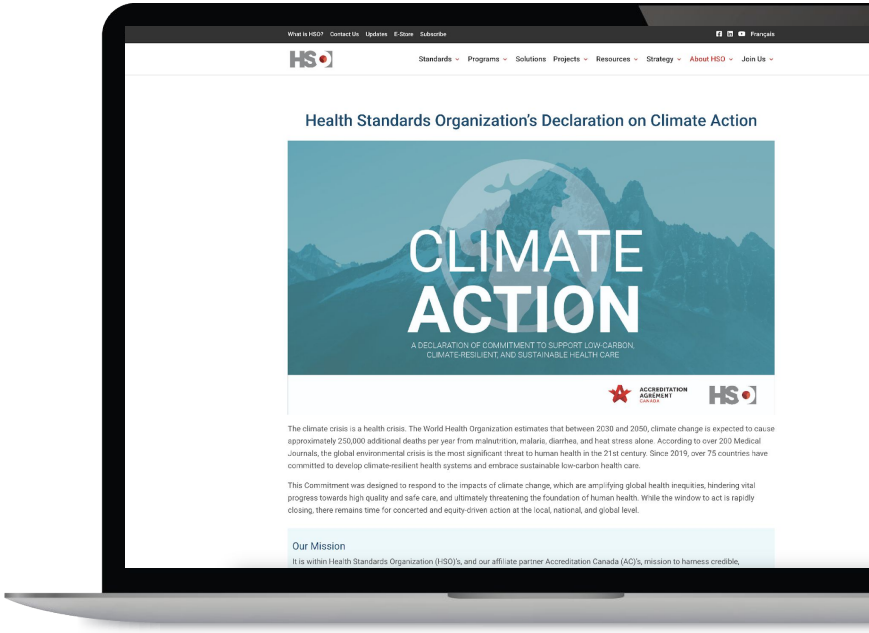
Climate Action Approach | Declaration

Review the declaration and action steps using the QR code

1. Establish an **advisory committee** of climate action and planetary health leaders to receive focused input on mobilizing HSO's levers of change to enable climate adaptation and mitigation strategies.
2. Advance HSO's effort to **reduce our carbon footprint** and the use of environmentally harmful products and practices
3. Continue developing and embedding more explicit requirements within **core and future HSO standards** to address the growing impacts of climate change on human and planetary health.
4. Introduce a new Climate Action Certificate to provide a framework for health and social service organizations to expand or continue their decarbonization and health system resiliency efforts.
5. Update our assessment instruments and data and analytics tools for health systems to identify environmental risks and enable climate action and resiliency.
6. **Recruit technical committee members**, surveyors, and patient surveyors with specialized knowledge and skills in climate action.
7. **Work with credible climate action partners** to develop implementation tools and resources to equip organizations with effective strategies to address climate risks.
8. Advocate for and integrate climate action into **entry-to-practice health professional education.**
9. Partner with climate action researchers to respond to proposals that address persistent research gaps, including links to mental health, and the unequal impact of climate change.



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HSO Climate Action Advisory Committee

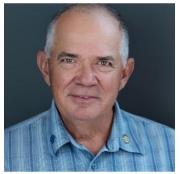
Dr. Myles Sergeant (co-chair)
Executive Director,
Canadian Coalition for Green Health Care

Judith Eigenbrod (co-chair)
Senior Program Manager,
Standards, Healthcare Equity
Health Standards Organization

Linda Varangu (advisor)
Senior Advisor, Climate Change,
Canadian Coalition for Green
Health Care

Dr. Sherilee Harper
Canada Research Chair in
Climate Change and Health

Darryl Quantz
Planetary Health Lead,
Fraser Health Authority, BC



Robert Barss
Manager of Environmental
Stewardship
Nova Scotia Health

Dr. Sarah Henderson
Scientific director of
Environmental Health Services,
BCCDC and NCCEH

Caitlin Roy
Clinical Support Pharmacist,
Saskatchewan Health
Authority

Vincent Boisvert
Senior Sustainability Advisor,
CIUSSS-du-nord-de-l'
île-de-Montréal

Dr. Courtney Howard
Emergency Physician, Yellowknives
Dene Territory
Vice-Chair, Global Climate and
Health Alliance

Julie Weir
Assistant Teaching Professor,
University of New Brunswick in
the Faculty of Nursing

Dr. Ming-Ka Chan
Pediatrician,
Keewatinohk Inniniw
Minoayawin Inc.

Dr. Maya Kalogirou
President, CANE

Dr. Stephan Williams
Anesthesiologist and Medical Co-Manager for
Carbon-neutrality and Sustainability, Centre
hospitalier de l'Université de Montréal (CHUM)

Dr. Bhavini Gohel
Clinical Associate professor,
Cumming School of Medicine,
University of Calgary

Karen Langstaff
Vice President Redevelopment,
Corporate Support Services
and Chief Sustainability Officer,
St. Joseph's Health care
Hamilton

Climate Action Benchmarking Tool Pilot | Engagement

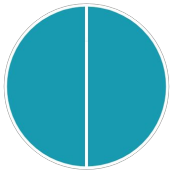
June 23 – August 15, 2025
Pilot of Climate Action Benchmarking Tool

October 24, 2025
International Day of Climate Action

Launch recruitment for Climate Resilience, Emergency and Disaster Management Technical Committee

Subscribe to our mailing list to be notified when a **Technical Committee** is open for applications

63 Hospitals signed up to participate in the pilot of the benchmarking tool



100% of participating organizations indicated they would be willing to use the tool on an annual basis based on time and effort required

Responses from hospitals/systems in **6 provinces** (BC, AB, ON, QC, NS, NL) and **Belgium**

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Climate Action Approach | Alignment

Subscribe to our mailing list to be notified when a **Technical Committee** is open for applications

Climate Action Benchmarking Tool	Aligned HSO Standards and RSPs
1. Corporate Leadership and Governance	• Leadership Standard • Governance Standard
2. Climate Change and Resiliency	• Leadership Standard • **Climate Resiliency, Emergency and Disaster Preparedness Standard, call for Technical Committee members opens October 24**
3. Education	• Leadership Standard
4. Supply Chain	• Leadership Standard • Infection Prevention and Control Standard • Medication Management Standard • Safe Use of Medical Devices and Equipment RSP
5. Clinical Practices	• Leadership Standard • Infection Prevention and Control Standard – publication December 2025
6. Medications and Anesthetics	• Medication Management Standard – publication November 2025 • Antimicrobial Stewardship RSP • Opioid Stewardship RSP
12. System Design	• Client Flow RSP • Safe Transitions RSP • Virtual Care – publication December 2025 • Home Care – currently in Public Review • Infection Prevention & Control

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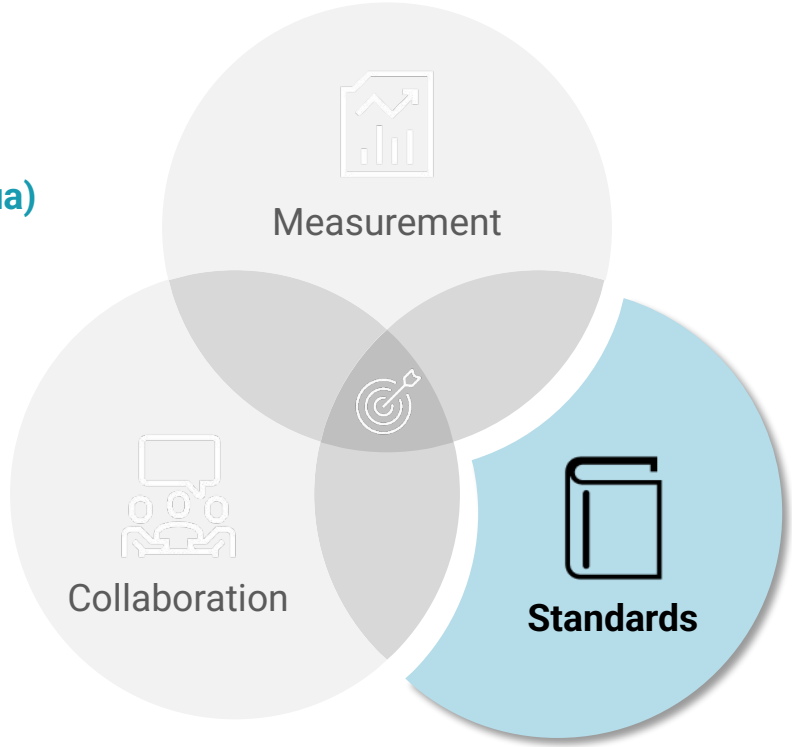
Climate Action Approach | Standards

We are accredited too!

International Society for Quality in Health Care (ISQua) requires all standards to:

- Support environmentally sustainable health care and social care
- Provide **actions for providers** to mitigate their environmental impact
- Be consistent with the **WHO definition** for an environmentally sustainable health care system
- Aim for the provision of services that do not damage the environment and have a **positive social impact.**



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Climate Action Approach | Standards

Emergency & Disaster Management/Climate Resiliency

Call for Technical Committee Members on October 24th – International Day of Climate Action

Health systems need to adapt and build resilience through improved emergency preparedness plans to effectively respond to climate-related disasters. The new standard will:

- include a hazard risk assessment, mitigation and response safety protocols, service continuity management, resource management, communications, training, and evaluation and recovery plans.
- address natural disasters, extreme weather events, fires and wildfires, hostage, abduction, weapon, mass casualty incidents, and pandemics.
- provide a whole system, all hazard, and one health approach.

Climate change is creating ever increasing health inequities most especially for vulnerable populations and disadvantaged regions, by damaging infrastructure, interrupting supply chains, impacting access to medical services, and creating new health risks like vector borne disease, respiratory and heat related illnesses.

Subscribe to our mailing list to be notified when a **Technical Committee** is open for applications

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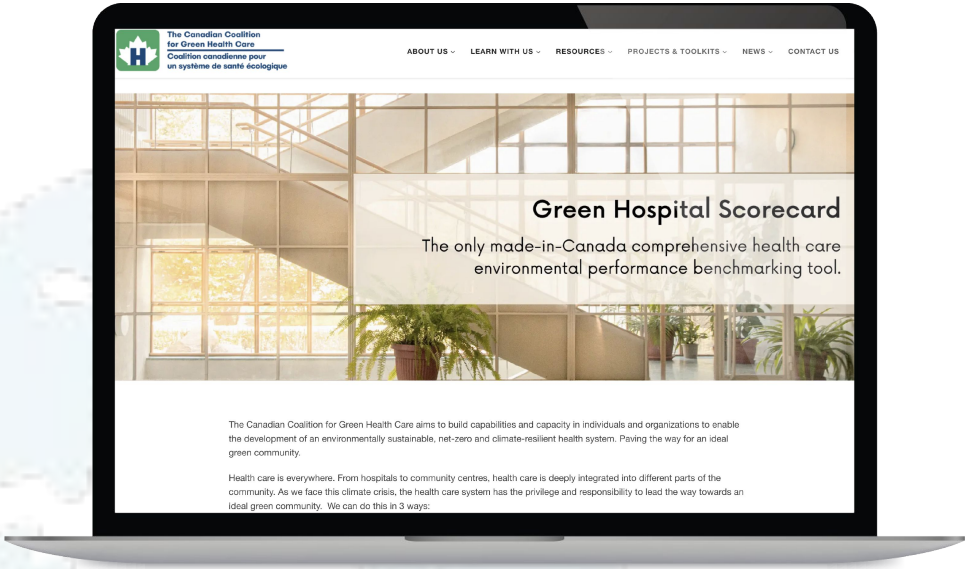
The Canadian Coalition for Green Health Care (CCGHC)



For 25 years (Today!!) the Canadian Coalition for Green Health Care has been helping those working in health care facilities, non-governmental and governmental organisations, individuals, students and businesses - to share green health care best practices and to become better equipped to deal with the growing demands placed upon them to be environmentally responsible health service workers and individuals.

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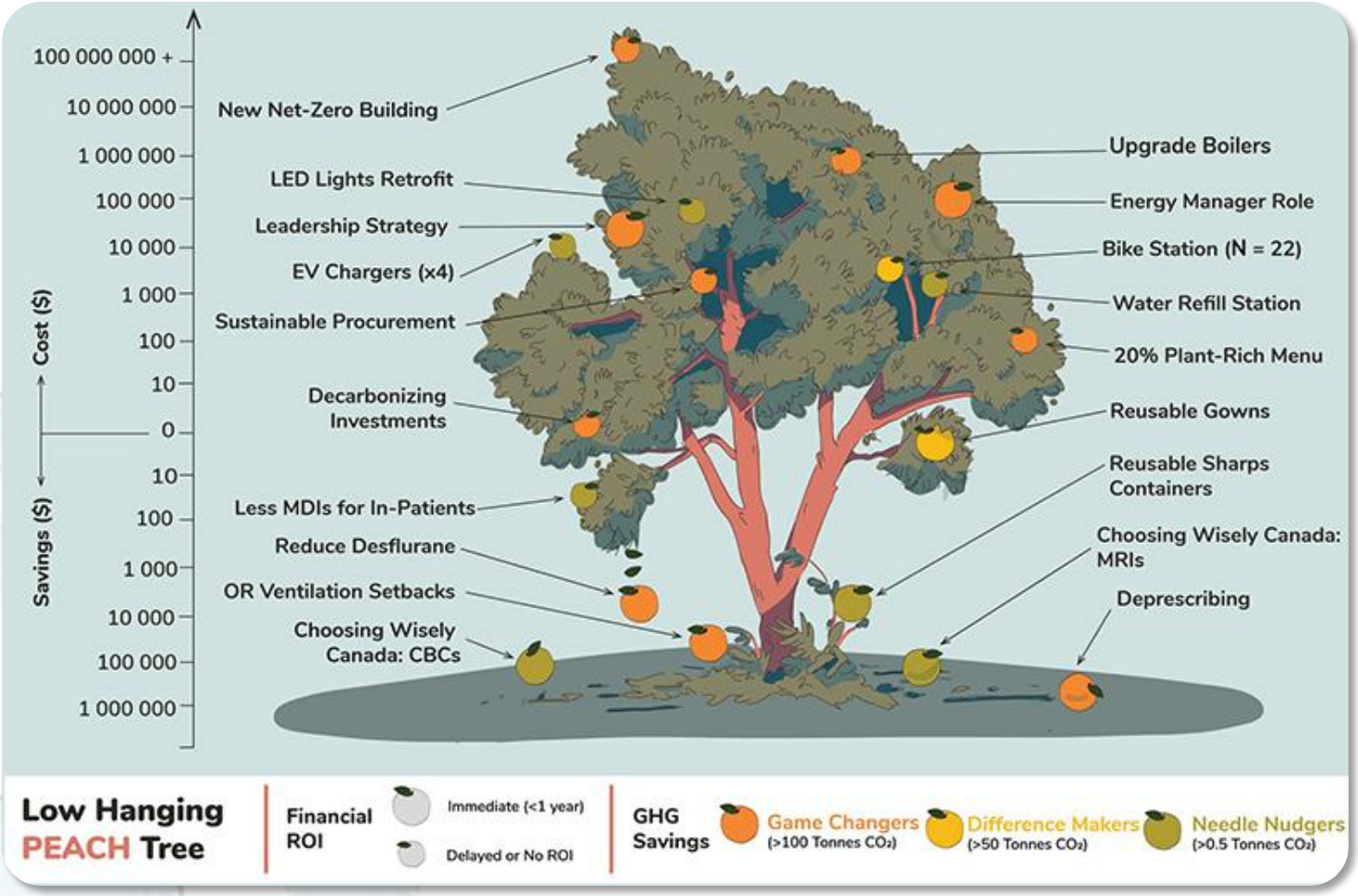
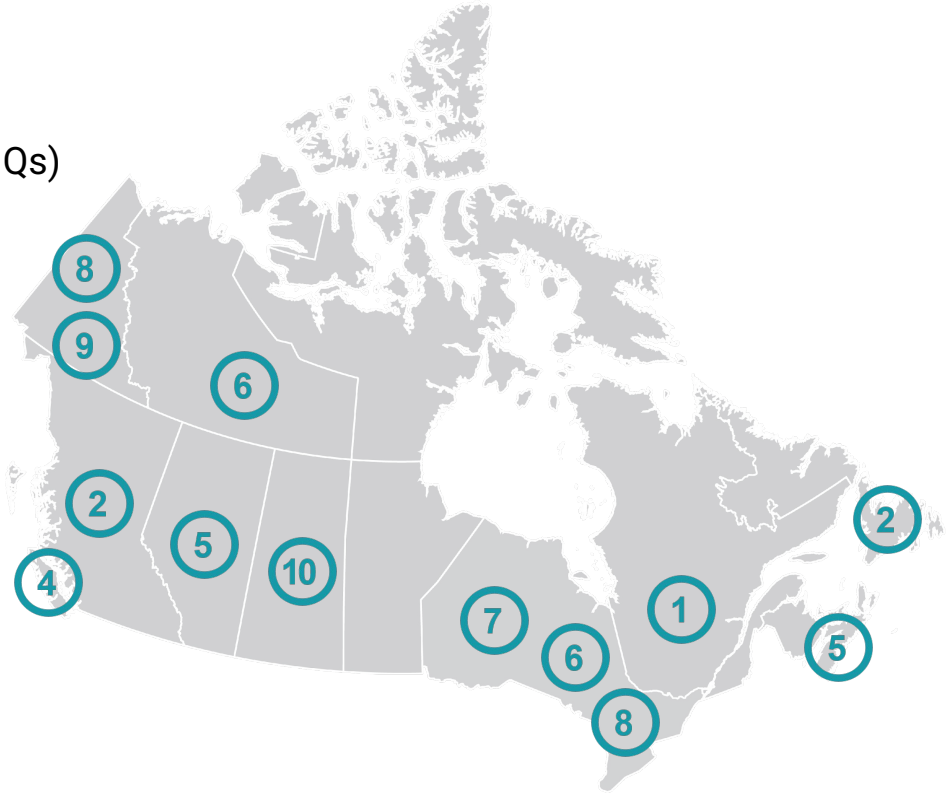


47

Climate Action Benchmarking Tool | Across Canada

Updated Green Hospital Scorecard: Sections

1. Corporate Leadership and Governance (7 the Qs)
2. Climate Change and Resiliency (5 Qs)
3. Education (2 Qs)
4. Supply Chain (2 Qs)
5. Clinical Practices (8 Qs)
6. Medications and Anesthetics (7 Qs)
7. Buildings – Energy, Waste, Water (12 Qs)
8. Food (5 Qs)
9. Transportation (2 Qs)
10. System Design (1 Q)

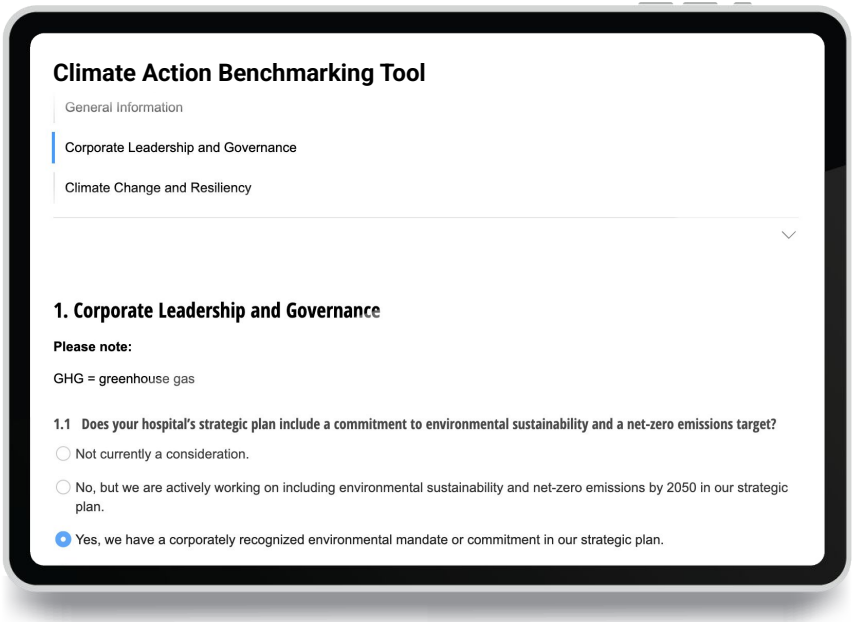


48

Climate Action Benchmarking Tool | Example

Updated Green Hospital Scorecard: Sections

1. **Corporate Leadership and Governance (7 the Qs)**
2. Climate Change and Resiliency (5 Qs)
3. Education (2 Qs)
4. Supply Chain (2 Qs)
5. Clinical Practices (8 Qs)
6. Medications and Anesthetics (7 Qs)
7. Buildings – Energy, Waste, Water (12 Qs)
8. Food (5 Qs)
9. Transportation (2 Qs)
10. System Design (1 Q)



49

Leadership | Centre hospitalier de l’Université de Montréal

Strategic Vision

To clearly define the actions to be taken, CHUM is implementing an action plan structured around six (6) strategic areas.

Each area is integrated into the clinical context of CHUM and CRCHUM research, with validation of its trajectory and regular evaluation of the directions taken to achieve carbon neutrality.

The plan outlined below also addresses the objectives and actions implemented by the MSSS in terms of sustainable development.

Area 1	Area 2	Area 3	Area 4	Area 5	Area 6
Energy	Responsible Procurement	Sustainable Food	Waste Materials	Sustainable Mobility	Responsible Digital Technology

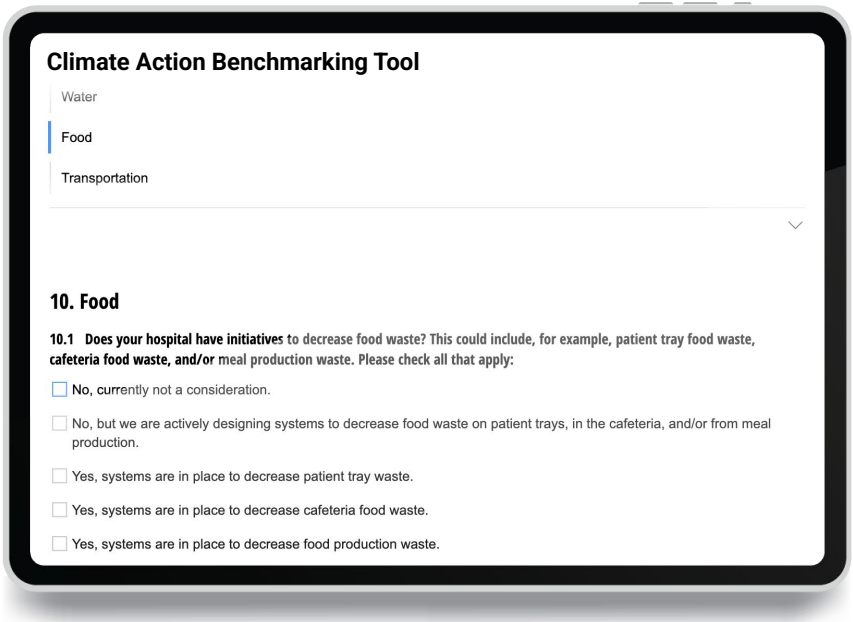
- Patient Safety
- Cost Savings
- Resiliency

50

Climate Action Benchmarking Tool | Example

Updated Green Hospital Scorecard: Sections

1. Corporate Leadership and Governance (7 the Qs)
2. Climate Change and Resiliency (5 Qs)
3. Education (2 Qs)
4. Supply Chain (2 Qs)
5. Clinical Practices (8 Qs)
6. Medications and Anesthetics (7 Qs)
7. Buildings – Energy, Waste, Water (12 Qs)
8. **Food (5 Qs)**
9. Transportation (2 Qs)
10. System Design (1 Q)



51

Food | Let's do better!

Location: France

Location: Canada

Location: Australia

Photos courtesy of: Nourish

52

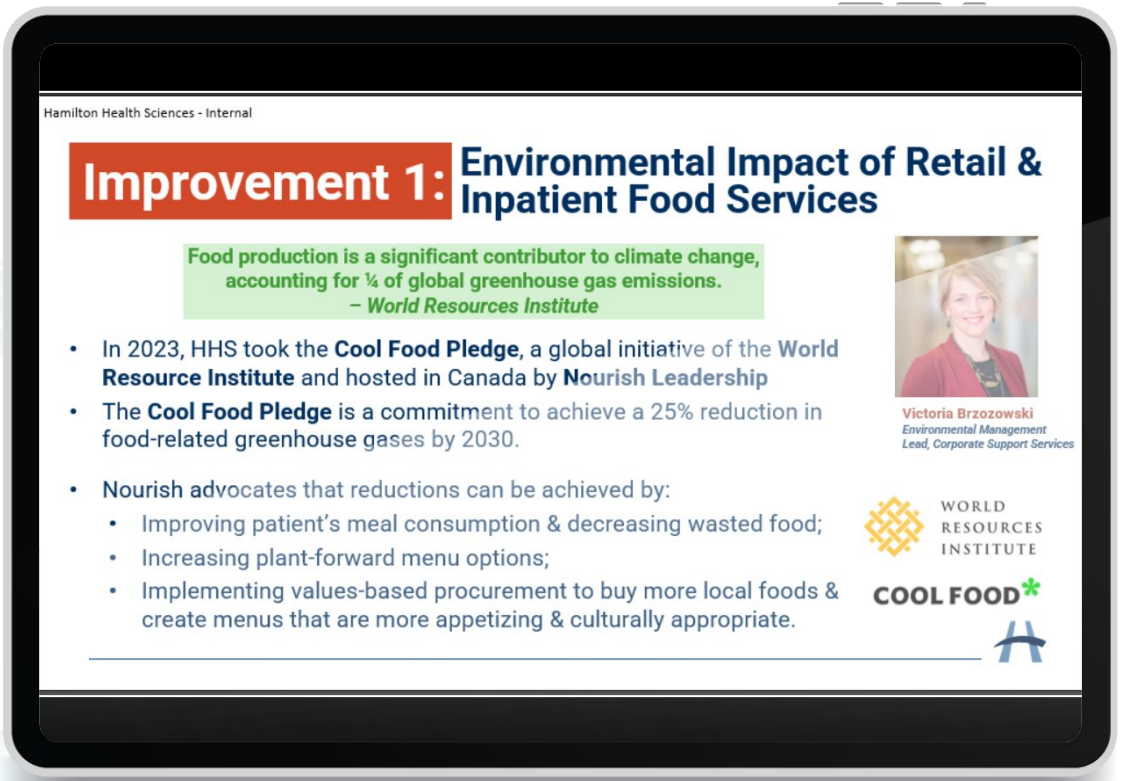
Food | Delicious examples that take a bite out of emissions

Photos courtesy of:

Nourish

53

Food | Cool Food



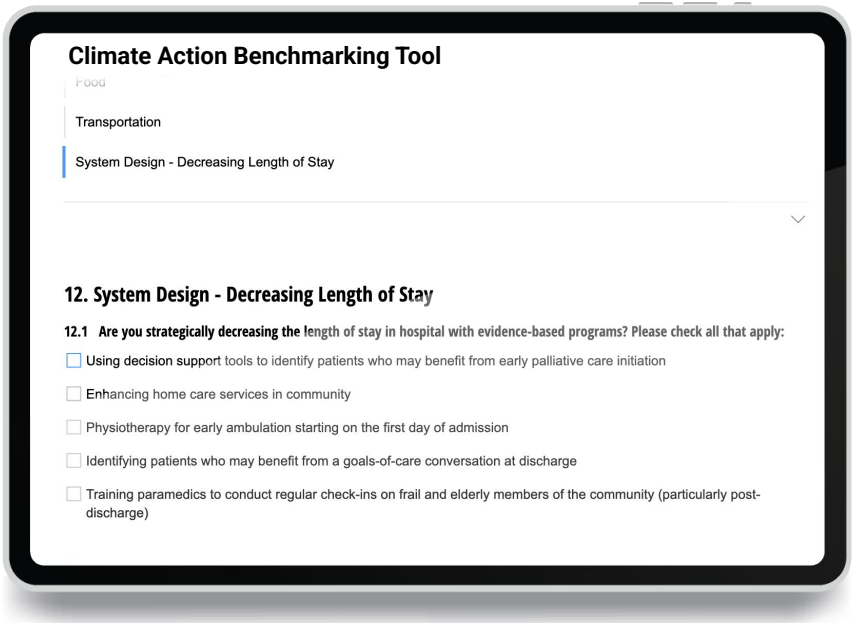
- Patient Safety
- Cost Savings
- Resiliency

54

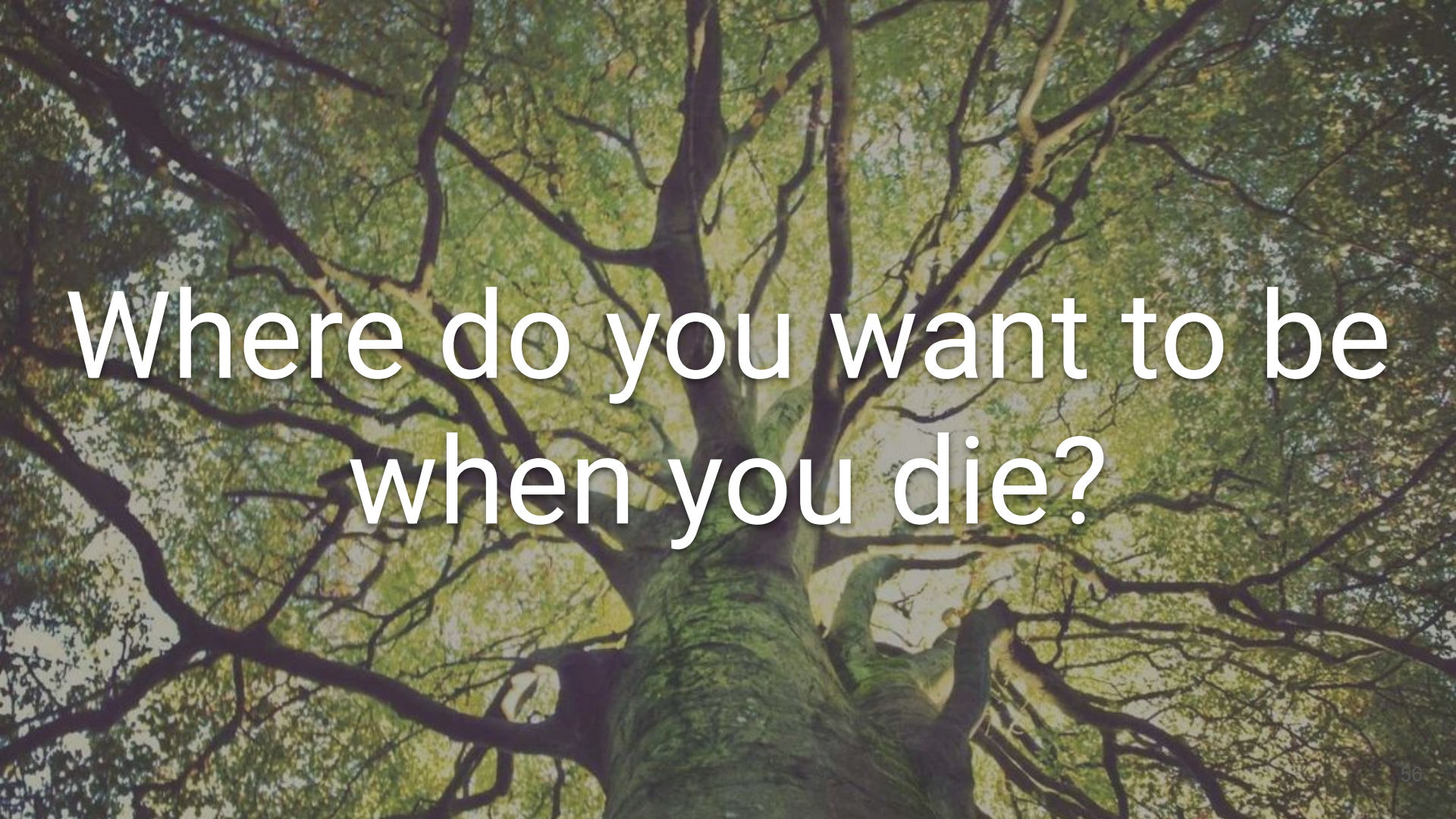
Climate Action Benchmarking Tool | System Design

Updated Green Hospital Scorecard: Sections

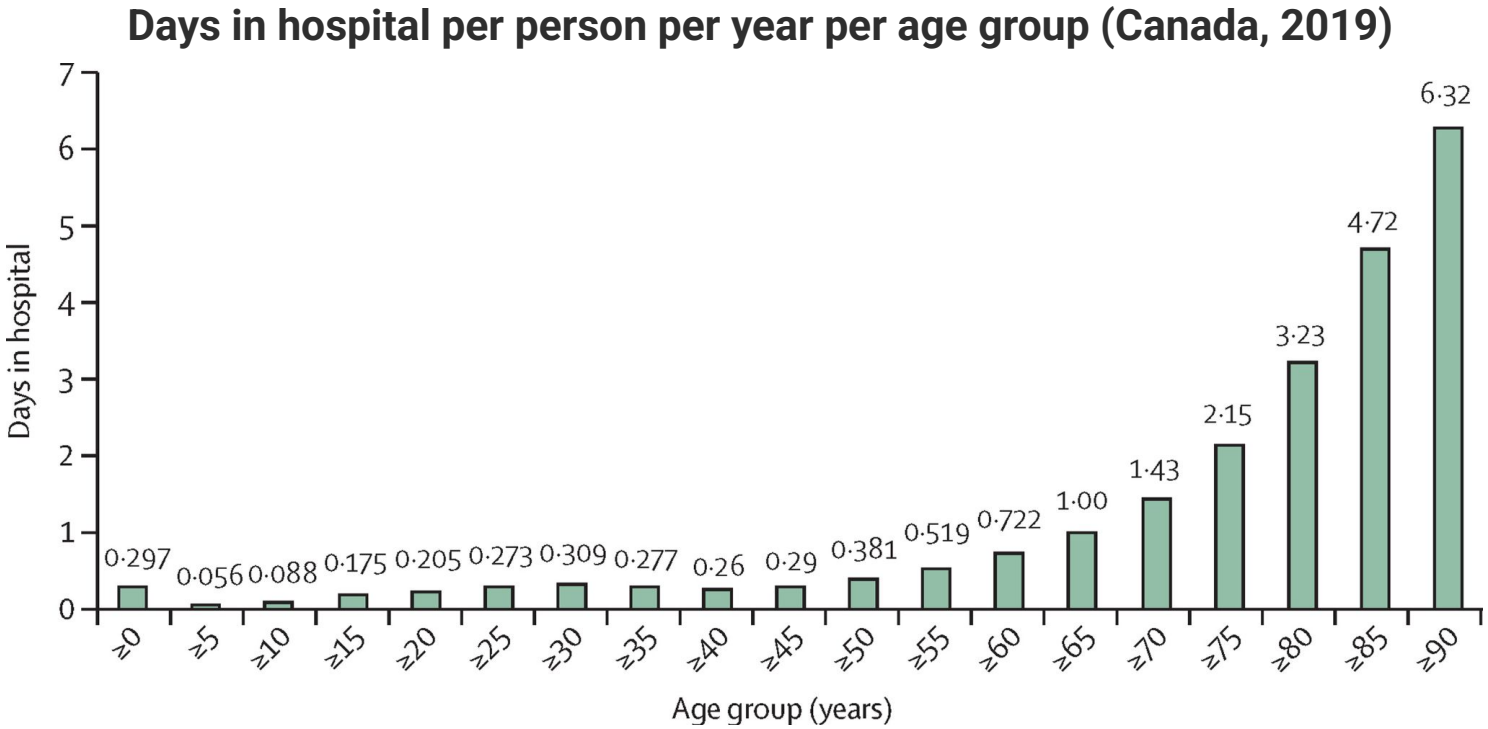
1. Corporate Leadership and Governance (7 the Qs)
2. Climate Change and Resiliency (5 Qs)
3. Education (2 Qs)
4. Supply Chain (2 Qs)
5. Clinical Practices (8 Qs)
6. Medications and Anesthetics (7 Qs)
7. Buildings – Energy, Waste, Water (12 Qs)
8. Food (5 Qs)
9. Transportation (2 Qs)
10. **System Design (1 Q)**



55


Where do you want to be when you die?

Resource Use | Comparison by Age Groups

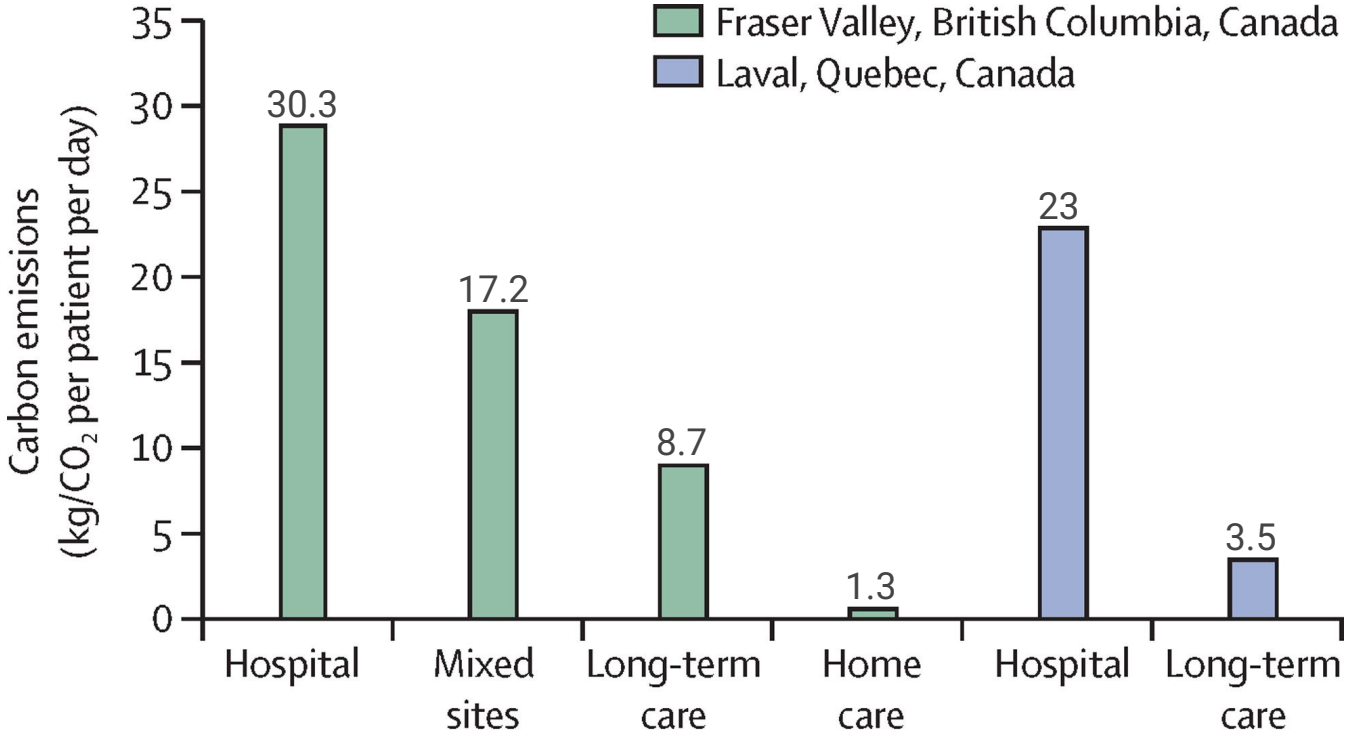


THE LANCET
Planetary Health

Managing greenhouse gas emissions in the terminal year of life in an overwhelmed health system: a paradigm shift for people and our planet

Myles Sergeant, MD [a] · Olivia Ly, MD [a] · Sujane Kandasamy, PhD [b] · Prof Sonia S Anand, MD PhD [c,d,c] · Russell J de Souza, SD [d,c]

Carbon Footprint | Comparison of Different Healthcare Facility Types



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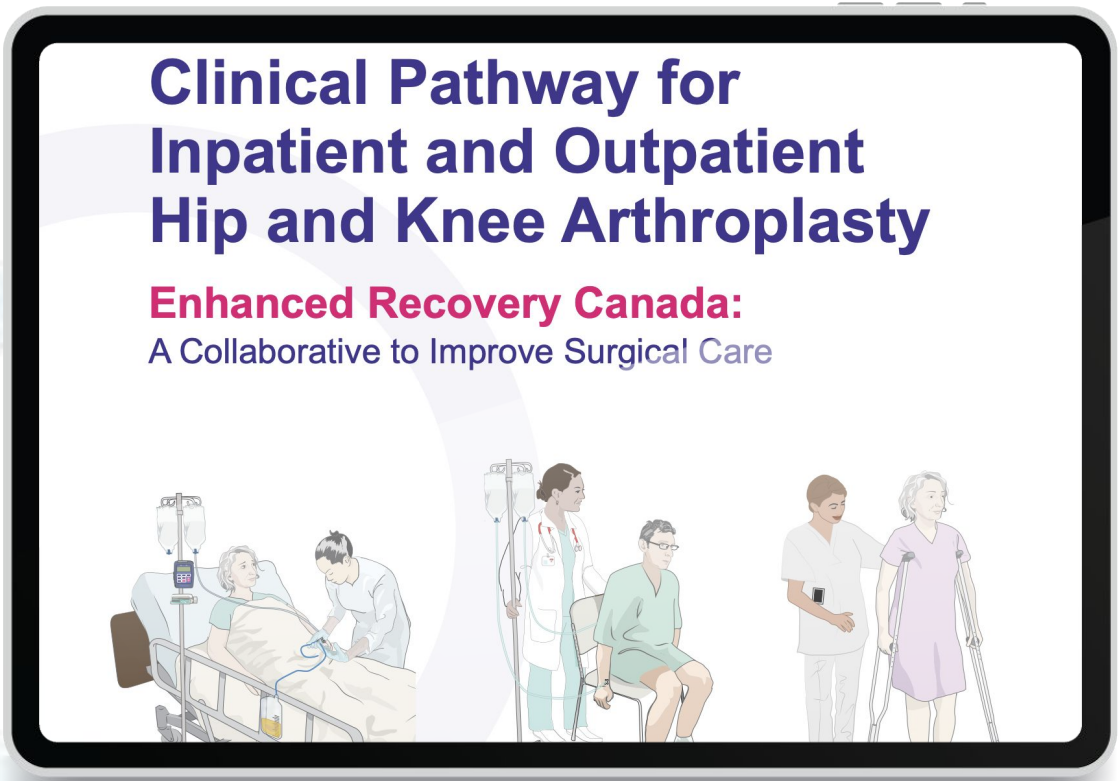
Scope 1 and 2 emissions

Design System | Enhanced Recovery Canada



- Patient Safety
- Cost Savings
- Resiliency

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Thank You

Reach out if you have questions:
climateaction@healthstandards.org

Connect with us

Email us with questions and feedback

Lightning Talks – Round One

Dr. Fahad Razak
St. Michael's Hospital &
University of Toronto

Use of Digital Health Data Repositories in Identifying Targets for Sustainability

Use of Digital Health Data Repositories in Identifying Targets for Sustainability.

Fahad Razak | MD MSc FRCPC

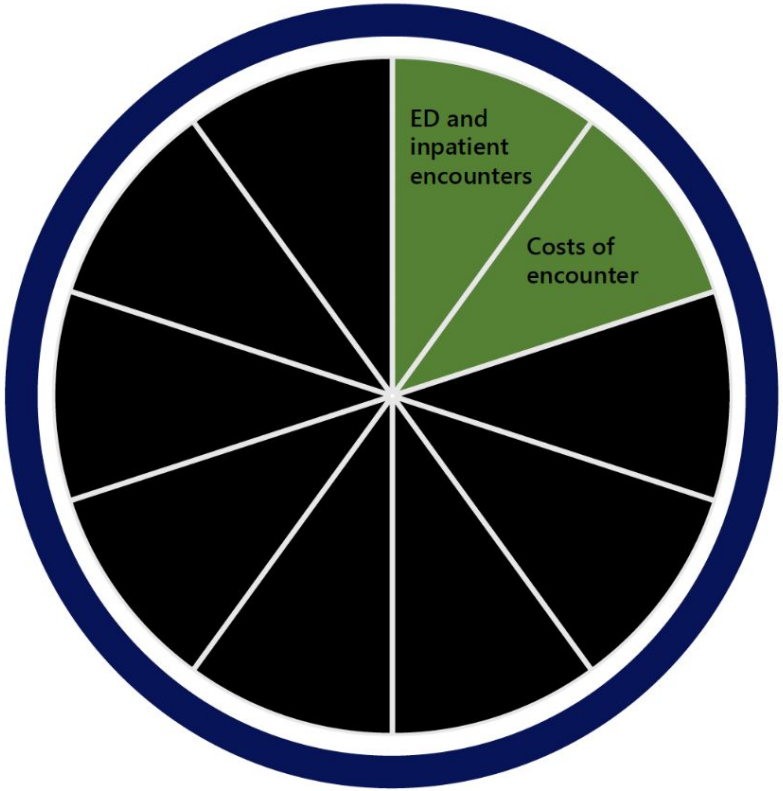
- Co-Provincial Clinical Lead, Ontario Health
- Internist, St Michael's Hospital
- Canada Research Chair in Data-Informed Healthcare Improvement, University of Toronto

GEMINI

VITAL

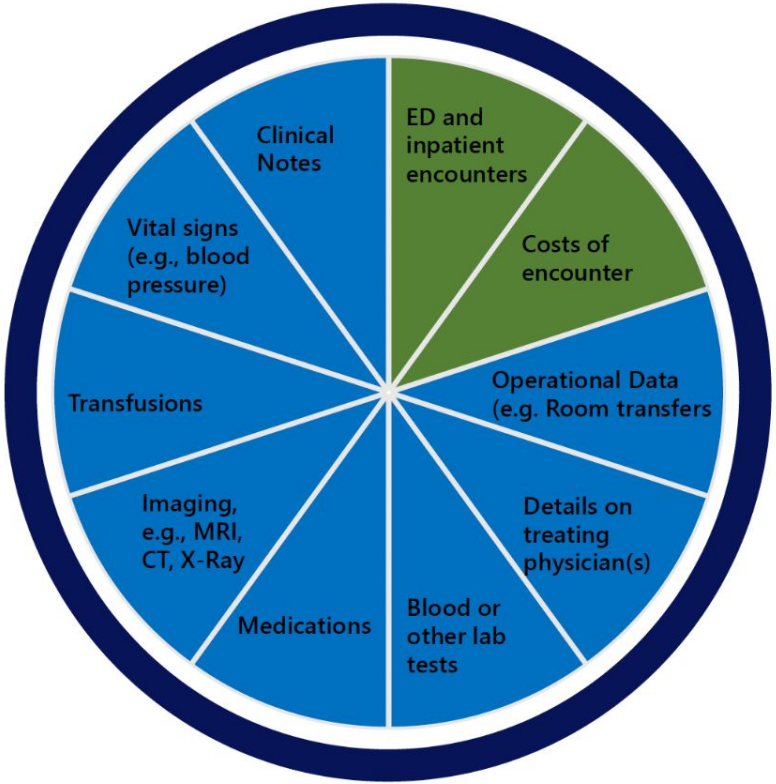
UNITY HEALTH TORONTO
Caring hearts. Leading minds.

Moving from administrative data to broader clinical data



Administrative data = Limited data generated administrative and billing purposes.

Moving from administrative data to broader clinical data



Administrative data = Limited data generated administrative and billing purposes.

Clinical data = Detailed data extracted from electronic health records

>>99% of all data generated in the system

Ensuring High Quality Data – 2021

Volume 28, Issue 3
March 2021

Article Contents

JOURNAL ARTICLE

Assessing the quality of clinical and administrative data extracted from hospitals: the General Medicine Inpatient Initiative (GEMINI) experience

Amol A Verma, Sachin V Pasricha, Hae Young Jung, Vladyslav Kushnir, Denise Y F Mak, Radha Koppula, Yishan Guo, Janice L Kwan, Lauren Lapointe-Shaw, Shail Rawal ... Show more

Author Notes

Journal of the American Medical Informatics Association, Volume 28, Issue 3, March 2021, Pages 578–587, https://doi.org/10.1093/jamia/ocaa225

Published: 04 November 2020 **Article history** ▾

Cite Permissions Share ▾

GEMINI

Ensuring High Quality Data

manual validation of 23,400+ data points from 7,400+ admissions

Variable	Laboratory	Radiology	Physicians	Death	ICU Transfer	Transfusion
Data Points Checked	5648	5092	2449	3814	3300	3116
Accuracy	100%	100%	98%	100%	100%	98%

GEMINI

GEMINI Data Platform

UNITY HEALTH TORONTO
Caring hearts. Leading minds.

- Electronic clinical and administrative health data
- ~40 hospitals
- ~25% of Canada's patients
- All adult medical, ICU, pediatric admissions
- ~50 FTEs

- High performance computing environments proving remote data access
- >3M hospitalizations
- >20B data points

- >1000 clinicians, scientists & students
- >150 projects; ~100 peer reviewed publications
- ~ $150M in grants across 13 institutions, ~60% held outside of Unity

GEMINI | https://geminimedicine.ca/

GEMINI – Quality Reports

GEMINI produces hospital and physician quality reports for inpatient General Medicine in partnership with Ontario Health

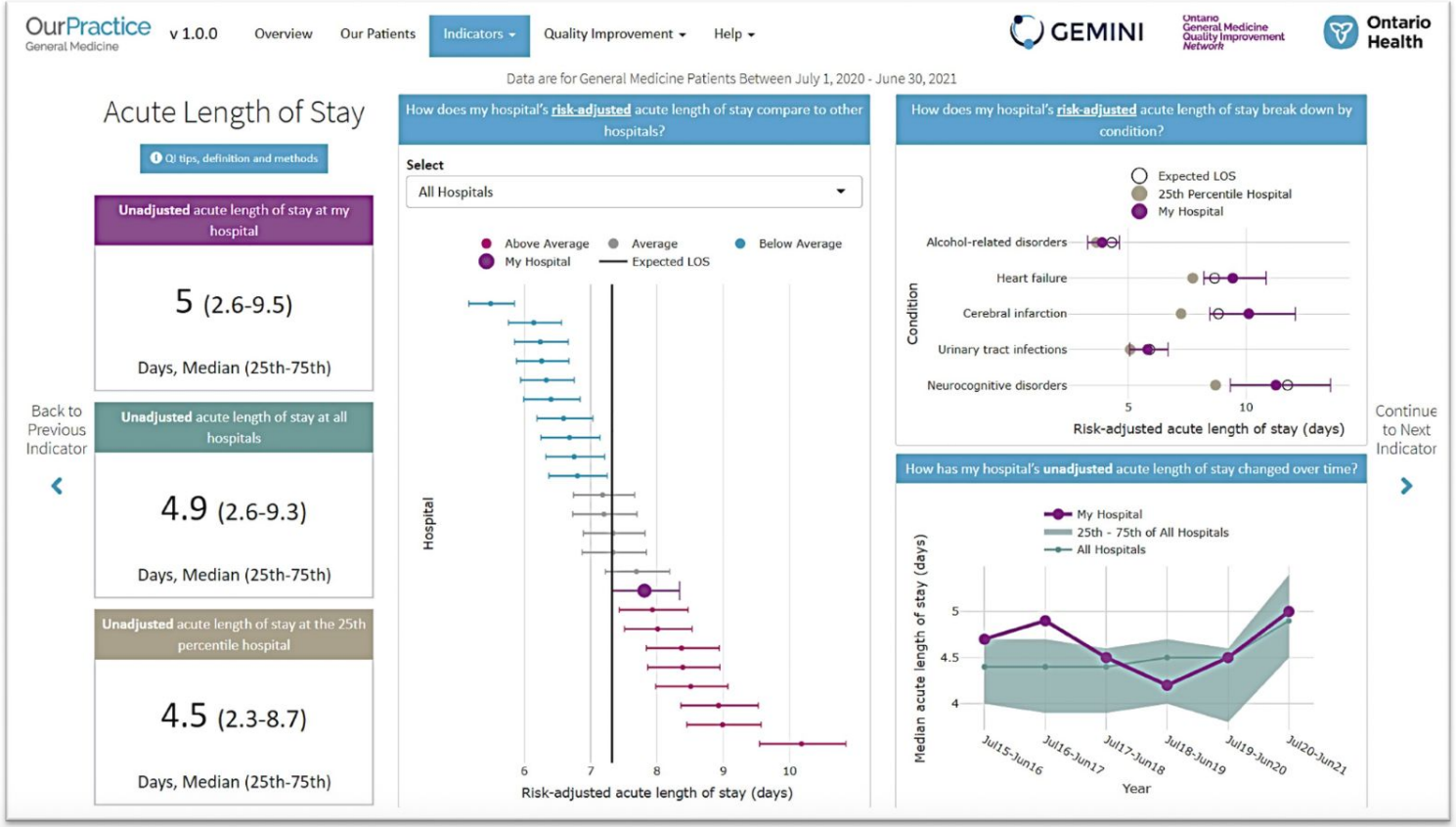
GEMINI – Quality Reports

We have delivered more than 1,500 quality reports to general medicine physicians across 60% of Ontario's Medical Beds

Ontario Health

GEMINI – Quality Reports

Hospitals receive annual reports about the quality of their general medicine care



Ontario Health

JGIM

CLIMATE HEALTH

Eight Ways General Internists Can Practice High-Value, Low-Carbon Care: The Canadian Society of Internal Medicine's Climate Conscious Choosing Wisely Canada Recommendations

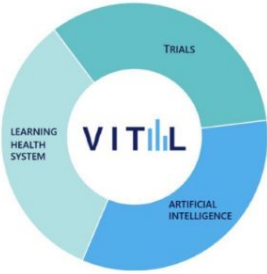
Mathilde Gaudreau-Simard, MD[1,2], Nabha Shetty, MD[3,4], William K. Silverstein, MD, MSc[5,6,7], Owen D. Luo, MD[8], and Valeria Stoynova, MD[9,10]

[1]Department of Medicine, Faculty of Medicine, University of Ottawa, Ottawa, ON, Canada; [2]Division of General Internal Medicine, The Ottawa Hospital, Ottawa, Canada; [3]Department of Medicine, Faculty of Medicine, Dalhousie University, Halifax, NS, Canada; [4]Division of General Internal Medicine, Nova Scotia Health, Halifax, NS, Canada; [5]Department of Medicine, University of Toronto, Toronto, ON, Canada; [6]Division of General Internal Medicine, Sunnybrook Health Sciences Center, Toronto, ON, Canada; [7]Choosing Wisely Canada, Toronto, ON, Canada; [8]Faculty of Medicine and Health Sciences, Mcgill University, Montreal, QC, Canada; [9]Division of General Internal Medicine, Island Health Victoria, Victoria, BC, Canada; [10]Department of Medicine, Faculty of Medicine, University of British Columbia, Vancouver, BC, Canada

1. Don’t prescribe intravenous antibiotics for patients who can safely be treated with an oral option, given that IV antibiotics have a higher carbon footprint.
2. Don’t prescribe heparin or low molecular weight heparin in situations where oral options are effective, preferred by the patient and felt to be safe by the prescriber
3. Don’t prescribe greenhouse gas-intensive metered-dose inhalers (MDIs) where a lower carbon alternative with comparable efficacy is available (e.g. dried-powder inhaler, soft-mist inhaler, or low-propellant MDI) in situations where technique is adequate and where patient preference has been considered.
4. Don’t recommend/order investigations or interventions before discussing patients’ expected trajectory of health and life expectancy, and exploring their preferences, values and goals of care.
5. Don’t continue medications without confirming clinical indications, with particular attention paid to sedative medications, proton pump inhibitors and inhalers.
6. Don’t routinely order daily blood tests on hospitalized patients if it will not change management.
7. Don’t use non-sterile disposable gloves when hand hygiene is sufficient.
8. Don’t book in-person follow-up appointments when a virtual visit is clinically appropriate and is preferred by the patient.

1. Don’t prescribe intravenous antibiotics for patients who can safely be treated with an oral option, given that IV antibiotics have a higher carbon footprint.	• Medication and Route Data
2. Don’t prescribe heparin or low molecular weight heparin in situations where oral options are effective, preferred by the patient and felt to be safe by the prescriber	• Medication and Route Data
3. Don’t prescribe greenhouse gas-intensive metered-dose inhalers (MDIs) where a lower carbon alternative with comparable efficacy is available (e.g. dried-powder inhaler, soft-mist inhaler, or low-propellant MDI) in situations where technique is adequate and where patient preference has been considered.	• Medication and Route Date
4. Don’t recommend/order investigations or interventions before discussing patients’ expected trajectory of health and life expectancy, and exploring their preferences, values and goals of care.	• Palliative Status; Clinical Notes
5. Don’t continue medications without confirming clinical indications, with particular attention paid to sedative medications, proton pump inhibitors and inhalers.	• Medication Data
6. Don’t routinely order daily blood tests on hospitalized patients if it will not change management.	• Lab Testing Data
7. Don’t use non-sterile disposable gloves when hand hygiene is sufficient.	
8. Don’t book in-person follow-up appointments when a virtual visit is clinically appropriate and is preferred by the patient.	• Appointment Location

VITAL Data Platform: “GEMINI 2.0” Across ON, AB, QC



- Received initial $30M from ISED (2025-2028)
- Additional ~$70M ask under review

Clinical data, including:

Clinical notes — Laboratory

Medical images — Medications

Vital signs — Care providers

Procedures — Clinical outcomes

Indigenous identifiers

Infrastructure:

1. Automated data pipelines
2. Linked clinical & imaging data
3. Secure computing environment
4. Linked Indigenous data
5. User portal for federated analysis
6. Clinical trials software
7. Governance, privacy & security

VITAL

160 hospitals

3 provinces

20 million patients

<24h near real-time

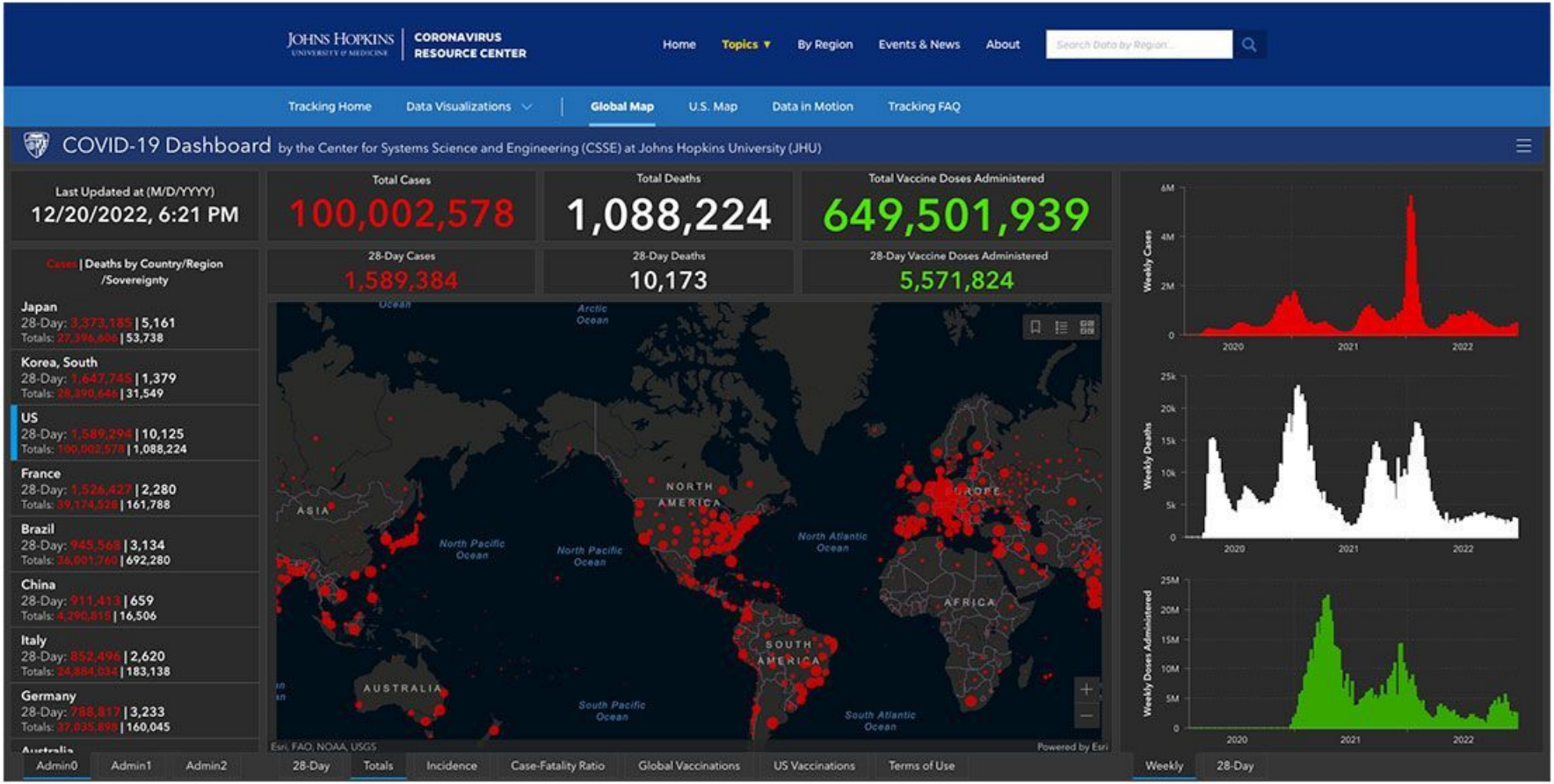
Dr. Sarah Cook
College of Family Physicians

Primary Care & Planetary Health: Strong Primary Care for a Healthier Planet

View Video

Hannah Permaul Flores
University of Toronto

Mapping Health for a Climate-Resilient Future: GIS Applications in Toronto


JOHNS HOPKINS UNIVERSITY & MEDICINE
CORONAVIRUS RESOURCE CENTER
Home
Topics
By Region
Events & News
About
Search Data by Region...
Tracking Home
Data Visualizations
Global Map
U.S. Map
Data in Motion
Tracking FAQ
COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)
Last Updated at (M/D/YYYY)
12/20/2022, 6:21 PM
Total Cases
100,002,578
Total Deaths
1,088,224
Total Vaccine Doses Administered
649,501,939
28-Day Cases
1,589,384
28-Day Deaths
10,173
28-Day Vaccine Doses Administered
5,571,824
Cases | Deaths by Country/Region /Sovereignty
Japan
28-Day: 3,373,185 | 5,161
Totals: 27,396,606 | 53,738
Korea, South
28-Day: 1,647,745 | 1,379
Totals: 28,390,646 | 31,549
US
28-Day: 1,589,298 | 10,125
Totals: 100,002,578 | 1,088,224
France
28-Day: 1,526,427 | 2,280
Totals: 39,174,528 | 161,788
Brazil
28-Day: 945,568 | 3,134
Totals: 36,001,760 | 692,280
China
28-Day: 911,413 | 659
Totals: 4,290,818 | 16,506
Italy
28-Day: 852,496 | 2,620
Totals: 24,884,034 | 183,138
Germany
28-Day: 788,817 | 3,233
Totals: 37,035,893 | 160,045
Arctic Ocean
NORTH AMERICA
ASIA
EUROPE
AFRICA
SOUTH AMERICA
AUSTRALIA
North Pacific Ocean
North Pacific Ocean
North Atlantic Ocean
South Pacific Ocean
South Atlantic Ocean
Esri, FAO, NOAA, USGS
Powered by Esri
Weekly Cases
Weekly Deaths
Weekly Doses Administered
2020
2021
2022
Admin0
Admin1
Admin2
28-Day
Totals
Incidence
Case-Fatality Ratio
Global Vaccinations
US Vaccinations
Terms of Use
Weekly
28-Day

Mapping Health for a Climate-Resilient Future: GIS Applications in Toronto

Hannah Permaul Flores, BSc (Hons)

UNIVERSITY OF TORONTO

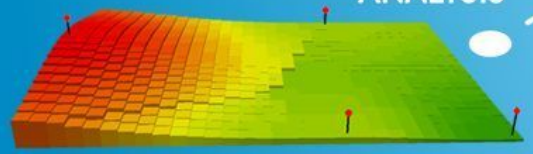
WHAT IS GIS?

GEOGRAPHIC INFORMATION SYSTEMS

MAPS

APPS

ANALYSIS

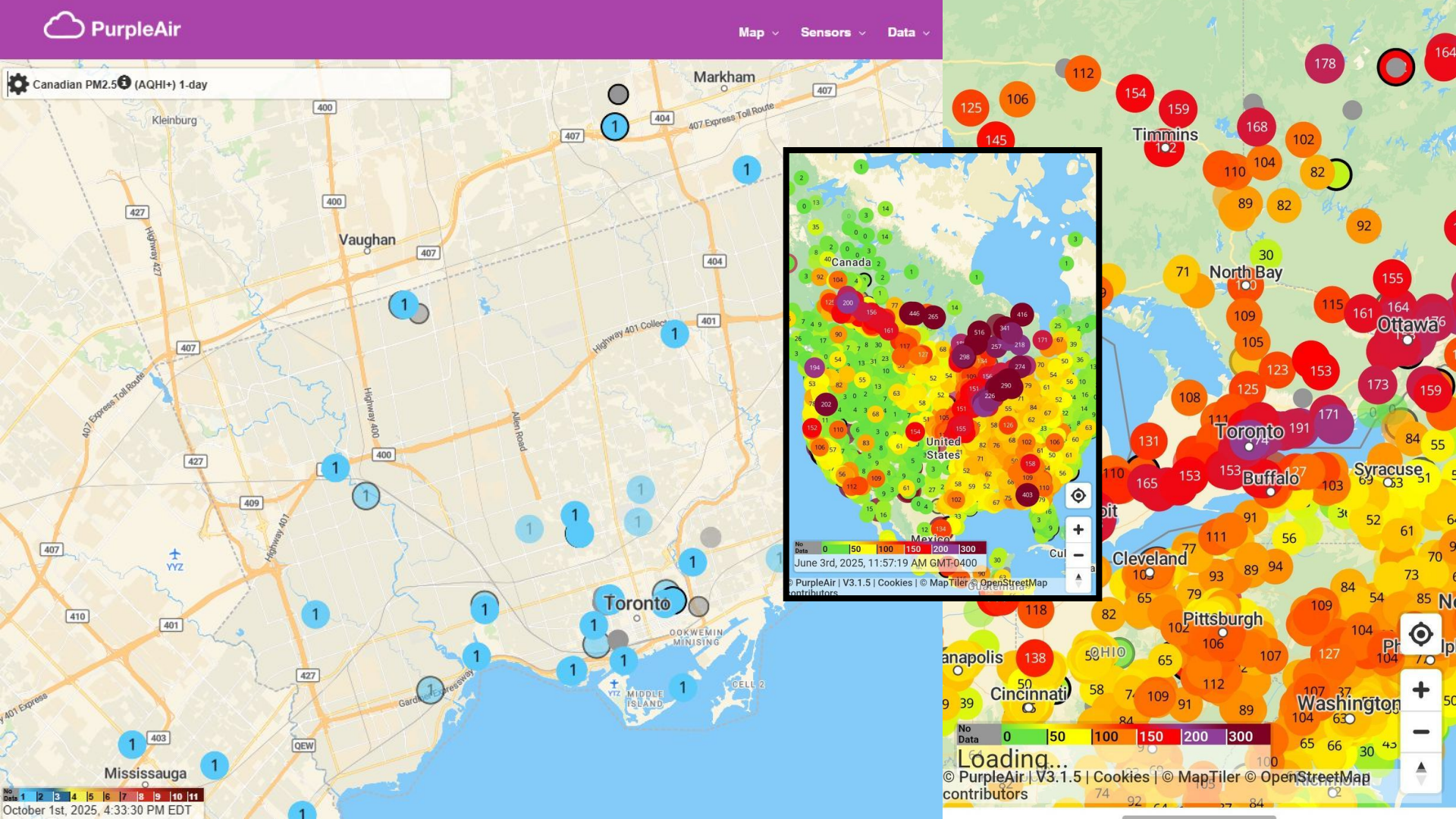


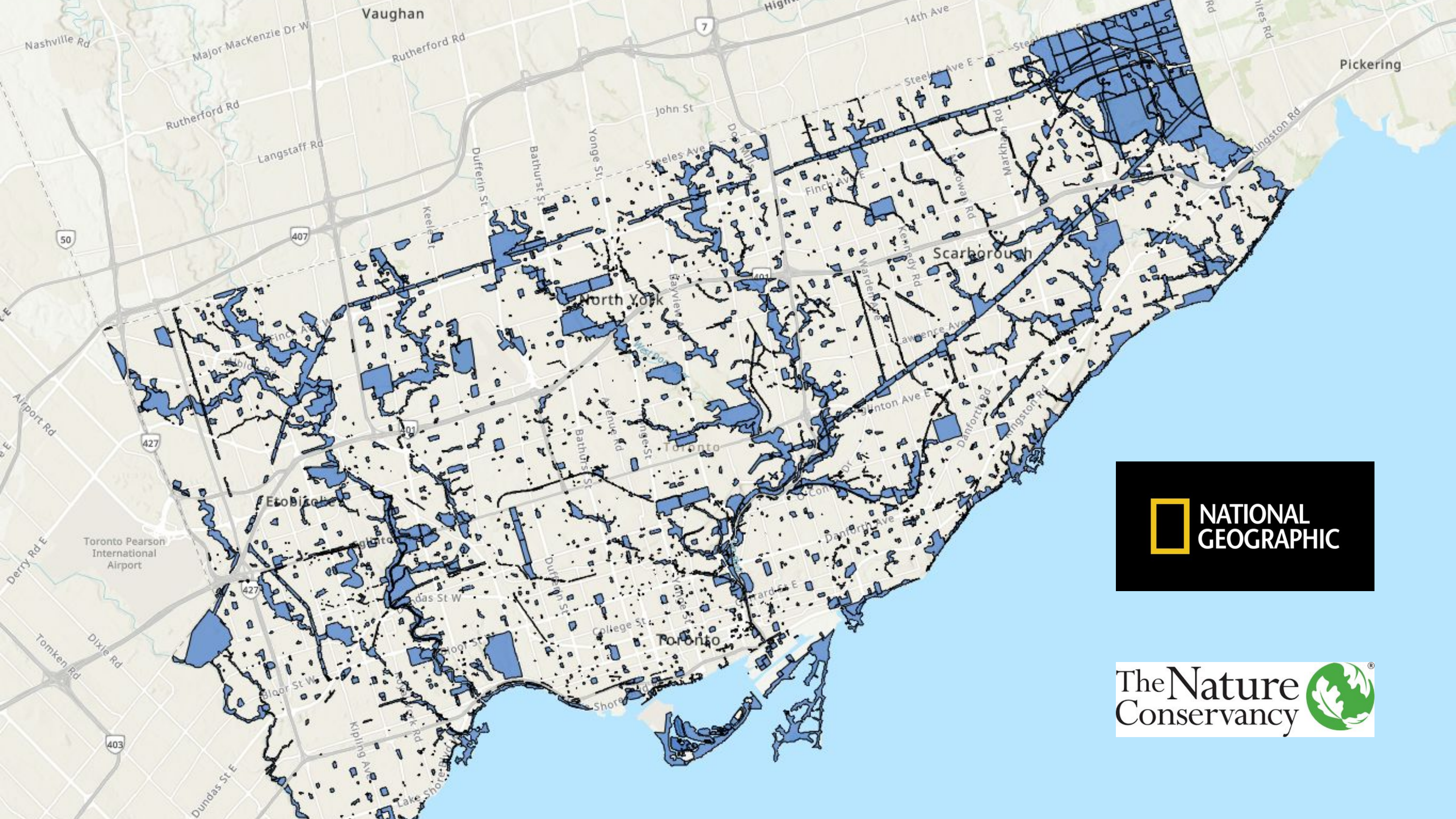
CAREERS

DATA

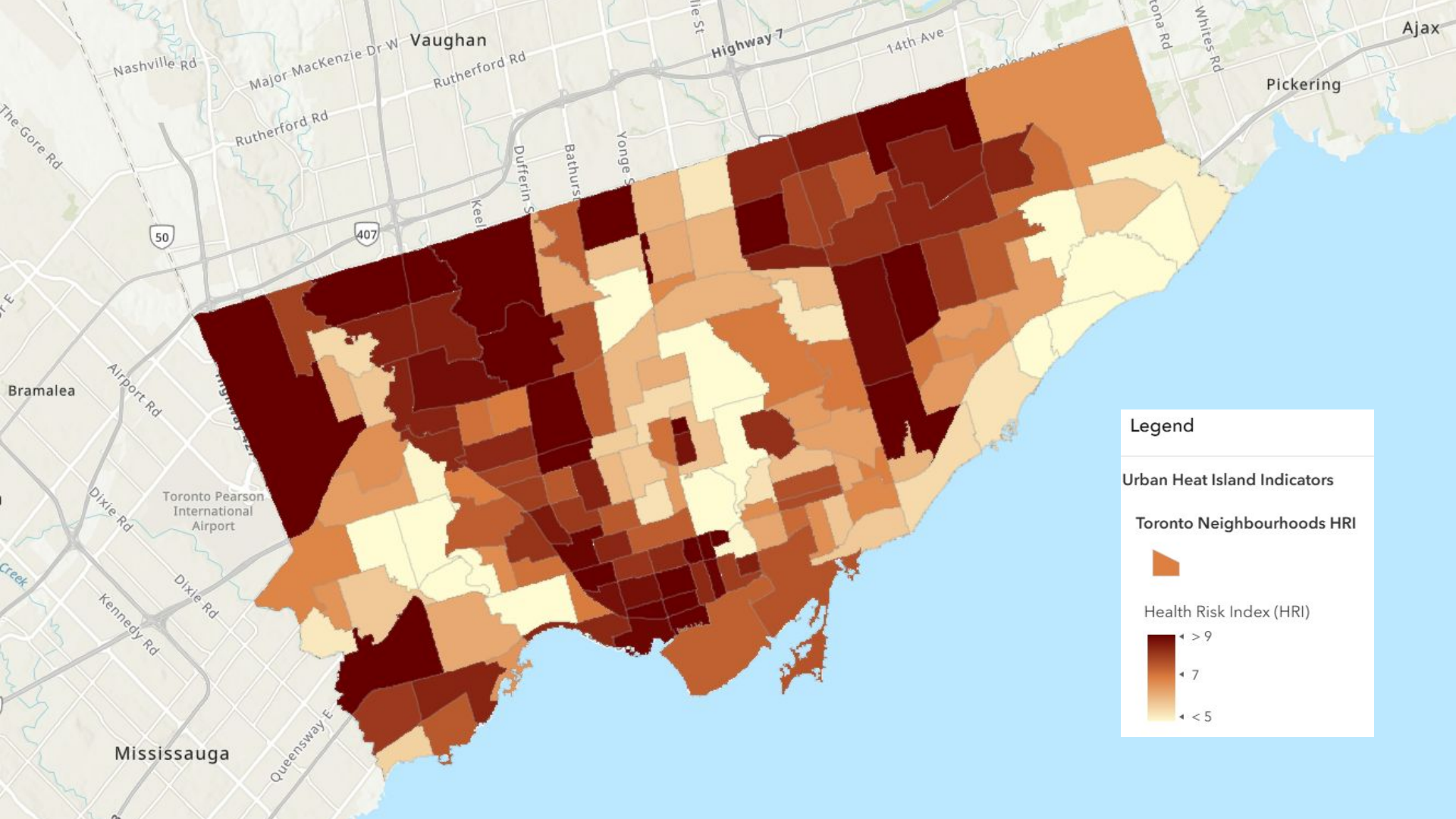
SOFTWARE

SATELLITES


PurpleAir
Map
Sensors
Data
Canadian PM2.5 (AQHI+) 1-day
Markham
Kleinburg
Vaughan
Toronto
Mississauga
Timmins
North Bay
Ottawa
Toronto
Buffalo
Syracuse
Cleveland
Pittsburgh
Cincinnati
Washington
Canada
United States
Mexico
No Data 0 50 100 150 200 300
June 3rd, 2025, 11:57:19 AM GMT-0400
© PurpleAir | V3.1.5 | Cookies | © MapTiler © OpenStreetMap contributors
Loading...
No Data 1 2 3 4 5 6 7 8 9 10 11
October 1st, 2025, 4:33:30 PM EDT



Vaughan
Pickering
Nashville Rd
Major MacKenzie Dr W
Rutherford Rd
14th Ave
Steeles Ave E
John St
Langstaff Rd
Steeles Ave
Finch Ave E
Scarborough
North York
Lawrence Ave
Eglinton Ave E
Kingston Rd
Danforth Rd
Toronto
Etobicoke
Toronto Pearson International Airport
Airport Rd
Derry Rd E
Dundas St W
College St
Bloor St W
Danforth Ave
Gerrard St E
Lake Shore Blvd W
Kipling Ave
Dundas St E
Tomken Rd
Dixie Rd
Dufferin St
Bathurst St
Yonge St
Bayview Ave
Warden Ave
Kennedy Rd
Markham Rd
Keele St
NATIONAL GEOGRAPHIC
The Nature Conservancy


Vaughan
Nashville Rd
Major MacKenzie Dr W
Rutherford Rd
Rutherford Rd
Highway 7
14th Ave
Ajax
Pickering
Whites Rd
The Gore Rd
Dufferin St
Bathurst
Yonge St
50
407
Bramalea
Airport Rd
Toronto Pearson International Airport
Dixie Rd
Dixie Rd
Kennedy Rd
Mississauga
Queensway E
Legend
Urban Heat Island Indicators
Toronto Neighbourhoods HRI
Health Risk Index (HRI)
> 9
7
< 5

For more of my maps

@hannahfloresthepoet

SEA ISLAND

MITCHELL ISLAND

Dr. Diane de Camps Meschino
Women's College Hospital &
University of Toronto

Planetary Health & Indoor Air Quality: Managing Invisible Risks

PLANETARY HEALTH & INDOOR AIR QUALITY

MANAGING INVISIBLE RISKS

Diane de Camps Meschino
BSc(H) MD FRCPC PLDP
Associate Professor
University of Toronto

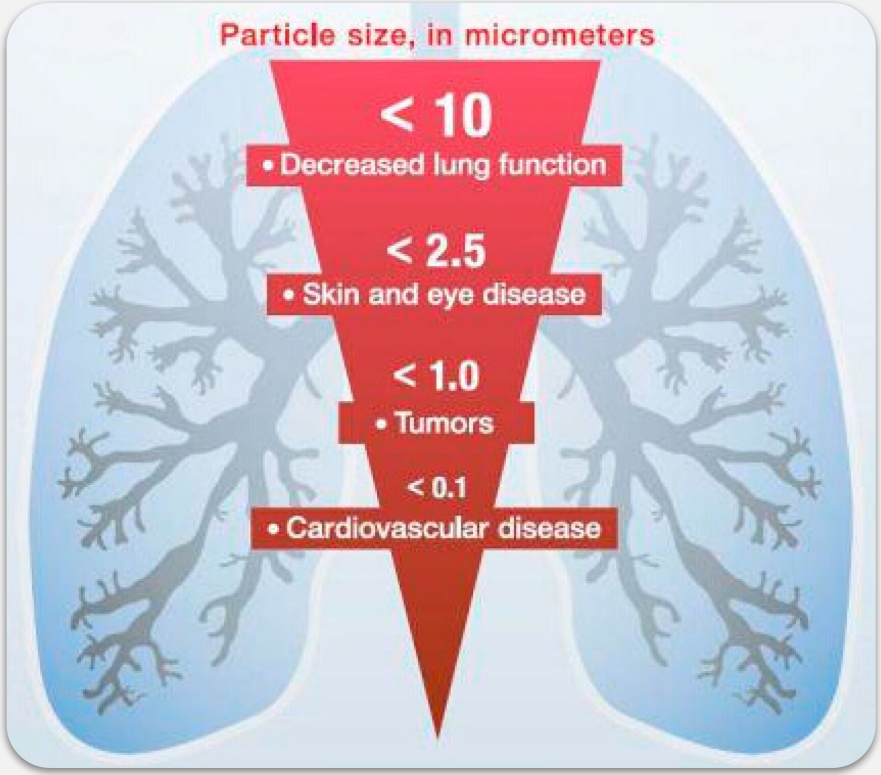
Leadership Advisor CCGHC
Heat ADAPT Grant
INHALE- International Air Quality Campaign
Canadian Learning Collaborative for Health Leadership
Advisor Green Technology Education Centre
World Health Leadership Network
Canadian Leadership Institute of Medical Education
Advisor Coalition for Community & Healthcare Acquired Infection Reduction (CHAIR)

WHY INDOOR AIR?

- 3.8 million/die prematurely from IAQ worldwide
- Most exposure outdoor air pollution occurs indoors (penetration)
- Most Canadians: ~ 90% time indoors (duration x concentration)
- Climate change factors increase risks

1. FIRE & SMOKE

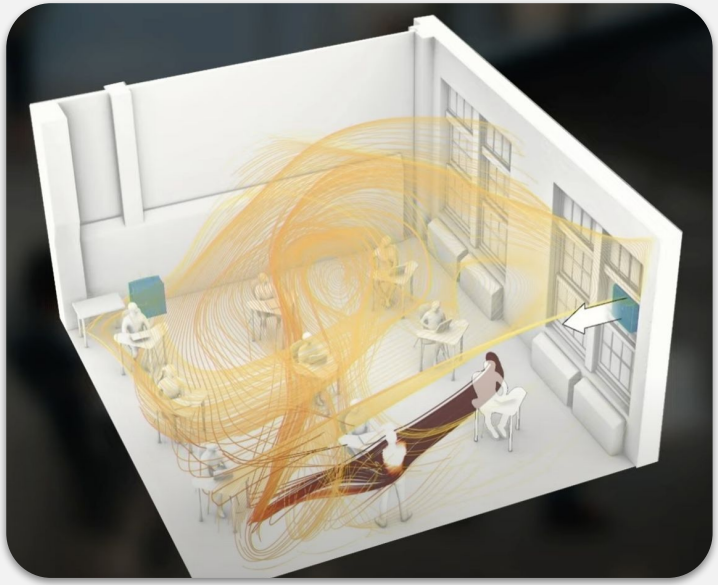
- PM: SP 1, 2.5, 10 μm
- Other toxic chemicals
- Distributed & Duration > than realized
- NO KNOWN SAFE LEVEL
- 5% Lung cancer globally
- End organs including brain



PM through lungs to organs

2. HOSPITAL ACQUIRED INFECTIONS

- Canada ~8% *
  - 240,000 HAI/y
  - >8,000 deaths/y
- Netherlands: 1%
- Most are antimicrobial resistance (AMR) infections: 84.4% ↑ risk of death
- *7.9% point prevalence 2017



Jo Allen's TED Talk

3. CARBON DIOXIDE

- CO_2 levels in offices / schools > limits
- ↓ GHG (↓ ventilation) = ↑ CO_2
- Tight buildings: ↑ CO_2
- ↓ Cognition & performance

  (NB crisis response)

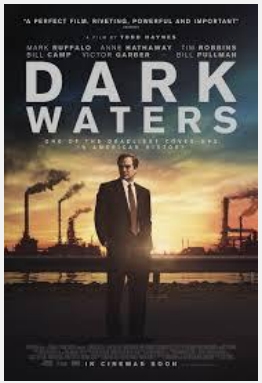
4. VOLATILE ORGANIC COMPOUNDS

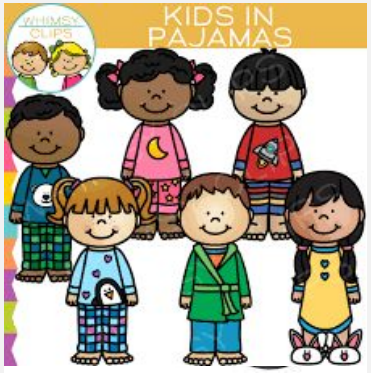
- Off-gas from household products

- *Formaldehyde: carcinogen cabinetry, laminate flooring
- **BTEX: benzene, toluene, ethylbenzene, xylene from gasoline

5. PFAS, BPA, FLAME RETARDANTS ~ILLEGAL BUT….

- Poly Fluorinated Alkyl Substances
- **F**-**C** bond = **F**orever **C**hemicals (doesn't break down)
- Impact: cancers, +++immune suppression, weight gain
- To defeat the law, Add a carbon…. REPEAT x 5000





6. RADON

- Natural decay of uranium from granite in the soil & water
- NO KNOWN SAFE LEVEL
- @ “acceptable level” = Lung cancer
  - **1/100 lifetime risk nonsmokers**;
  - ***1/10 lifetime risk smoker***
- Radon □ lung cancer deaths: 3000 people/yr Canada

IAQ HEALTH RISKS

- Cancer – many organs systems
- Brain health, dementias, Parkinsons…
- Cognitive performance
- COPD, Asthma etc.
- Mental health
- Autoimmunity

- Cardiovascular health
- Immune Suppression
- Reproductive Malfunction
- Fetal impact, Breast Milk
- Skin …

- **Exposure ↑ risk:** 

RISK ASSESSMENT

- Frequency x Duration x Concentration
- Where do you spend your time?
- Bedrooms = 1/3 of time
- Test & Monitor

RADON GAS TEST REPORT RESULTS FOR ADDRESS:

Location	Barcode	Type of Measurement	Test Start Date	Test End Date	Days Deployed	Results (Bq/m3)
					Number of Detectors:	1
Living/Dining Room; First Floor 1	GJ2329	Single	02-Feb-25	06-May-25	93	57 +/- 6

Results Guidelines

Health Canada	200
US EPA	150
World Health Organization	100

95

WHEN YOU CANNOT CONTROL THE SOURCE

- Optimize HVAC: **Health & GHG; ↑ ventilation**
  - Health Facilities – Engineered solutions (Copper, superior pathogen filters, UV)
- N95 ventilators- new CSA standards; resp virus=airborne
- Portable air purifiers HEPA (PM) & Carbon (VOC)
    - **smoke deactivates electrostatic**
- OR shelter in clean air location

WHEN YOU CANNOT CONTROL THE SOURCE

- Open windows when safe- to vent and cool
- **Consumer education and choices:**
  - construction materials, HVAC, Sofas, carpeting, clothing,
  - cleaning products, personal products, vehicle
- Cooking: well-ventilated
- Cleaning: avoid the overuse of chemicals and air fresheners
- Nature based solutions (shade, plants)

Beware disinformation

JOIN US, TOGETHER WE CAN

TIME FOR ACTION

Diane.Meschino@wchospital.ca

The Canadian Coalition for Green Health Care

Coalition canadienne pour un système de santé écologique

inHALE Indoor Healthy Air for Living Environments

https://inhale-health.org/

Laura McGrath

Shift: Action for Pension Wealth and Planet Health

Climate Change and Health Care Pensions

The powerful climate action you haven’t thought about yet

Healthcare Pensions and Climate

October 3, 2025 | Toronto Climate Week

shift ACTION FOR PENSION WEALTH AND PLANET HEALTH

Canada Pension Plan Investment Board:

$731 billion

Healthcare of Ontario Pension Plan (HOOPP):

$123 billion

shift ACTION FOR PENSION WEALTH AND PLANET HEALTH

“

Pension plans must step up to prevent runaway global catastrophe.

JANICE, HOOPP
BENEFICIARY

Long-term investors

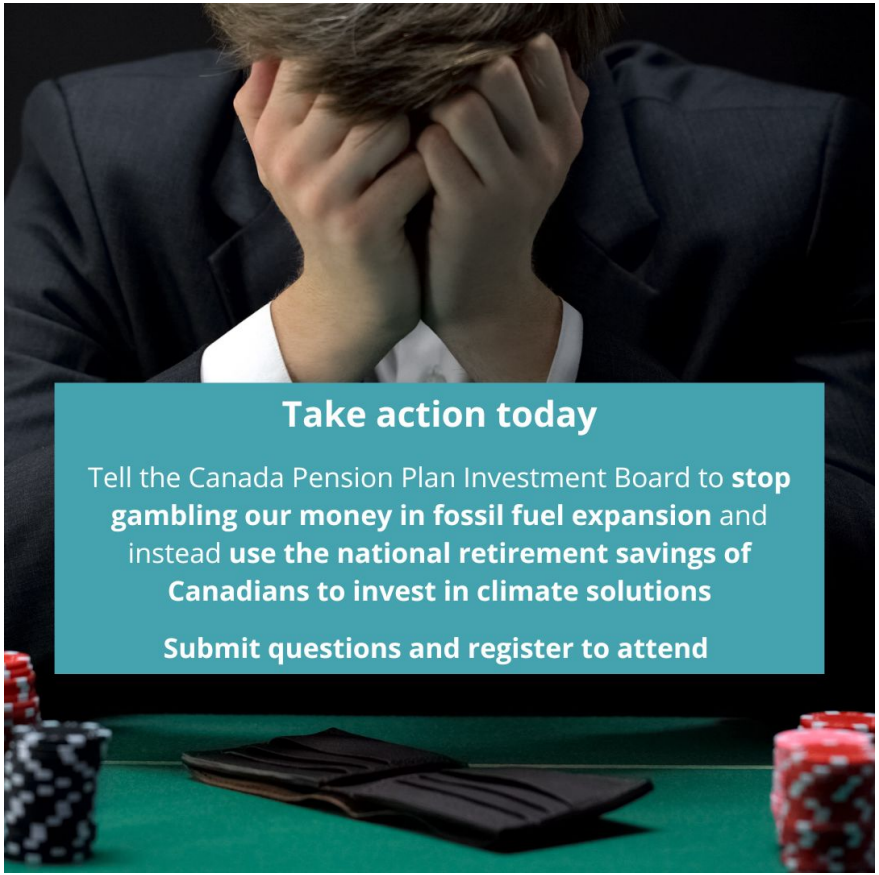
Exposed to climate risks

Own everything

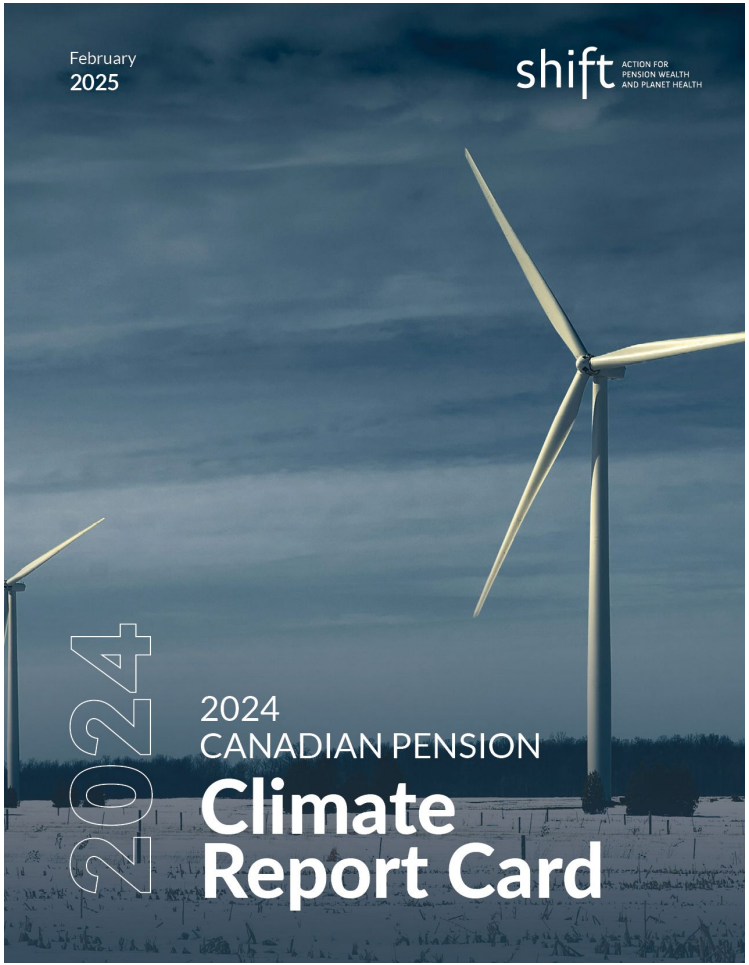
Accountable to us

shift ACTION FOR PENSION WEALTH AND PLANET HEALTH

shift ACTION FOR PENSION WEALTH AND PLANET HEALTH


Take action today
Tell the Canada Pension Plan Investment Board to **stop gambling our money in fossil fuel expansion** and instead **use the national retirement savings of Canadians to invest in climate solutions**
Submit questions and register to attend


Investing in fossil fuels is bad for our planet, bad for our health, and bad for our pensions.
Ontario health workers: sign the open letter asking HOOPP to stop investing in fossil fuels.
shift
ACTION FOR PENSION WEALTH AND PLANET HEALTH



SEVEN

Net-zero commitments

EIGHT

Green investment goals

FIVE

Limits on fossil fuel investments

SIX

Fossil-free boards

ONE

Pension fund going backwards

shift ACTION FOR PENSION WEALTH AND PLANET HEALTH

www.ShiftAction.ca -> Take Action

shift ACTION FOR PENSION WEALTH AND PLANET HEALTH

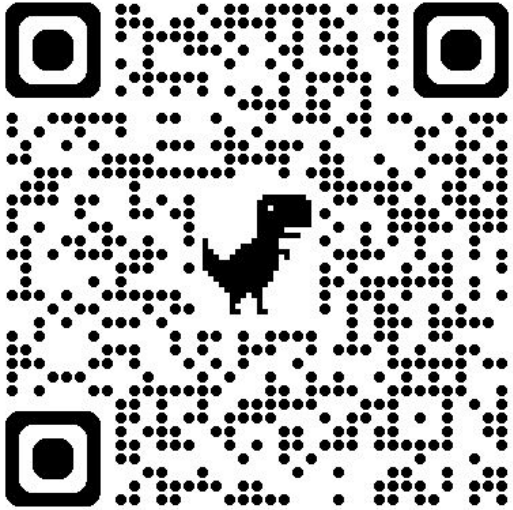
Send your personal message to HOOPP.

shift ACTION FOR PENSION WEALTH AND PLANET HEALTH

The moment we're in

Big financial decisions about projects in the "national interest"

shift ACTION FOR PENSION WEALTH AND PLANET HEALTH



www.ShiftAction.ca

Laura@ShiftAction.ca

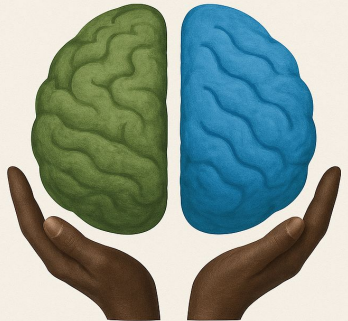
shift ACTION FOR PENSION WEALTH AND PLANET HEALTH

Muse Laroyia
University of Calgary & Brain Climate Equity Collaborative

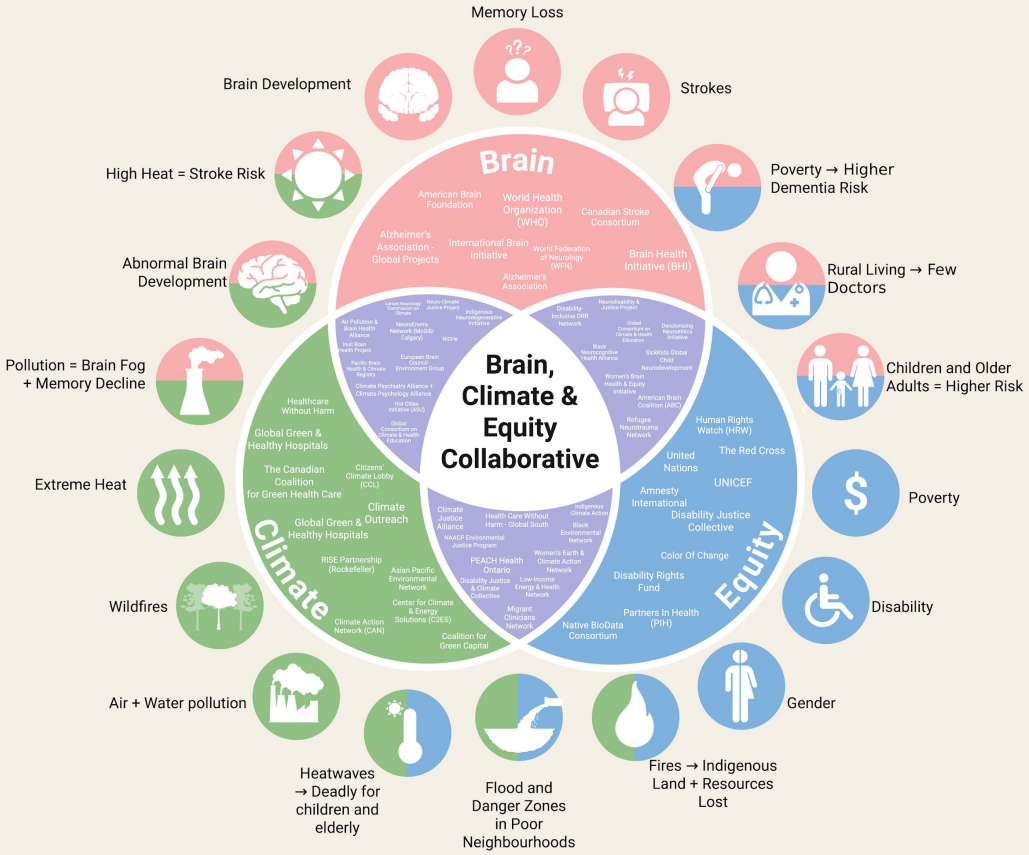
The Brain Climate Equity Collaborative

Brain Climate Equity Collaborative (Brain-CE Collab)

Presented by:
Muse Laroyia, MSc Candidate Neuroscience
Dr. Bhavini Makwana, MBBS, MD, FCFP (COE), FRSPH, PGDip GPH
Co-Leads of Brain-CE Collab



Who We Are: Brain-CE Collab



Canada's first collaborative tackling neuro-climate inequities through research, education, advocacy, and innovation.

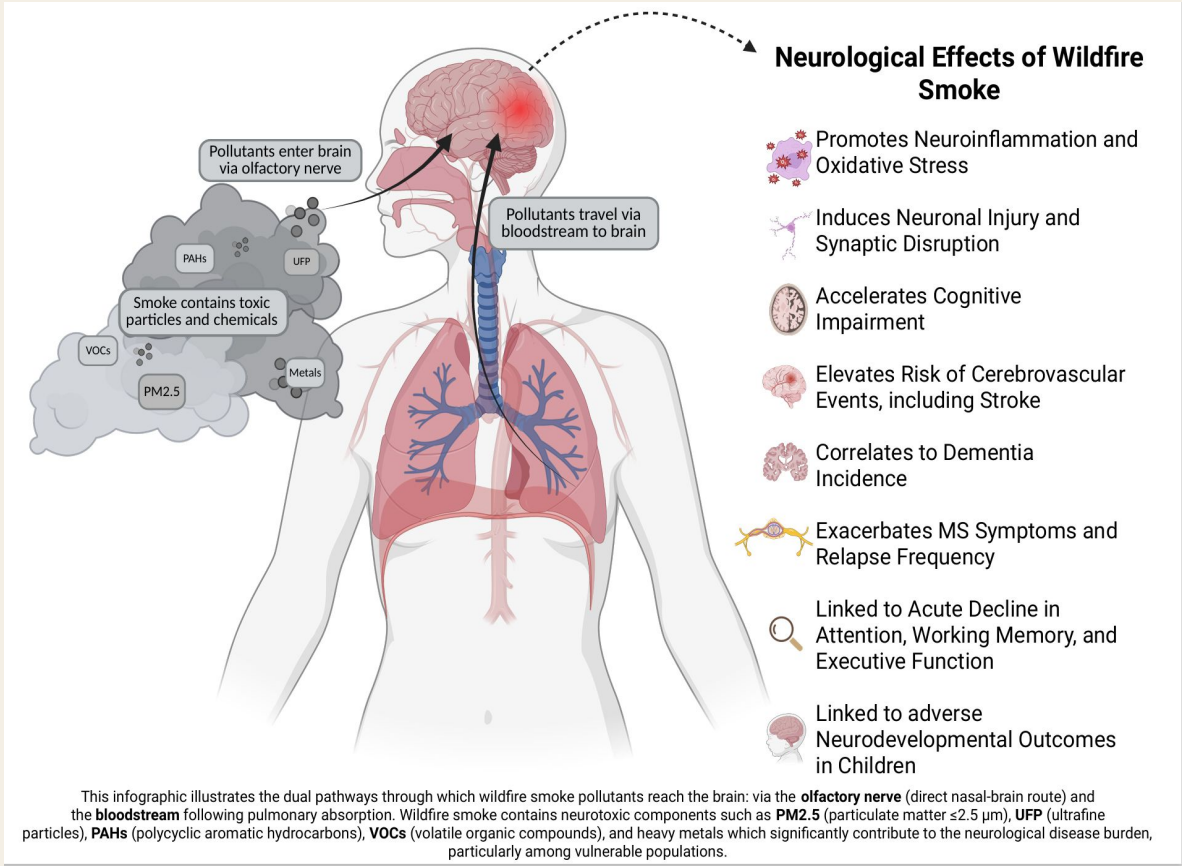
Mission and Vision

Mission: Fight climate-linked brain harm through research, awareness, and innovation - centering equity.

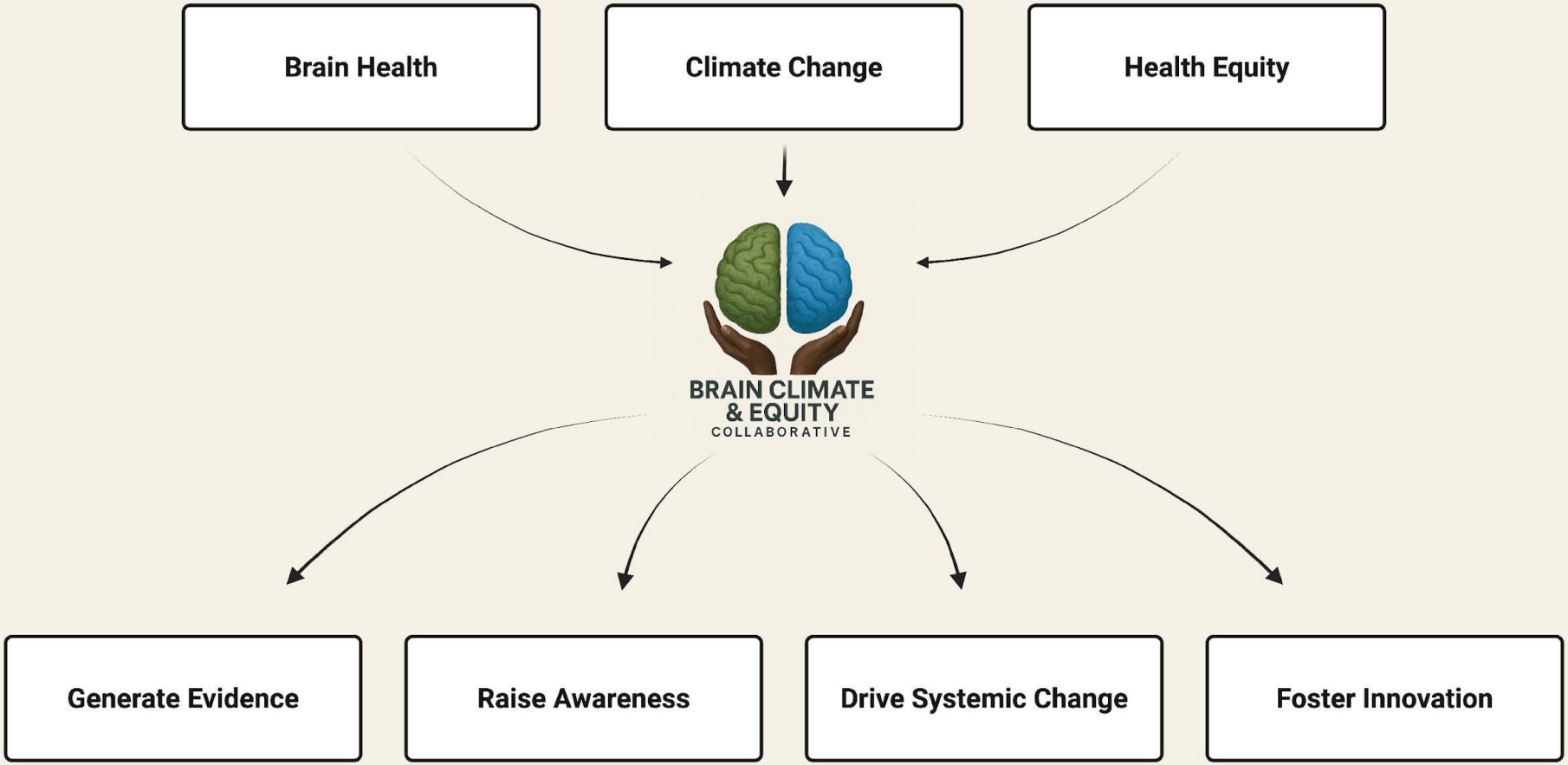
Vision: Climate-resilient brain health for all, embedded in policy and healthcare.

Why it Matters

1. **Brain Health is Climate Health**
2. **Equity Gap**
3. **Systems Blind Spot**



This infographic illustrates the dual pathways through which wildfire smoke pollutants reach the brain: via the **olfactory nerve** (direct nasal-brain route) and the **bloodstream** following pulmonary absorption. Wildfire smoke contains neurotoxic components such as **PM2.5** (particulate matter ≤2.5 μm), **UFP** (ultrafine particles), **PAHs** (polycyclic aromatic hydrocarbons), **VOCs** (volatile organic compounds), and heavy metals which significantly contribute to the neurological disease burden, particularly among vulnerable populations.


Brain Health
Climate Change
Health Equity
BRAIN CLIMATE
& EQUITY
COLLABORATIVE
Generate Evidence
Raise Awareness
Drive Systemic Change
Foster Innovation

Current Progress & Partnerships

Research

- Wildfire smoke can harm your brain, not just your lungs
- Analysis Piece on misalignment between Canadian & WHO air quality guidelines
- Scooping Review: Underway on climate impacts on brain health & equity (+ Mental Health)

Awareness

- 3 Articles in Progress
- Conferences in the Upcoming Year: International Physiatry, Toronto Climate Week, Canada Climate Week.
- Creating Infographics and Clinical Tools: In development for pilot use in neurology clinics.
- Knowledge Translation Workshops.

Systemic Change

- Launch Event: November 7th 2025 at UCalgary's Hunter Hub
- Partnerships: City of Hamilton, McMaster's PEACH Health Ontario, International NeuroClimate Working Group

Innovation

- Website + Social Media
- Health Hack Competition with Innovation 4 Health and Neuro Nexus

Our Core Team

Muse Laroyia
Co-Lead
Neuroscience
MSc Candidate

Dr. Bhavini Makwana (Gohel)
Co-Lead
Physician and Clinical Associate Professor

Dr. Ali Bateman
Director
Physiatrist and Assistant Professor

Dr. Philip Barber
Director
Neurologist and Professor of Neurology and Radiology

Daniela Oboh
Director
MSc Candidate

Dr. Sujane Kandasamy
Global Leader and Assistant Professor

Fiona Parascandalo, MA, MSc
Research Coordinator

Dr. Burcin Ikiz
Eco-Neuroscientist and Adjunct Professor

UNIVERSITY OF CALGARY

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

Western
UNIVERSITY · CANADA

McMaster University

Call to Action

Brainclimate.org

Interest Survey

Decarbonization in Action
Project Team
Canadian Coalition for Green Health Care

Vivian Shi

Deveney Bazinet

Introducing the Solutions Atlas: *An Online Catalogue of Sustainable Healthcare Options*

Decarbonization in Action

Implementation support and technical expertise

Amplification of implemented decarbonization solutions

Best practice sharing through the Knowledge & Implementation Network (KIN)

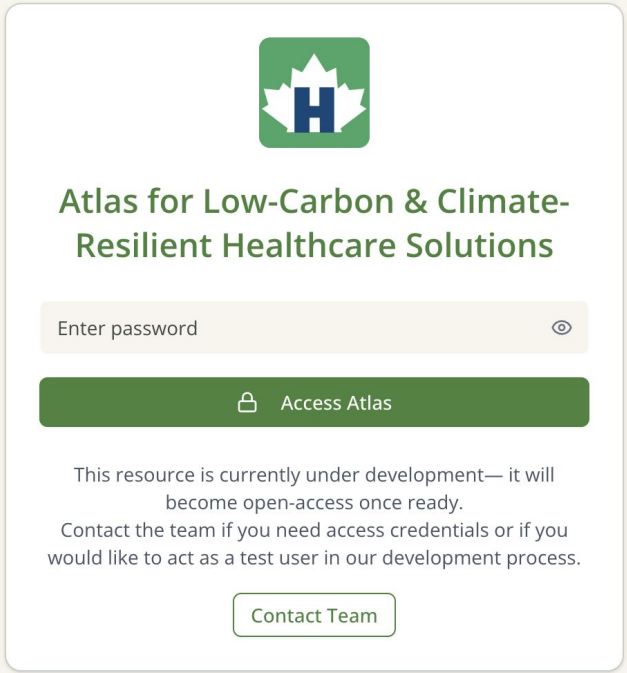
Systems-level change for scaling hospital decarbonization

Solutions Atlas, the online catalogue of healthcare solutions for climate impact

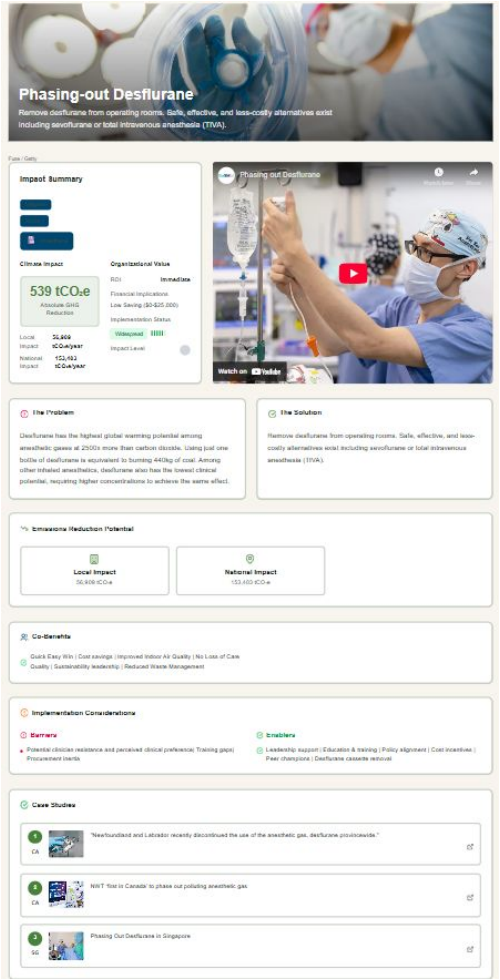
MaRS

Peter Gilgan Foundation

Image: Scott Webb, unsplash.com


Atlas for Low-Carbon & Climate-Resilient Healthcare Solutions
Enter password
Access Atlas
This resource is currently under development— it will become open-access once ready.
Contact the team if you need access credentials or if you would like to act as a test user in our development process.
Contact Team

Solution	Type	Specialty	Implementation Status	Impact Level	GHG Reduction
Instituting a leadership strategy for sustainability Administrative time spent creating or adapting a sustainability strategy.	Mitigation	Organizational	Widespread		8,475 tons CO_2 eq.
Decarbonizing investments Foundations adopt impact investing practices to measure, reduce, and report financed emissions.	Mitigation	Organizational	Proven		3,919 tons CO_2 eq.
A new low-carbon building New buildings operate with minimal GHG production.	Mitigation, Adaptation, Resilience	Building	Demonstration		3,119 tons CO_2 eq.
Replacing oil and gas boilers Upgrading to energy-efficient boilers can reduce GHG production.	Mitigation	Building	Proven		1,754 tons CO_2 eq.
Sustainable procurement contracts Hospitals work with procurement agencies that award contracts to companies. If sustainability is part of the scoring system, it motivat…	Mitigation	Procurement	Demonstration		848 tons CO_2 eq.
Operating Room (OR) ventilation setbacks Implement OR setback strategies.	Mitigation	Building, Surgery	Widespread		780 tons CO_2 eq.
Phasing-out Desflurane Remove desflurane from operating rooms. Safe, effective, and less-costly alternatives exist including sevoflurane or total intravenous…	Mitigation	Anaesthesia	Widespread		539 tons CO_2 eq.
Introducing plant-rich menus in hospitals Plant-rich diets provide healthy nutrients, fibre, and vitamins which reduces the risk of certain chronic diseases like cardiovascular…	Mitigation	Food and Nutrition	Pilot		286 tons CO_2 eq.
Adding an energy manager role A dedicated energy manager is hired to oversee and optimize all aspects of a hospital's energy use, providing a single-point of…	Mitigation	Building	Fully embedded		231 tons CO_2 eq.
Zero-emission EV chargers A facility with an EV charger may encourage more employees to drive EVs to work and make EV use more accessible. Impact and…	Mitigation	Transportation	Widespread		32 tons CO_2 eq.
Deprescribing medications The Canadian Medication Appropriateness and Deprescribing Network offers resources to both patients and providers. Patients c…	Mitigation	Family medicine	Proven		170 tons CO_2 eq.
Reusable gowns Reusable gowns can be sent to cleaning services to be washed and sterilized. Switching to reusable gowns saves both upstream suppl…	Mitigation	Procurement, Surgery	Proven		146 tons CO_2 eq.

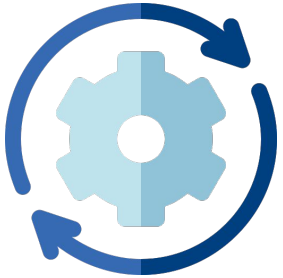


Get early access!
Scan QR code or go to
atlas.greenhealthcare.ca

Learn, share, connect, and kick start your climate initiative

Find and share ideas by specialty

Prioritize by impact, feasibility, scalability



Connect with experts and peers for practical insights

Let us know what you want to see in the Atlas

Join our mailing list to be invited for early-bird access and help shape the Atlas!

Interested in *Decarbonization in Action*? Get in touch with the Project Team!

will@greenhealthcare.ca

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vivian@greenhealthcare.ca

Interactive Session:
Advancing Sustainable Procurement: An Interactive "Hot Seat" Simulation on Sustainable Health Care Supply Chains

brought to you by:

Deloitte.

WORKSHOP FACILITATORS:

Harsha David
Senior Manager

Sophia Wei
Business Analyst, Supply Chain and Network Operations

Ryan Henderson
Consultant, Healthcare Solutions, Deloitte

TORONTO CLIMATE WEEK

Advancing Sustainable Procurement

An Interactive “Hot Seat” Simulation on Sustainable Healthcare Supply Chains

Toronto Climate Week 2025 – Sustainable by Design

Deloitte.

Workshop Objectives

Here's a breakdown of what we hope you will take away from this workshop.

1 Understand why sustainability matters in healthcare supply chains

2 Explore and evaluate criteria for vetting sustainability amongst vendors

3 Gain practical strategies to effectively engage suppliers and promote sustainable practices

Ground Rules

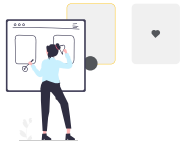
This workshop is meant to serve as an engaging way to discover common challenges and discuss what the future of sustainable healthcare can look like. Let's align on how we'll listen to, engage with, and build with one another.

No Titles

Everyone's voice matters – regardless of experience, title, or tenure

Active Listening

Give your full attention to whoever is speaking. Listen without interrupting, and seek to understand different perspectives, even if you disagree.



Focus on Solutions & Forward Momentum

Approach challenges with a solutions mindset. Avoid dwelling on barriers or defeatist attitudes—work together to move scenarios forward.

Participation is Encouraged but Voluntary

Everyone is encouraged to contribute, but no one is required to share or perform if they are uncomfortable. Respect each person's level of engagement.

Encourage Creativity & Openness

Share unconventional ideas and keep an open mind. Avoid criticism—ask questions to understand others, and offer only constructive, idea-focused feedback.

Facilitators

We have assembled a team of facilitators which bring the necessary knowledge, skills, experience together in support of a successful workshop.

Harsha David

Workshop Facilitator Lead

Harsha is a Senior Manager with over a decade of experience, specializing in sustainability and health equity in healthcare. She has extensive experience developing and scaling care programs, commissioning facilities, and aligning clinical and operational priorities with sustainability goals.

Harsha has advised healthcare leaders on Decarbonization and Resilience, designing for Health Equity, developed environmental strategies for clients, and supported federal institutions in driving systematic change toward sustainable healthcare. She holds Master's degrees in Medical Science [Medical Informatics] and Development Finance.

Sophia Wei

Workshop Facilitator

Sophia Wei is a Business Analyst with Deloitte's Supply Chain and Network Operations practice, where she specializes in data-driven supply chain transformations across diverse industries.

With extensive experience in data analytics and supply chain optimization, Sophia has helped organizations identify inefficiencies, reduce waste, and build more resilient operations.

Ryan Henderson

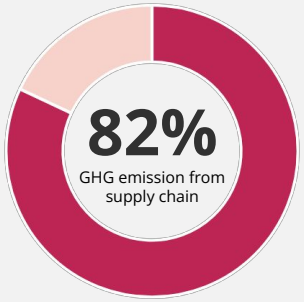
Workshop Facilitator

Ryan is an accomplished nursing leader with over a decade of experience in Emergency and Critical Care. He serves as a Consultant with Deloitte's Healthcare Solutions practice and as a Nursing Officer with the Canadian Armed Forces. Formerly a Board member of the College of Nurses of Ontario, Ryan is dedicated to advancing quality, patient safety, and clinical decision-making in healthcare.

Passionate about addressing healthcare supply chain and energy security as national security concerns, Ryan embraces interdisciplinary collaboration and mentorship. He holds a Master's in Health Informatics and Bachelor's degrees in both Nursing and Science [Biochemistry & Chemical Engineering]. In 2025, Ryan received the King Charles III Coronation Medal for his significant contributions to Canada.

Sustainable Procurement

The potential for procurement to drive impact in healthcare is significant ....



The healthcare sector in Canada as a whole is responsible for approximately 5% of the country's total GHG emissions[1]

Across the health care ecosystem, **Supply Chain related emissions are dominant** (~82%[2]).

WHAT DOES THAT MEAN AT THE COMPANY LEVEL?

Decarbonization requires **emissions reduction strategies** across upstream and downstream **supply chain** activities.

VALUE DRIVERS FOR SUSTAINABLE PROCUREMENT

Cost-saving

Sustainable procurement **optimizes resource use** and reduces long-term costs, enabling funds to be redirected to patient care.
For example, hospitals can save up to $30,000 per operating room annually through sustainable practices.

$30,000[3]
annual savings per operating room

Staff Engagement

Future generations of healthcare workers are passionate about environmental issues. Aligning organizational culture with sustainability fosters **a sense of purpose and belonging** among staff.

2.2%[4]
Higher return on equity for organizations with high workforce treatment score

Resilience & Preparedness

Sustainable supply chains strengthen organizational resilience, **ensuring continuity of care** during climate events and emergencies, ensuring minimal disturbance to operations, clinical activities and care delivery.

44%[5]
Canadian organizations focusing on sustainable supply chains

Improved Patient Outcome

Several sustainability initiatives, such as active transportation, reduction in greenhouse emissions, green spaces will all **directly improve physical and mental wellbeing of patients and staff**.
Quality improvement of health systems sustainability expands to patient experience, efficiency, equity and safety.

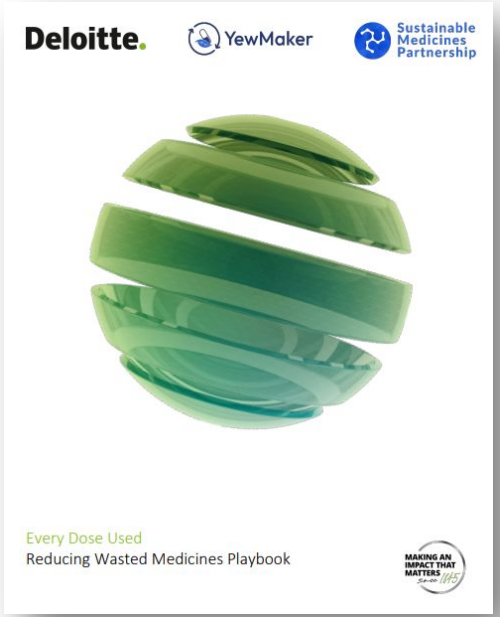
1) Canadian Medical Association Journal ; 2) Canadian Public Health Association; 3) Practice Green Health; 4) HR Trends 2024 Survey ; 5) CSO 2024 survey;

Zooming into the Medicine Supply Chain

Globally, it is estimated that major pharmaceutical companies destroy $11B USD worth of excess inventory each year. Within Canada, it is estimated that 3% to 7% of medications intended for patients go unused. There are many opportunities which might better insulate the medicine supply chain against waste and improve operating efficiency.

Medicine supply chain

- **A.** Balancing Incentives
- **B.** Regulatory Barriers
- **C.** Packaging Inefficiencies
- **D.** Lack of Data Integration
- **E.** Poor Demand Forecasting
- **F.** Distribution & Storage Rules
- **G.** Shelf Life Management
- **H.** Prescription Management
- **I.** Reallocation & Donation Barriers



Every Dose Counts!

Let’s review a poll result from earlier in the day…

Are you involved in any step in the supply chain process?

(e.g. evaluation products, engaging with suppliers, receive stock, managing stock levels, providing suppliers etc.):

41% YES / 59% NO

Vendor Vetting Velocity – The Scenario

One of the most challenging tasks in driving sustainable supply chain is evaluating alternative suppliers and their solutions

The Situation:

You help to run a Trauma Centre in central Ontario. The hospital is the only inpatient facility in a 36 km radius and it's interested in transitioning away from one surgical equipment vendor to one which is more aligned with its environmental sustainability targets and values. Of course, the successful bidder must also satisfy the facility's operational needs.

You are members of the hospital's product Evaluation Committee and after receiving several responses from a variety of potential vendors, you've narrowed the search down to three distinct options. Each company claims to be "green," but their approach and impact varies. Your task is to evaluate their pitches and recommend the best partner.

You are in the "Hot Seat" to create the most effective Vetting Framework

Vendor Vetting Velocity – The Contenders

One of the most challenging tasks in driving sustainable supply chain is evaluating alternative suppliers and their solutions

'BioBasics MedSupply'

Vendor Summary:
A small, local start-up that offers a limited range of products made from biodegradable materials. Their prices are higher, and their product line is not yet comprehensive.

Locally Sourced & Manufactured: All products are made within a 100 km radius of the hospital, minimizing transportation emissions and supporting the local economy.

Biodegradable Materials: Surgical tools and packaging are made from plant-based polymers that decompose in commercial composting facilities, reducing landfill waste.

Limited Product Range: Currently offers only the most commonly used surgical instruments, with plans to expand as they scale up production.

Premium Pricing: Due to small-batch production and sustainable sourcing, prices are 20–30% higher than traditional suppliers.

Community Reinvestment: A portion of profits is reinvested in local environmental initiatives, such as urban reforestation or clean water projects.

'Far & Wide Medical'

Vendor Summary:
A large, established company that has recently launched a new "green line" of products. They tout a recycling program for their plastic waste but still rely on long-distance, high-carbon-footprint shipping.

Extensive Product Portfolio: Offers a full range of surgical equipment, including specialty and custom items, ensuring operational continuity.

Green Line Recycling Program: Provides a take-back service for used plastic instruments and packaging, which are then recycled in centralized facilities.

High-Volume, International Shipping: Most products are manufactured overseas and shipped via air or sea, resulting in a significant carbon footprint despite green branding.

Third-Party Certifications: Holds ISO 14001 and other environmental certifications for their "green line," but these apply only to part of their product offering.

Bulk Purchasing Discounts: Offers cost savings for large-volume orders, making them attractive for budget-conscious hospitals.

Printcision Instruments

Vendor Summary:
A company focused on technological innovation. They propose using an on-site 3D printer for certain surgical tools, which would drastically reduce shipping but requires a significant initial investment and new staff training.

On-Site 3D Printing: Installs and supports a hospital-based 3D printer for producing select surgical tools on-demand, reducing inventory needs and shipping emissions.

Customizable Designs: Allows clinicians to request tailored instrument modifications, potentially improving clinical outcomes and workflow efficiency, and creating new research opportunities.

High Initial Investment: Requires a substantial upfront cost for equipment, installation, and specialized staff training.

Material Source Uncertainty: 3D printing filaments are sourced globally; sustainability depends on the choice of filament (biodegradable vs. conventional).

Rapid Prototyping & Surge Capacity: Enables quick response to unexpected demand spikes (e.g., pandemics, mass casualty events) by augmenting traditional inventory with produced tools, as needed.

You are in the "Hot Seat" to create the most effective Vetting Framework

Audience engagement: slido.com (#2384 258)

What are 3-4 sustainability-related criterion that can be used to evaluate these different options?

Audience engagement: slido.com (#2384 258)

Please rank the following evaluation criteria in order of importance (from most to least critical). Assume the supplier can reliably meet demand at an affordable price.

1. Emissions in production and transportation
2. Investment in local community
3. Customer confidentiality policy
4. Non-emission related metrics (e.g. water usage, disposal options)
5. Other

Audience engagement: slido.com (#2384 258)

What are some reliable data sources you could use to evaluate the criterion?

Step 4: The Twist - Vendor Vetting Velocity

Managing climate events is becoming a reality of operations and your suppliers need to partner with you

Context:
Three months after migrating to the new vendor, a forest fire sweeps through the area and causes catastrophic damage to the local power generating station. As a result, an electrical outage blankets your community, disrupting hospital operations and patient care across all service lines. Emergency response crews are overwhelmed and power may not be re-established for days.

To support continuity of care during times of crisis, and to build resilience into critical healthcare infrastructure:

- What sustainable supply chain strategies should the hospital and vendor have put in place before the power outage occurred?
- What is needed to make that happen?

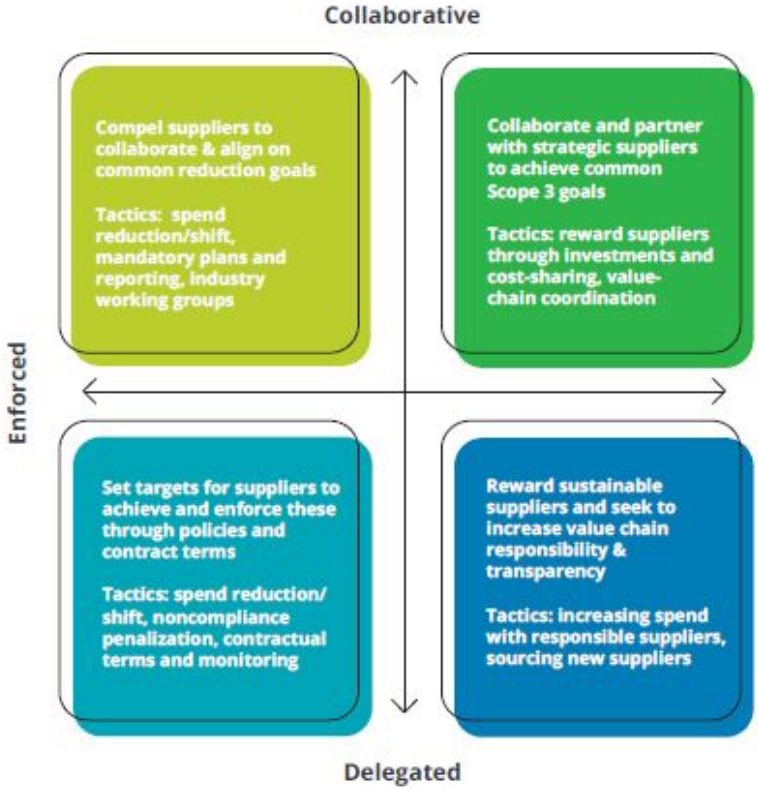
In the absence of such mitigation strategies, how might the hospital and vendor respond to this crisis in an environmentally-conscious way?

Audience Engagement: slido.com (#2384 258)

What additional criteria would you consider when assessing vendors to manage such a scenario?

Supplier Engagement Strategy Options

Considering your own unique set of circumstances such as market positioning, supplier leverage, and internal capabilities, you can determine the best approach to achieving your sustainability aspirations.



Collaborate and Incentivize

Appropriate for managing relationships with suppliers that are integral and strategic to the company's operations at the enterprise level.

Leveraging value creation levers in this model includes providing access to funding, engaging in joint business planning, and shifting demand/spend to these pivotal suppliers.

Delegate and Incentivize

Suited for suppliers who play a critical operational and financial role but may not be essential at the enterprise scale.

Key strategies include setting clear sustainability goals that meet certain emission-reduction targets or compliance with sustainability standards, which can foster additional value creation from the suppliers.

Collaborate and Enforce

Beneficial when dealing with suppliers who provide standard products and services and are driven by compliance.

Implementing group buying organizations to enhance affordability and compliance, providing an sustainability playbook for suppliers, and introducing penalties for non-compliance to agreed terms help enforce standards while maintaining collaboration.

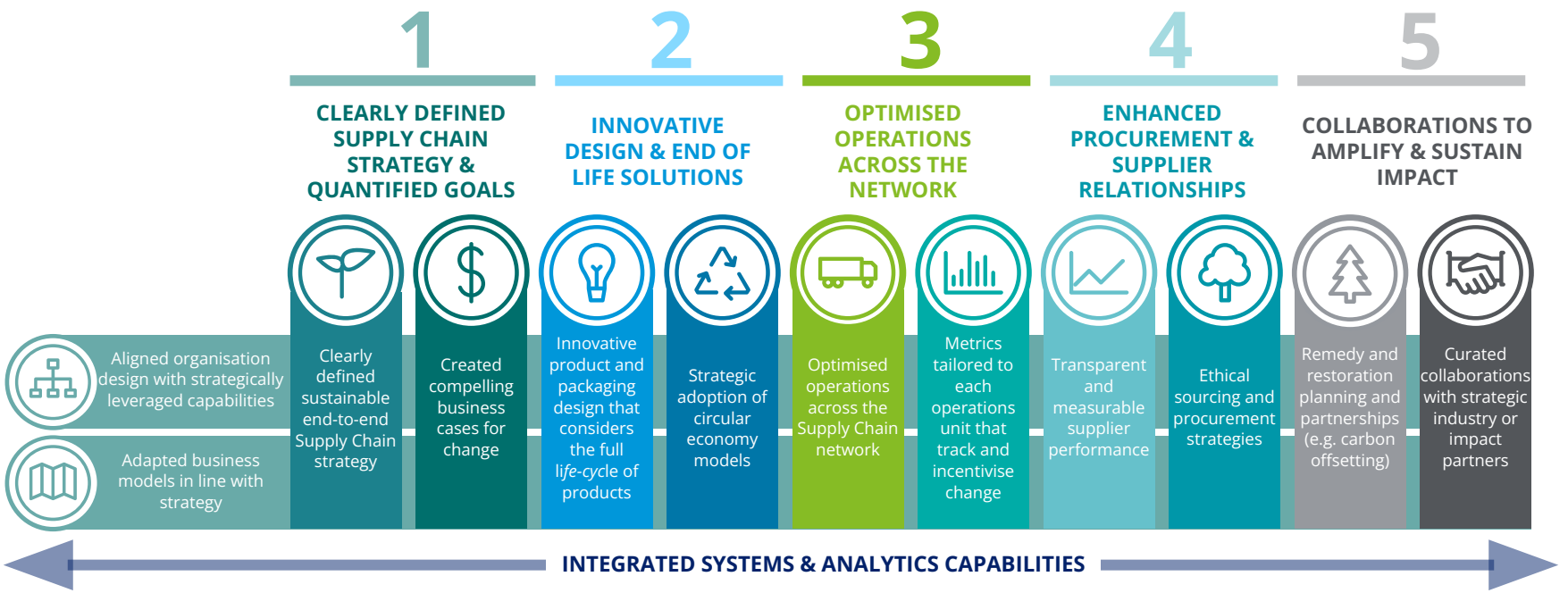
Delegate and Enforce

Best for noncritical, transactional suppliers that constitute a significant portion of the company's supply base.

Strategies may include implementing rigorous sustainability requirements that need to be met and enforcing reductions in code of conduct violations through penalty mechanisms.

Sustainable Supply Chain Journey

To effectively drive sustainable supply chains, it is important to invest in five key areas.



Resources to Enable Your Sustainable Journey

Several resources inspired today's discussion.

Evergreen sustainable supplier

Interactive online platform designed to facilitate supplier engagement with the NHS regarding sustainability efforts and help align their practices with the NHS's net zero and sustainability goals.

Design for Life roadmap

Deloitte UK's medical technology circularity strategic framework developed to guide the design and construction of healthcare facilities with a focus on sustainability and environmental considerations.

Reducing Wasted Medicines Playbook

Deloitte's playbook on waste medicines reductions. This playbook embodies Deloitte's action-orientated ethos and commitment to driving systemic change, through developing and disseminating practical solutions.

Article on the Health Equity Economic Impact

Deloitte Center for Health Solutions' Analysis showing the economic gain from closing health gaps and recommended actions.

Further readings and thought leadership

SUSTAINABLE SUPPLY CHAIN

Sustainable supply chains - The vital role of sourcing and procurement

This article offers a perspective on how the sourcing and procurement functions can take a more organized, purposeful approach to confront mounting sustainability challenges in their supply chains.

Power to the fleet

A framework to support decision making for charging infrastructure and commercial ecosystem for electric vehicles.

CLIMATE RESILIENCE & STRATEGY

Why climate resilience is key to building the health care organization of the future

This report outlines the core climate risks to the future of health and offers strategies can use to build more resilient health care systems.

Deloitte 2024 CxO Sustainability Report - Canada insights

Global findings based on surveying over 2,100 executives across 27 countries on their views and strategies related to sustainability and climate change.

Climate resilience & healthcare systems

This article explores the intersection of climate change, resilience, and sustainability in the context of healthcare systems.

HEALTH EQUITY

Closing Health Gaps through Collaborative Action 2024

This paper outlines a strategic framework for place-based models to close health gaps through collaborative, cross-sector action.

Future Scenarios and the Case for Equitable Climate Action

Scenario analysis for based on the prioritization of climate action and equitable outcomes for future society and implications for healthcare.

Advancing health equity through community-based ecosystems

Outlines the importance of community health and its potential to drive better health outcomes and reduce healthcare costs.

You Can Leverage Deloitte's Global Partnerships

Sustainability Accelerator Tool

The Sustainability Accelerator tool is a digital solution that assesses a hospital's performance across three domains—Environment, Wellbeing and Health Equity, and Leadership and Governance—and proposes plans to address development areas.

Geneva Sustainability Centre

International Hospital Federation

Sustainable Medicines Partnership

Convening 42 collaborators across the life science and health care supply chain, the Sustainable Medicines Partnership focuses on 4 strategic pillars:

1) Comprehensive, up-to-date info across the medicine's ecosystem
2) Metrics that incentivize change and monitor progress
3) Reduce wasted medicines
4) Share inspiring examples

YewMaker

Sustainable Medicines Partnership

Global Health Equity Network

The GHEN's mission is to close health gaps between and within countries. The network convenes over 50 cross-sector organizations to accelerate health equity action across three pillars:

- *Activate leadership*: Join over 100 organizations in signing the Zero Health Gaps Pledge
- *Incite action:* Convene coalitions in priority locations and topics
- *Share learnings:* Learn from partners on their innovations

WORLD ECONOMIC FORUM

Lightning Talks – Round Two

Dr. Anita Rao

Trillium Health Partners & Toronto Academic Health Sciences Network

Greening The Operating Room

GREENING THE OPERATING ROOM

Anita Rao, MD, FRCPC | anita.rao@thp.ca

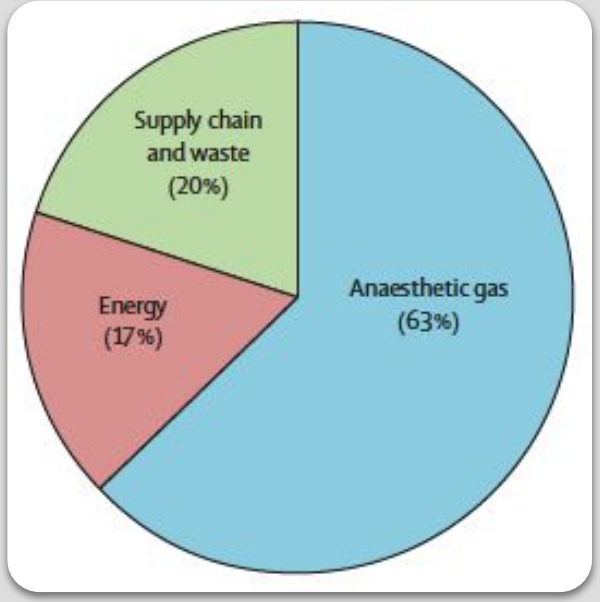
OR: MOST RESOURCE INTENSIVE

20 - 33% of hospital waste is generated in the OR (1).

Perioperative services is a disproportionate polluter in the healthcare sector and is a key target for reductions.

Waste and Emissions from healthcare are steadily increasing in last several years.

Anesthetic Gases contribute 5% of ALL hospital CO_2 emissions (2).



1. Sustainable Development Unit. Carbon footprint from anaesthetic gas use, 2013. Accessed 24 October 2021. www.sduhealth.org.uk/documents/publications/Anaesthetic_gases_research_v1.pdf.

2. McNeil, A., Lillywhite R., Brown, C. The impact of surgery on global climate: a carbon footprinting study of operating theatres in three health systems. Lancet Planet Health 2017;1: e381–88

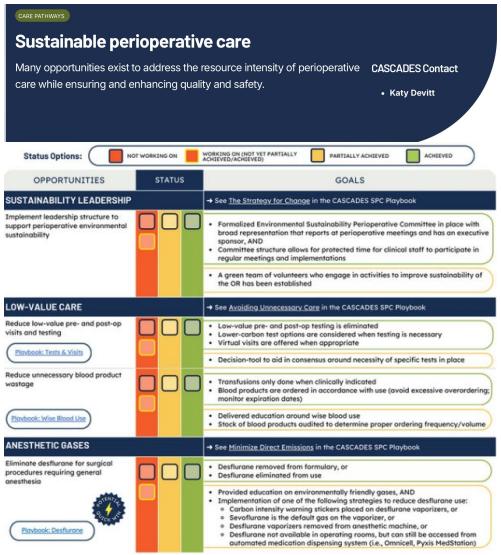
RESOURCES

Ontario's Anesthesiologists
A SECTION OF THE ONTARIO MEDICAL ASSOCIATION

- Focus on leadership, sharing knowledge and advocacy.
- Anesthesiologists, Anesthesia Assistants, Engineers and FPA.
- Specific deliverables:
  a) Eliminate Desflurane and encourage nitrous mitigation
  b) Sustainable Procurement
  c) Political Advocacy

https://ontariosanesthesiologists.ca/environmental-sustainability-working-group

CASCADES



https://cascadescanada.ca/action-areas/perioperative-care/

TRIPLE BOTTOM LINE

Intervention	CO_2/Waste Reduction	Financial Savings/year
Anesthetic Gases	743 tonnes	$ 125,000
Intersurgical Circuits	21 tonnes of CO_2	$ 37,000
BYORB	466 tonnes CO_2	$ 19,000
PVC 123 Vinyl Recycling	2.6 tonnes waste	Minimal
Stryker Sustainability	1.2 tonnes waste	$ 145,000
Reusable Surgical Gowns	15 tonnes (projected)	Partially achieved: cost neutral
HVAC Setback	53 tonnes CO_2	$ 54,000
Nitrous	1,250 tonnes	$ 90,000

Peter Gilgan Mississauga Hospital will not have Centralized Nitrous.

Trillium Health Partners | INSTITUTE FOR BETTER HEALTH

Tipu Islam
Canadian Coalition for Green Health Care

Circular Clinical Care: Single-Use Plastics Reduction

CIRCULAR CLINICAL CARE:
SINGLE-USE PLASTICS REDUCTION

This project was undertaken with the financial support of:
Ce projet a été réalisé avec l'appui financier de :

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Project Manager: Sandra Alexander, MSc.

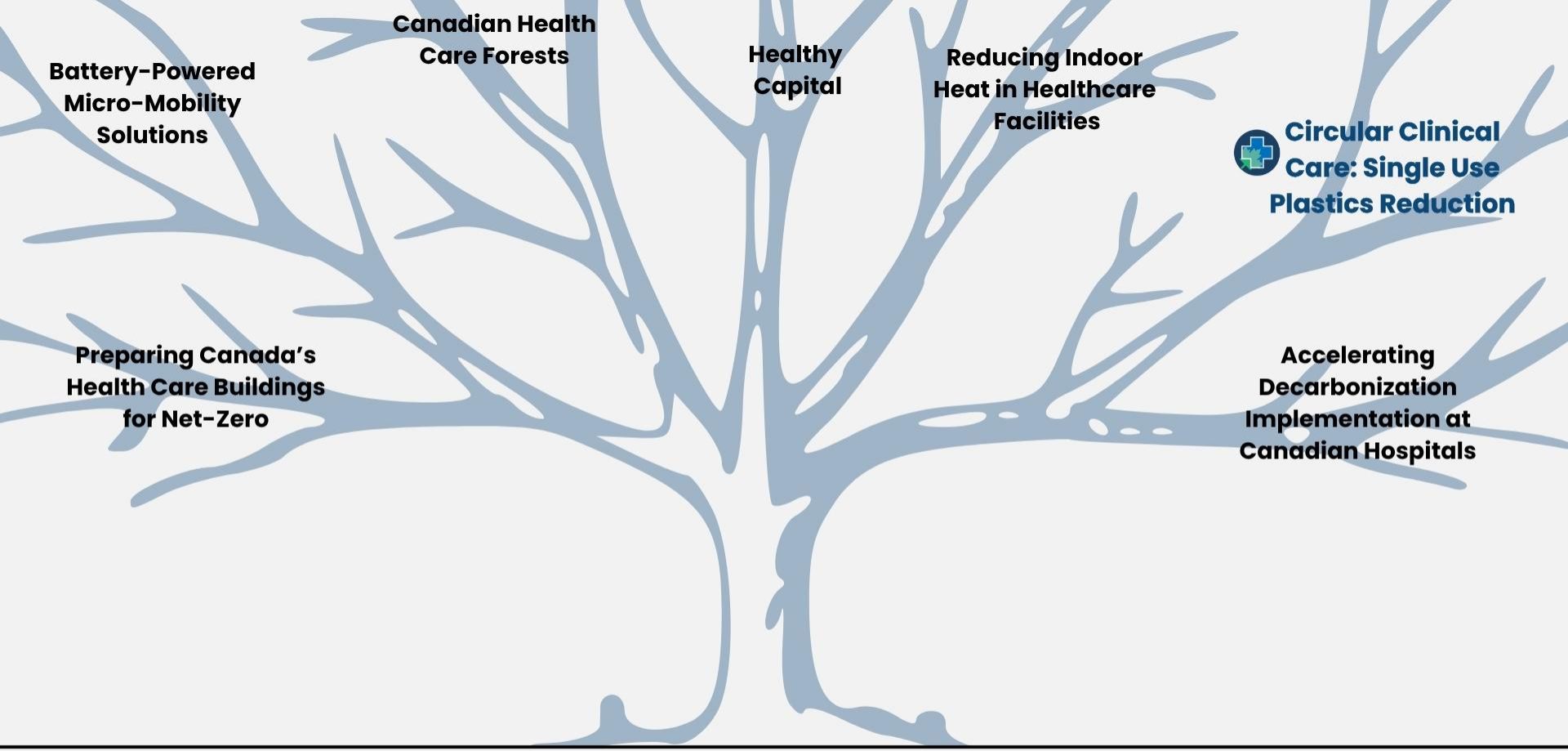
Project Advisor: Linda Varangu, MEng.

Research Associate: Tipu Sultan Islam, MSc.

THE COALITION

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

- National charity
- Canadian network dedicated to advancing environmental sustainability in the health sector
- Vision: sustainable, resilient, and equitable health system for all
- Mobilize change-makers, build capacity, and deliver practical tools and strategies that drive meaningful action



Non-comprehensive. The order in which branches appear has no significance.

OVERVIEW

- National 3-year project funded by Environment and Climate Change Canada (ECCC)

- Interdisciplinary team committed to sustainably reducing single-use plastic waste in health care
  - Perioperative Care, Textiles, Packaging, and Food-Related Services

- Partners
  - Pilot Partner: Hamilton Health Sciences (HHS)
  - McMaster University Postgraduate Medical Education
  - PEACH Health Ontario

- Three-year initiative
  - **Year One:** Pilot at Hamilton Health Sciences
  - **Year Two:** Transition to National Campaign
  - **Year Three:** National Campaign

"Every $1 invested in public health interventions brings a median return of over $14 saved in costs to health and economic sectors."

Canadian Public Health Association, 2022

Plastic

Plastics:

Perioperative Care

Textiles

Packaging

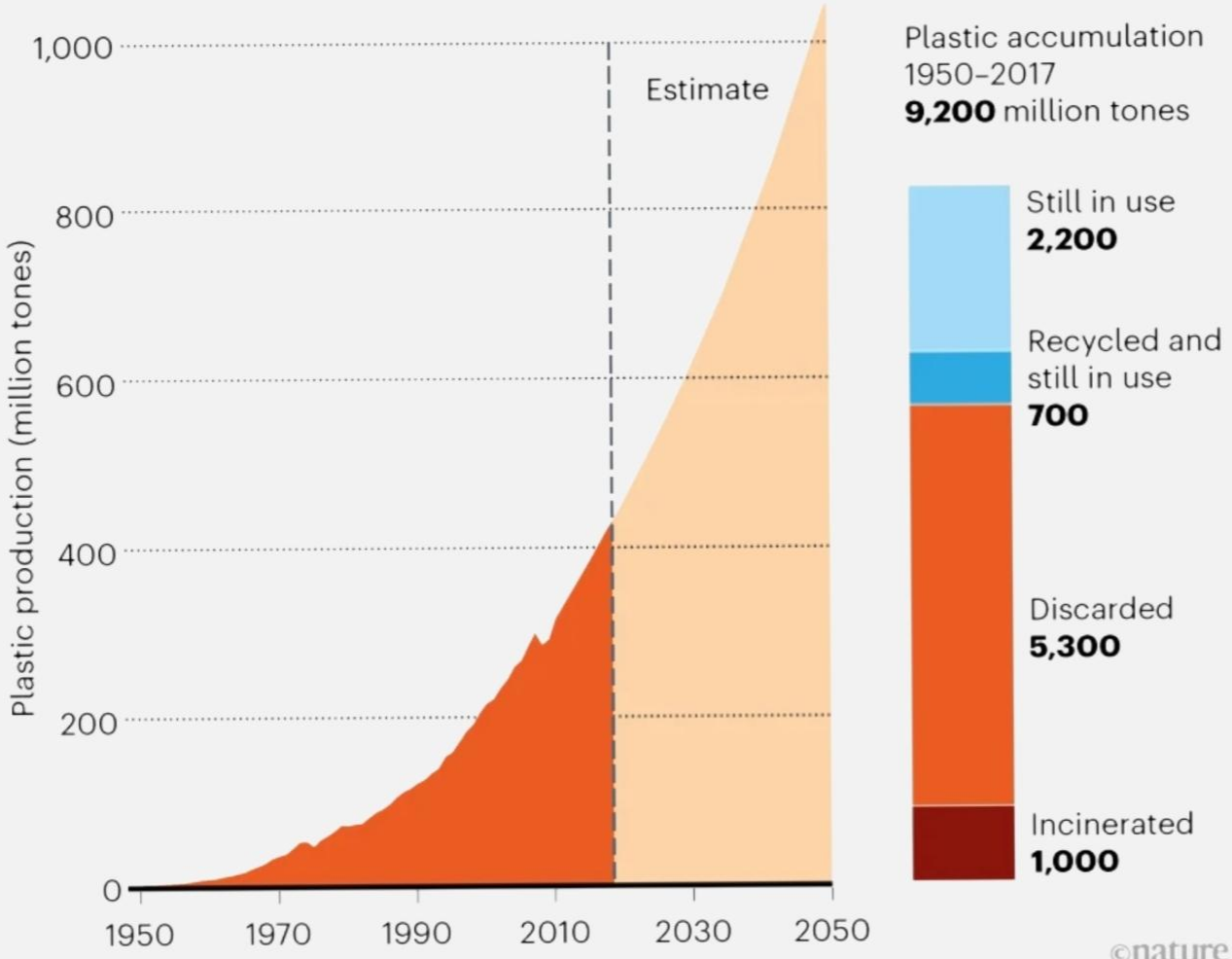
Nutrition and Cafeteria Services

Defining Plastic

Plastic: Synthetic material made of polymers that could be molded and set into a solid shape

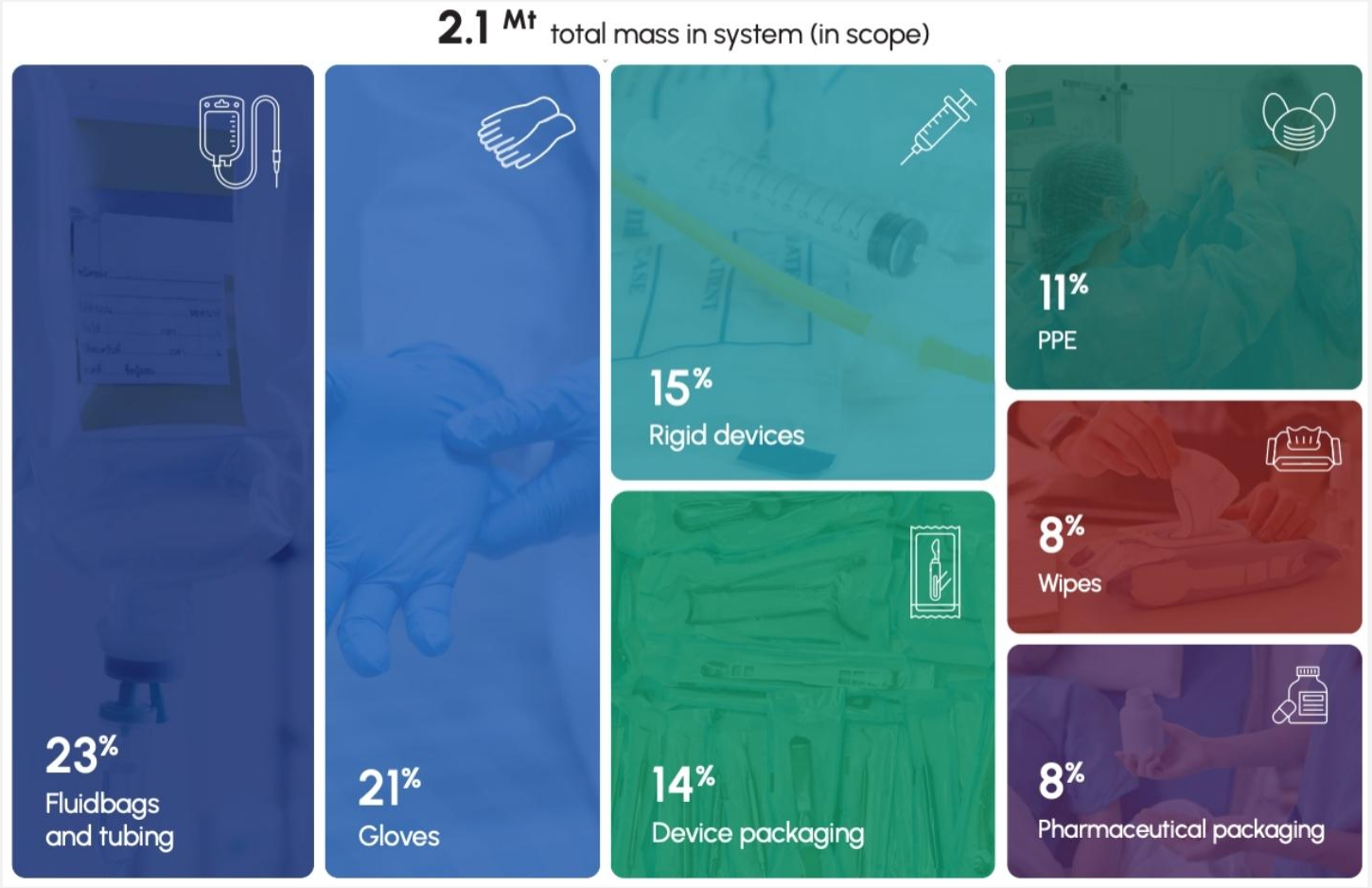
Common plastics in healthcare:

- Packaging (**Polyethylene**)
- Disposable syringes (**Polypropylene**)
- IV bags (**Polyvinyl chloride**)
- Pharmacy (**Polystyrene**)
- Masks (**Acrylonitrile Butadiene Styrene**)
- Blood Oxygenators (**Polycarbonate**)



Source: Nature. 2022. Plastics tsunami: Can a landmark treaty stop waste from choking the oceans?

Adapted directly from Systemiq and Eunomia. (2025). A Prescription for Change: Rethinking plastics use in healthcare to reduce waste, greenhouse gas emissions and costs



Adapted directly from Systemiq and Eunomia. (2025). A Prescription for Change: Rethinking plastics use in healthcare to reduce waste, greenhouse gas emissions and costs

FIGURE 1.2

Total emissions of the healthcare single-use plastic system in 2023

Europe and North America, %

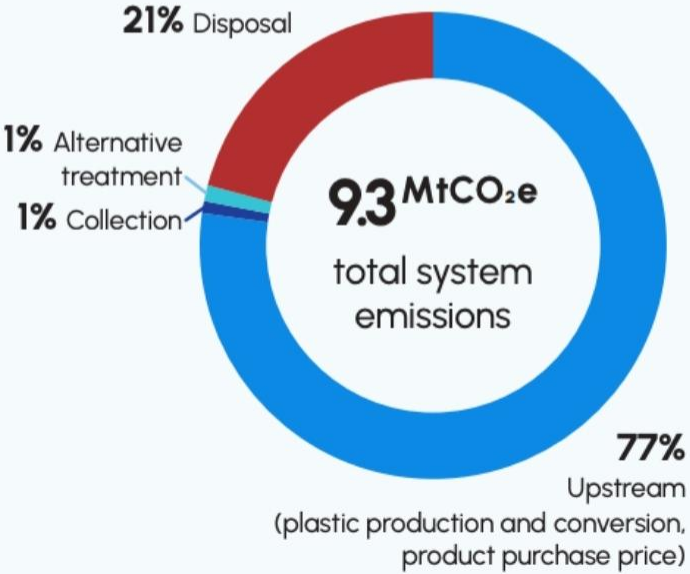
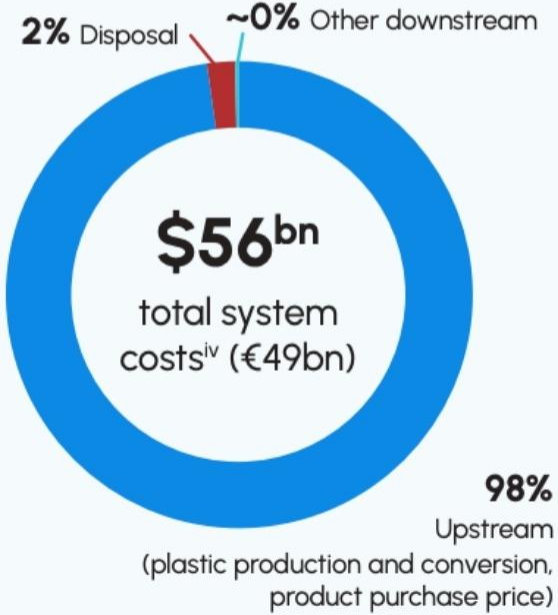


FIGURE 1.3

Split costs by lifcycle process step of the healthcare single-use plastic system in 2023

Europe and North America, %



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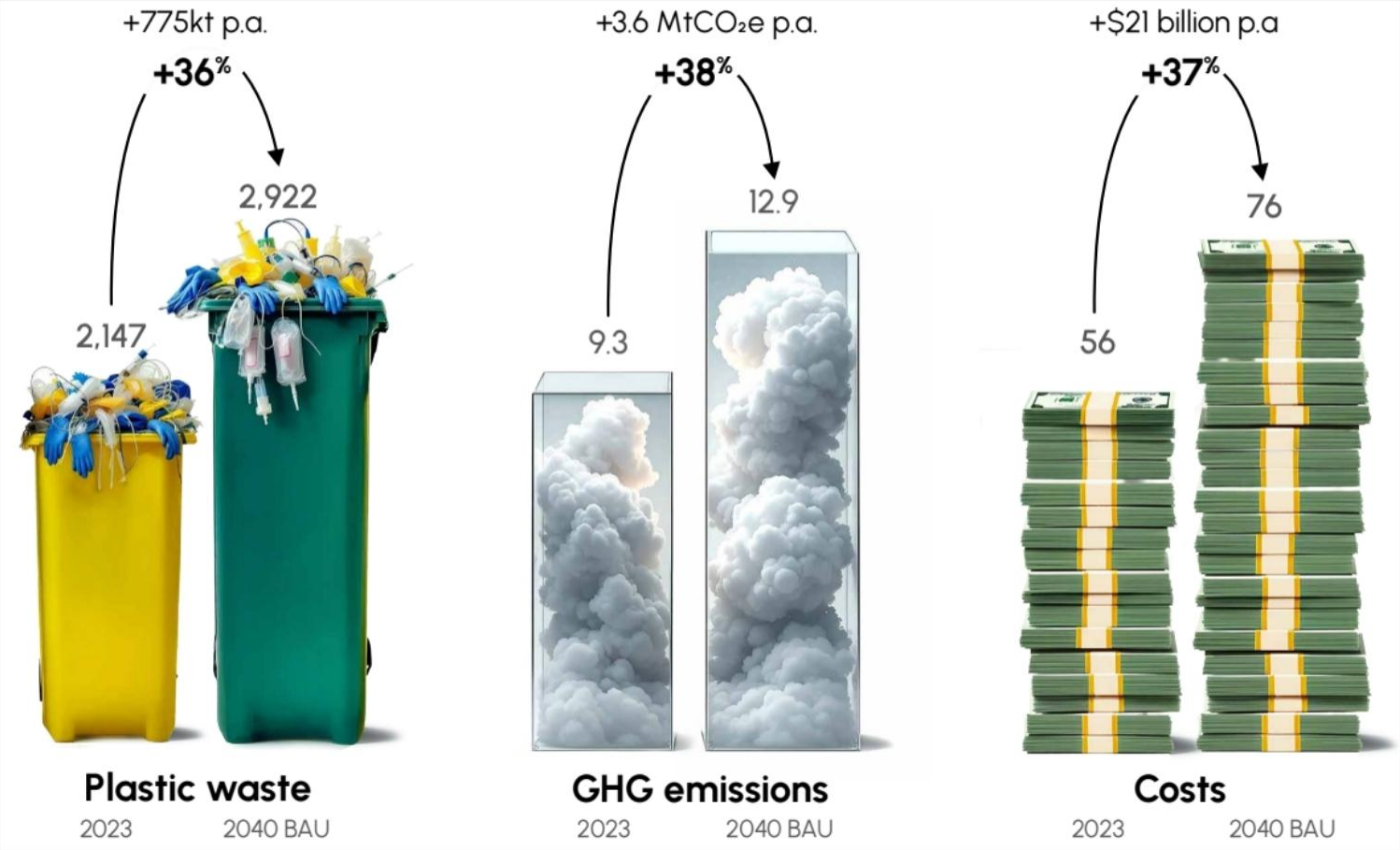
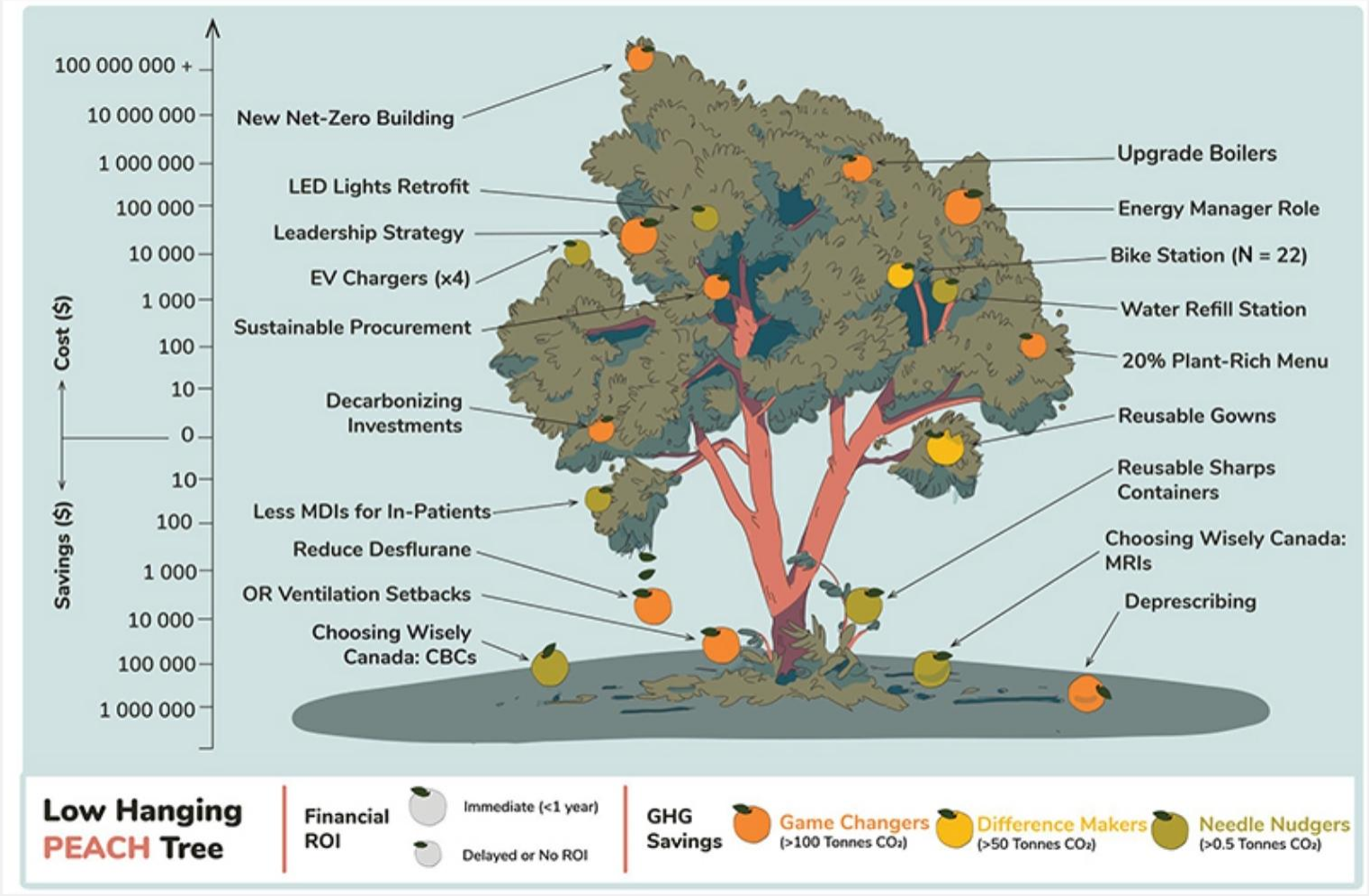


Adapted directly from Sergeant et al. (2022). 10.12927/hcq.2022.26946



Saplings

This project was undertaken with the financial support of:
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Environment and Climate Change Canada | Environnement et Changement climatique Canada

CASE STUDIES & BUSINESS CASES

DIRECT IV PUSH

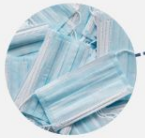
ONTARIO

Reducing waste by providing medications through direct IV administration. Inspired by Alberta Health Services

REUSABLE MASKS

QUÉBEC

Reusable surgical masks in hospitals within Quebec. Collaborating with Synergie Santé Environnement and manufacturers like Frëtt



ENDOSCOPY TAP WATER

ONTARIO

Switching from bottled water to tap water. Collaborating with Hamilton Health Sciences & McMaster University Postgraduate Medical Education

URINARY INCONTINENCE

ONTARIO

Promoting multidisciplinary urinary incontinence treatment within hospitals. Inspired by National Health Services

BYOB DAY SURGERY

ONTARIO

Encouraging patients to bring their own reusable bag for day surgery. Building on the existing program at HHS. Inspired by North York General Hospital

GLASS BOTTLES

MULTI-PROVINCE

Switching from plastic bottles to glass bottles in outpatient pharmacies

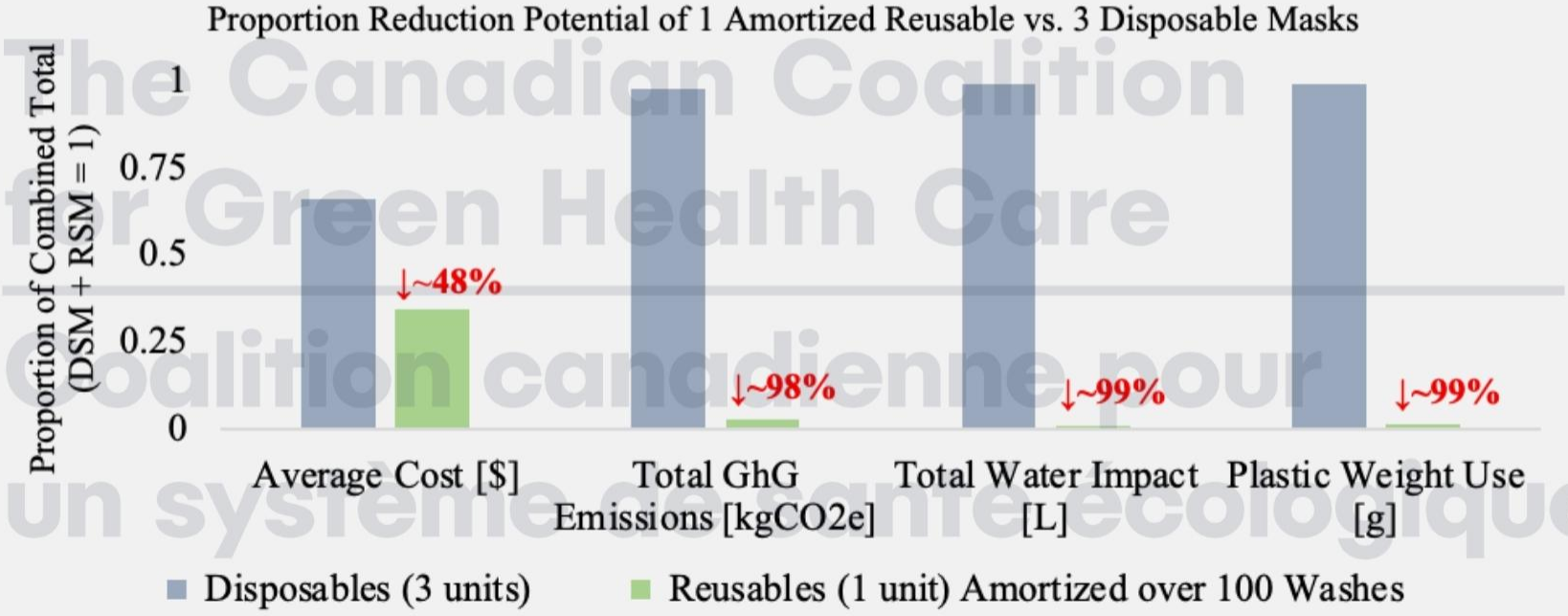
Direct-IV Push

DIRECT-IV PUSH:

- Led by Alberta Health Services
- **Key results:**
  - $23,266.56 annual savings
  - 1,271.95 kgCO2e per year
  - 25% annual reduction in mini bag orders
  - Qualitative improvement in patient experience

Surgical Masks

Surgical Masks:



Values are based on current data available to the team

Tap Water in Endoscopy*

*Colonoscopy, Colonoscopy and Gastroscopy, Fecal Immunochemical Test (FIT) Positive Colonoscopy / Colonoscopy and Gastroscopy, Gastroscopy, and Sigmoidoscopy

A BRIEF HISTORY

Canadian Leaders

Dr. Jen Telford, Dr. Karimuddin and Green Team at St. Paul's Hospital Vancouver
Dr. Husein Moloo and Green Team at the Ottawa Hospital
Dr. Margheriat Cadeddu and Green Team at St. Joseph's Hamilton

1. **Before 1980s**
   Tap water was the standard

2. **1985: switching to sterile water**
   Study in 1985 on bacteremia during esophageal variceal sclerotherapy cited as the *turning point* [1]

3. **Supply chain disruptions**
   Tap water is often used when there are supply chain disruptions

4. **2018: tap water may be safe**
   American society of gastrointestinal endoscopy guideline--'tap water for irrigation may be safe'

5. **2024: Canadian Journal of Surgery initiating change**
   The Green Thumb of Endoscopy: Switching from Sterile Water to Tap Water—sustainability-focused innovation in general surgery [3]

6. **July 2025: recent evidence of safety**
   Testing the precautionary principle: a scoping review comparing potable tap and sterile water for irrigation in colonoscopy [4]

7. **Vancouver General and The Ottawa Hospital**
   Canadian hospitals leading the change back to tap water for non-sterile endoscopy procedures

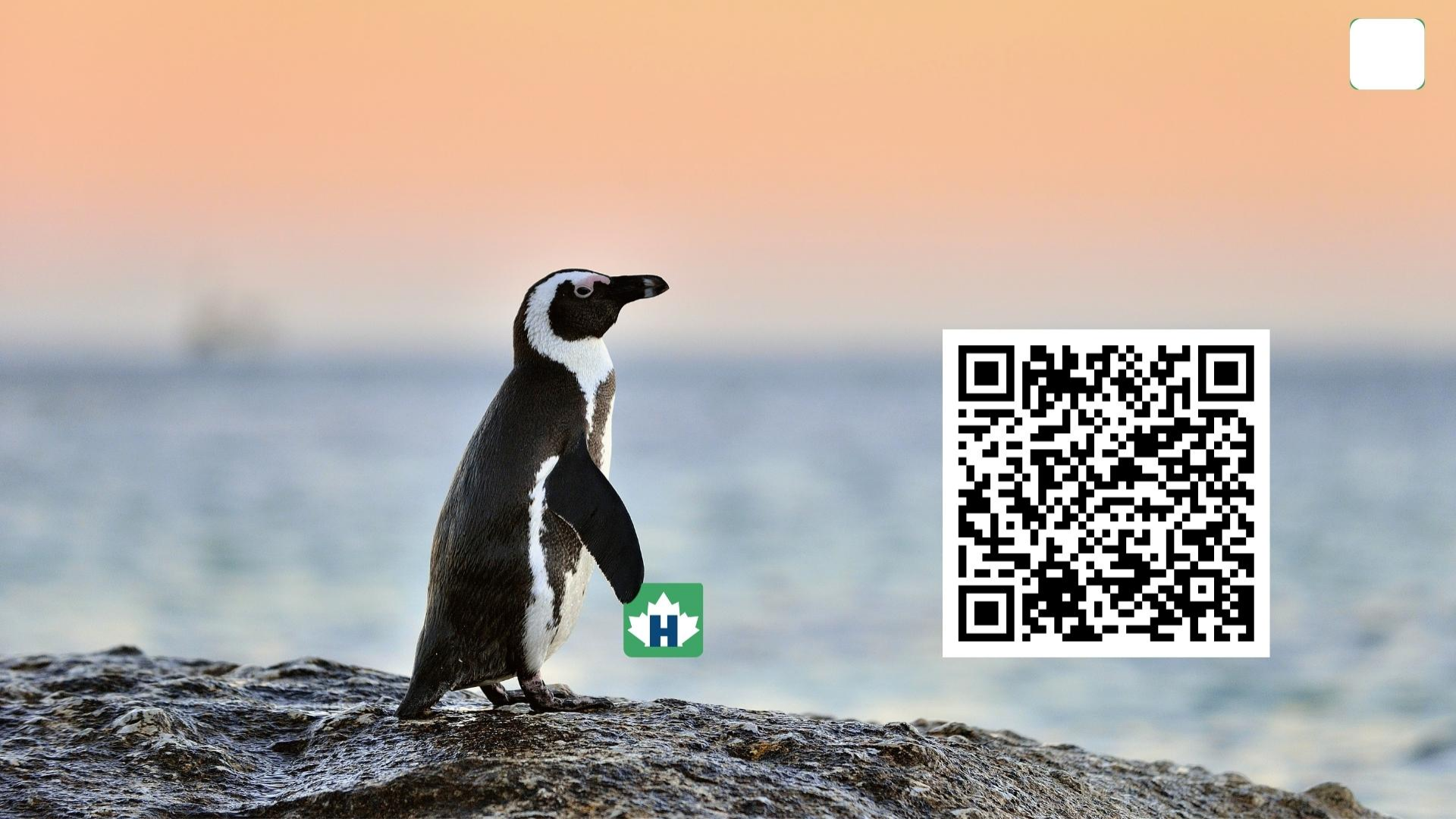
8. **St. Joe's Hamilton and HHS joining the initiative**
   St. Joseph's Healthcare Hamilton and Hamilton Health Sciences join the initiative through McMaster's PGME

1. Brayko, C.M., Kozarek, R.A., Sanowski, R.A., & Testa, A.W. (1985). "Bacteremia during esophageal variceal sclerotherapy: its cause and prevention".
2. ASGE Quality Assurance in Endoscopy Committee; Calderwood AH, Day LW, Muthusamy VR, Collins J, Hambrick RD 3rd, Brock AS, Guda NM, Buscaglia JM, Petersen BT, Buttar NS, Khanna LG, Kushnir VM, Repaka A, Villa NA, Eisen GM. ASGE guideline for infection control during GI endoscopy. Gastrointest Endosc. 2018 May;87(5):1167-1179. doi: 10.1016/j.gie.2017.12.009. Epub 2018 Mar 21. PMID: 29573782.
3. Dr. Christine Li, et al Canadian Journal of Surgery (Supplement to Volume 67, Issue 6)
4.Canadian Journal of Surgery 68(4):E281-E288 Hilalion (San) Ahn Alexie et al

Tap Water in Endoscopy*

Annual Impact Projection	Total Projection - Rounded
Bottle Reduction [bottles]	4,000
Plastic Reduction [kg]	700
Environmental Impact [kgCO2e]	1,000
Average Cost Savings	$ 9,000

*in-scope procedures only



Thank you.

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

This project was undertaken with the financial support of:
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Environment and Climate Change Canada
Environnement et Changement climatique Canada

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sandra@greenhealthcare.ca

greenhealthcare.ca/plastics

Dr. Mili Roy

University of Toronto &
Canadian Association of
Physicians for the
Environment

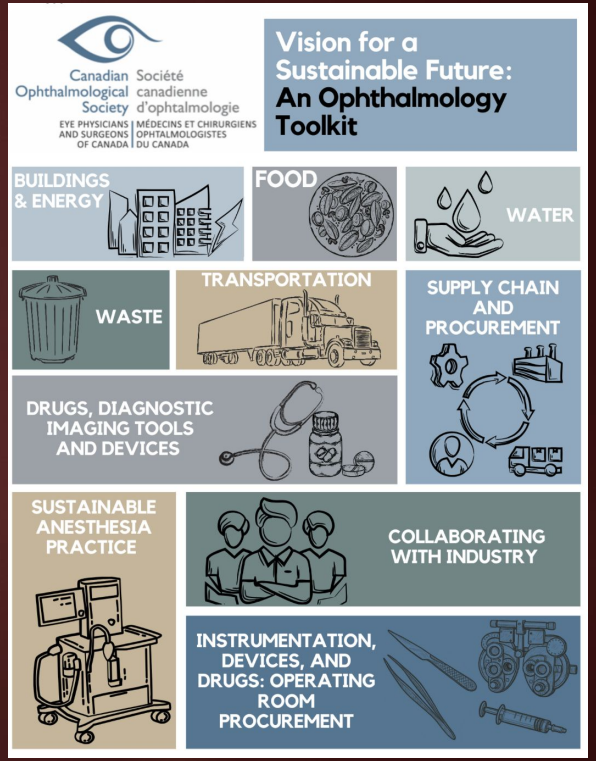
Vision for a Sustainable Future: An Ophthalmology Toolkit

Vision for a Sustainable Future: An Ophthalmology Toolkit

Dr Mili Roy
Faculty of Medicine, Univ. of Toronto
Ontario Regional Co-Chair, Canadian Assn of Physicians for the Environment
Co-chair, Ontario Climate Emergency Campaign

Prepared for:
Sustainable by Design
CCGHC

October 3, 2025



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

Outline

Canadian Ophthalmological Society | Société canadienne d'ophtalmologie
EYE PHYSICIANS AND SURGEONS OF CANADA | MÉDECINS ET CHIRURGIENS OPHTALMOLOGISTES DU CANADA

Vision for a Sustainable Future: An Ophthalmology Toolkit

- **Introduction**
- **Toolkit Recommendations Summary**
- **Toolkit Application & Amplification Goals**
- **Conclusions**

No Disclosures

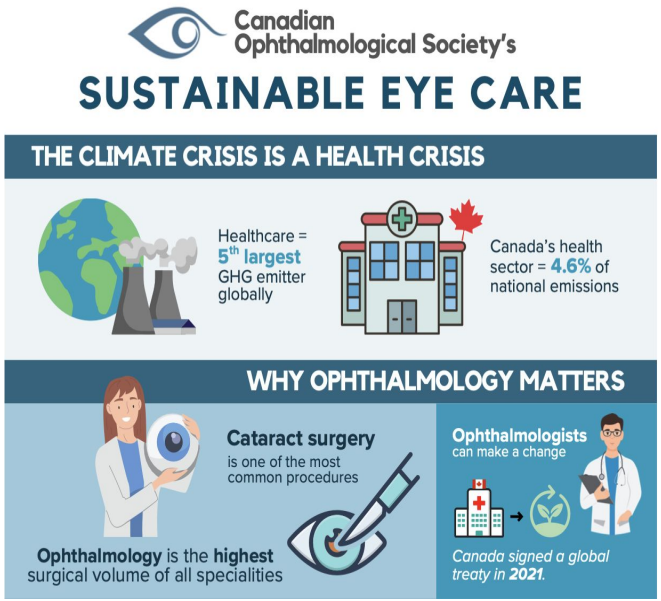
Introduction

Ophthalmology: **highest surgical & procedural volumes** in medicine

Cataract surgery: most common surgical procedure globally

OR's: 70% of healthcare emissions

Why ophthalmology? The rationale for sustainable eye care



The exact contribution of eye care generated emissions within the larger envelope of total health care emissions in Canada is not fully understood

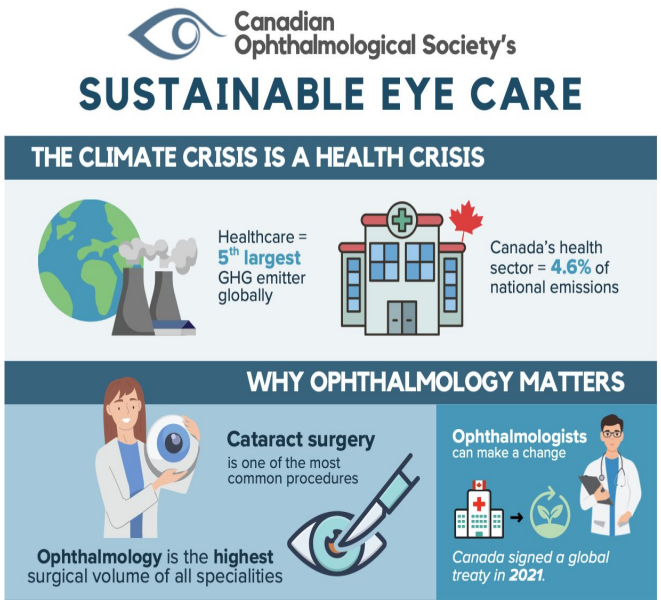
Introduction

Ophthalmology **emissions: >50% from surgical materials**

Strong business case for sustainability

Ophthalmologists: unique role & opportunity in decarbonization of healthcare

Why ophthalmology? The rationale for sustainable eye care



The exact contribution of eye care generated emissions within the larger envelope of total health care emissions in Canada is not fully understood

The Response:
Sustainability in Ophthalmology Toolkit

Canadian Ophthalmological Society
Société canadienne d'ophtalmologie
EYE PHYSICIANS AND SURGEONS OF CANADA | MÉDECINS ET CHIRURGIENS OPHTALMOLOGISTES DU CANADA

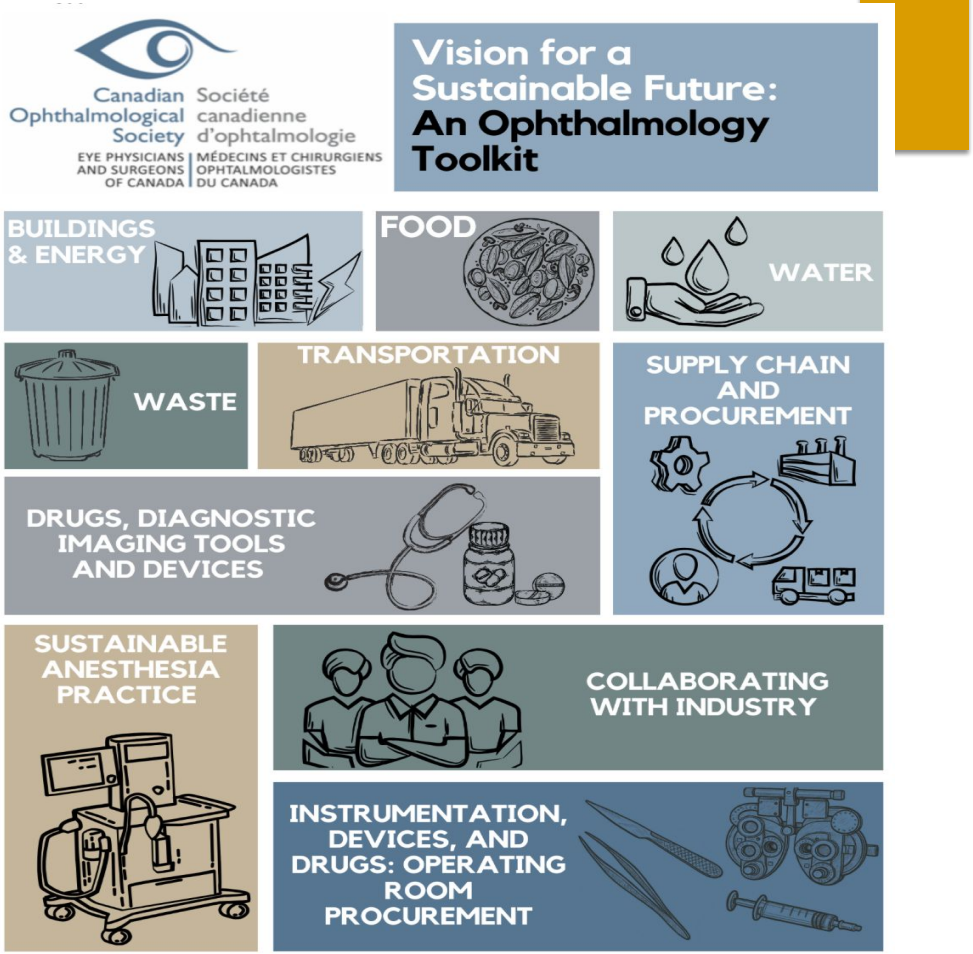
First by a surgical specialty in Canada

Ophthalmology Toolkit Modules

Modules reflect emissions sources in eye care delivery

Each module includes:

- ***Key Learning Points***
- ***QI based action items***
- ***Resource links***
- ***Real-world examples***
- ***Living Document***



Acknowledgement: Dr Sujane Kandasamy & PEACH/CCGHC team

Ophthalmology Toolkit Modules

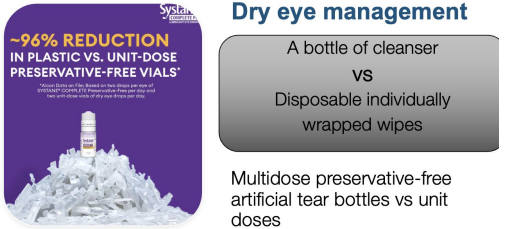
Key Points from Modules

Acknowledgement: Dr Sujane Kandasamy & PEACH/CCGHC team

Waste in Ophthalmology is massive!

Waste in Ophthalmology

- Target:
  - Surgical packs
  - Procedural packs
  - Disposable instruments
  - Eyedrops
  - Packaging



Transportation in Ophthalmology

- Tele-ophthalmology & remote consultations
- Consolidating appointments
  - eg same day testing, laser, surgery
- Rural patient outreach
  - eg partner with optometrists

Re-think transportation of both patients & staff

Supply Chain & Procurement in Ophthalmology

Apply all procurement principles to surgical procurement for huge impact

Drugs, Diagnostics & Devices: Ophthalmology

Ophthalmic Instrument Cleaning & Sterilization (OICS) Task Force made 3 specific Recommendations for multidose topical drugs:

- May use for multiple patients
- May use until labeled expiry date
  - rather than 28 days
- Patients may bring partially used medications home postoperatively

Sustainability in the ophthalmology OR

We need to do better…

US/UK cataract surgery:

CO_2 emissions
equivalent to driving:
500-800 km per case

Aravind cataract surgery:

CO_2 emissions
equivalent to driving:

A Global Gold Standard in Ophthalmic OR Sustainability: Aravind Eye Care System.

US/UK cataract surgery:

CO_2 emissions
equivalent to driving:

500-800 km per case

Aravind cataract surgery:

CO_2 emissions
equivalent to driving:

~ 23 km per case

A Global Gold Standard in Ophthalmic OR Sustainability: Aravind Eye Care System.

US/UK cataract surgery:

CO_2 emissions
equivalent to driving:
500-800 km per case

Aravind cataract surgery:

CO_2 emissions
equivalent to driving:
~ 23 km per case

20X higher emissions & waste!

A Global Gold Standard in Ophthalmic OR Sustainability: Aravind Eye Care System.

How can we do better?

Sustainability in the OR: Submodules

- Barriers to Sustainable Practice
- Patient Prep & Flow
- Energy, Water & Waste Management
- Sustainable Anesthesia
- Instrumentation & Procurement
- Collaboration with Industry
- Staff Training & Education

Sustainability in the OR

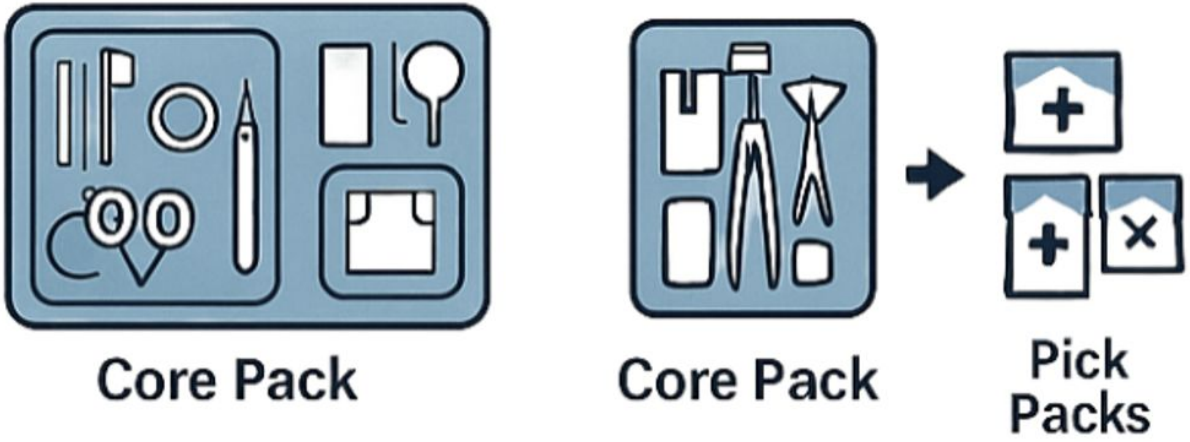
- Patients: eliminate whole body drapes to adopt face drapes
- Surgeons: Health Canada approved reusable PPE eg. gowns & masks
- Switch H20-based to alcohol based hand scrubs
- Multi-dose antiseptics & topical drugs

Sustainability in the OR

- Reusable instruments
- OICS Task Force: short-cycle unwrapped instrument sterilization
- Bilateral same day cataract surgery

Sustainability in the OR:
Streamline surgical packs

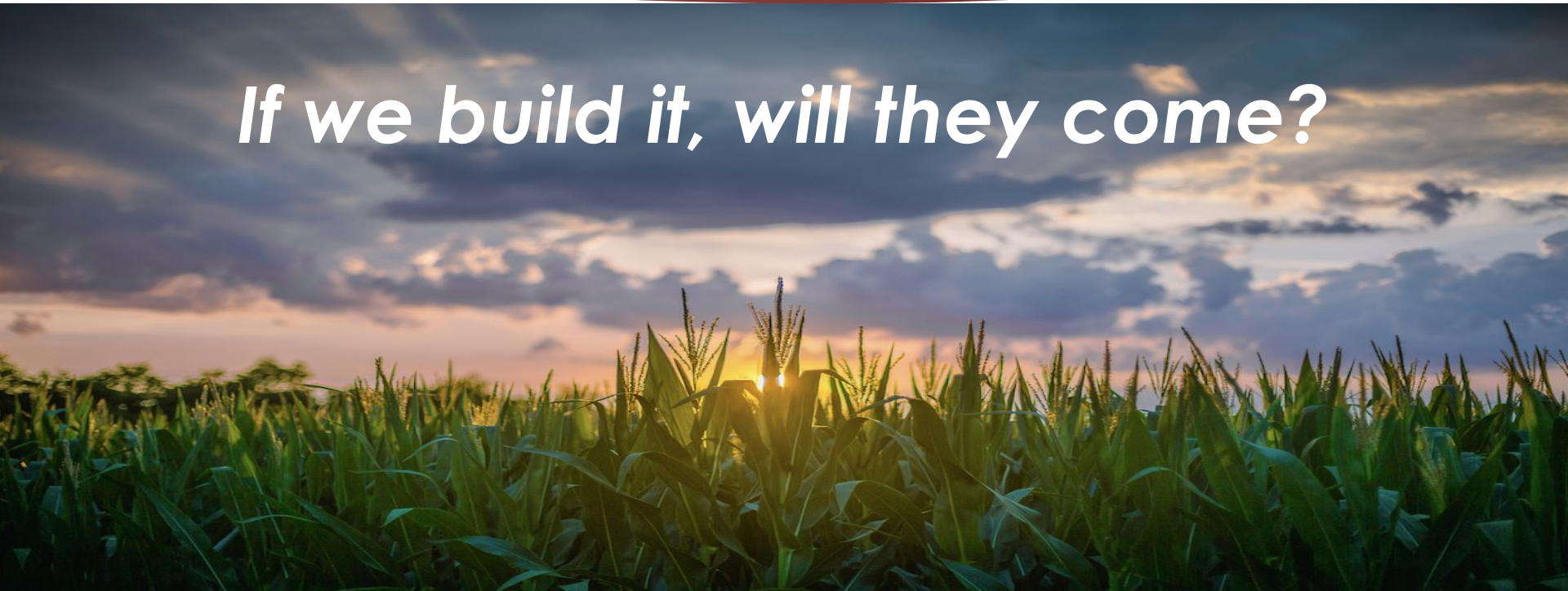
Optimization of surgical trays by removal of unused instruments from core tray and utilization of 'pick packs' as needed



Sustainability in the OR: Streamline surgical packs

Optimization of surgical trays by removal of unused instruments from core tray and utilization of 'pick packs' as needed

Toolkit Application & Amplification Strategies



Application & Amplification Strategies: COS

- Educate COS members across Canada:
  - Self assessment program at annual COS meeting
  - Annual national webinar

Application & Amplification Strategies: Cross promotion

- COS supported website cross-posted to:
  - CCGHC
  - PEACH
  - Royal College
  - Eyesustain
  - CASCADES

Canadian Ophthalmological Society
Société canadienne d'ophtalmologie
EYE PHYSICIANS AND SURGEONS OF CANADA | MÉDECINS ET CHIRURGIENS OPHTALMOLOGISTES DU CANADA

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

ROYAL COLLEGE
OF PHYSICIANS AND SURGEONS OF CANADA
COLLÈGE ROYAL
DES MÉDECINS ET CHIRURGIENS DU CANADA

PEACH

Application & Amplification Strategies

- Peer-reviewed article in Cdn J Ophthalmology - in process
- Shareable library of materials
  - (eg. slide sets) for presentations, Grand Rounds, and journal clubs across Canada
- Engagement with industry
  - early phase in process

Application & Amplification Strategies: Choosing Wisely Canada

- Develop ophthalmology recommendations for Choosing Wisely Canada
  - In process
- CWC awarded grant

Choosing Wisely Canada™

Application & Amplification Strategies: Royal College Partnership

- RCPSC curriculum development:
  - Translate toolkit into an ophthalmology specific planetary health curriculum for residency training

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ROYAL COLLEGE
OF PHYSICIANS AND SURGEONS OF CANADA
COLLÈGE ROYAL
DES MÉDECINS ET CHIRURGIENS DU CANADA

Conclusions

- Eye care, especially surgical care, has staggering and preventable negative environmental impacts
- Ophthalmologists have a significant role & responsibility to decarbonize the eye care sector

Acknowledgements:

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Dr Abdullah Al-Ani

Loukman Ghouti *(MD Candidate)*

Wendy Hatch, OD

Dr Paul Huang

Kyobin Hwang

Dr Michael Kryshtalskyj

Adrien Lusterio *(MD Candidate)*

Zorana Lynton *(MD Candidate)*

Dr Colin Mann

Dr Milad Modabber

Dr Rob Moore

Dr Farah Moti

Zoe Myers *(MD Candidate)*

David Rabinovitch *(MD Candidate)*

Dr Brooklyn Rawlyk

Dr Marie-Claude Robert

Dr Mili Roy

Dr Saama Sabeti

Cecilia Tran *(MD Candidate)*

Dr Chinmayi Vyas

Thank you

Shellyza Sajwani
Canadian Association of Pharmacy for the Environment & The Ottawa Hospital

Pharmacy Professionals at the Front Line of the Climate Crisis

The Pharmacy Profession and the Climate Crisis

Shellyza Sajwani, Mpharm, PharmD
Adjunct Professor - University of Ottawa
Co-Chair - Canadian Association of Pharmacy for the Environment (CAPhE)
Co-Founder - Climaceutics Health Solutions

Role of pharmaceuticals in emissions

- Canadian healthcare GHG emissions are a result of public hospitals (22%), prescribed drugs (21%) and physician services (13%).
- Prescribed and non-prescribed pharmaceuticals together represent 25% of the total healthcare GHG emissions, the largest of any category

Airline Industry

Health Systems

Climate **Mitigation** Within Pharmacy

Medication Use (Anaesthetic Gases + Inhalers), Deprescribing

Medication Waste reduction

Building/Materials & Energy

Life cycle assessment + Procurement

Outside emissions - remember direct impacts of pharmaceuticals +plastic to pollution

Pharmacy… Mitigation

Anaesthetic Gas Review (sevaflurane v.s. desflurane)

Deprescribing

Alternatives to MDIs inhalers where clinically appropriate

Medication Use (Anaesthetic Gases + Inhalers)

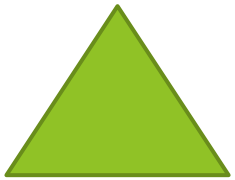
Waste reduction

Building/Materials & Energy

Procurement/Life Cycle Analysis

Climate **Adaptation** Within Pharmacy

Disaster Plan Recommendations



Subject Matter Impacts/ Medication Management

Strengthening Supply Chains /Minimizing Shortages

Equity considerations for all of the above

Disaster Plans ACCESS TO MEDICATIONS

SASKATCHEWAN COLLEGE OF PHARMACY PROFESSIONALS

Reference Manual

Emergency Preparedness Resource Kit for Pharmacists and Pharmacy Technicians

(Adapted with permission from the College of Pharmacists of Manitoba)

Definitions
"**member(s)**" includes licensed pharmacist(s) and pharmacy technician(s).

Natural Disasters and Pharmacy Practice

Natural disasters pose unique challenges to the practice of pharmacy, as they can disrupt essential health-care services and access to medications. During such events, pharmacies play a crucial role in ensuring the continuity of patient care. Pharmacists are not only responsible for managing medication inventories and dispensing prescriptions, but also for providing critical information and support to patients and the community.

The need for accurate medication management, emergency supply distribution and patient education becomes paramount as individuals struggle to maintain their health and access their medications both during and in the aftermath of a natural disaster.

Effective emergency and disaster management preparedness and response plans for pharmacy professionals should be tailored to your specific province and professional judgement. Regular training, drills and collaboration with local pharmacies, regulatory colleges and health-care organizations are essential for this to occur.

Pharmacy resources

- Ensuring Continuity of Care During and After Emergencies and Natural Disasters
- Top Considerations for Pharmacy Managers: Managing Emergency Pharmacy Closures
- Top Considerations for your Pharmacy: Planning for an Emergency Pharmacy Closure

Patient resources

- Preparing for Emergencies: Medication Checklist and Grab & Go Medication Bag

Avoiding closures, improving access to medications.

Inventory?

Staffing?

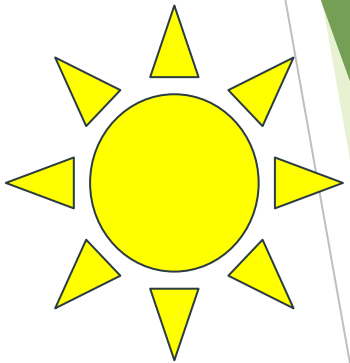
Electronic infrastructure?

Communication processes?

PLANNING CRITICAL

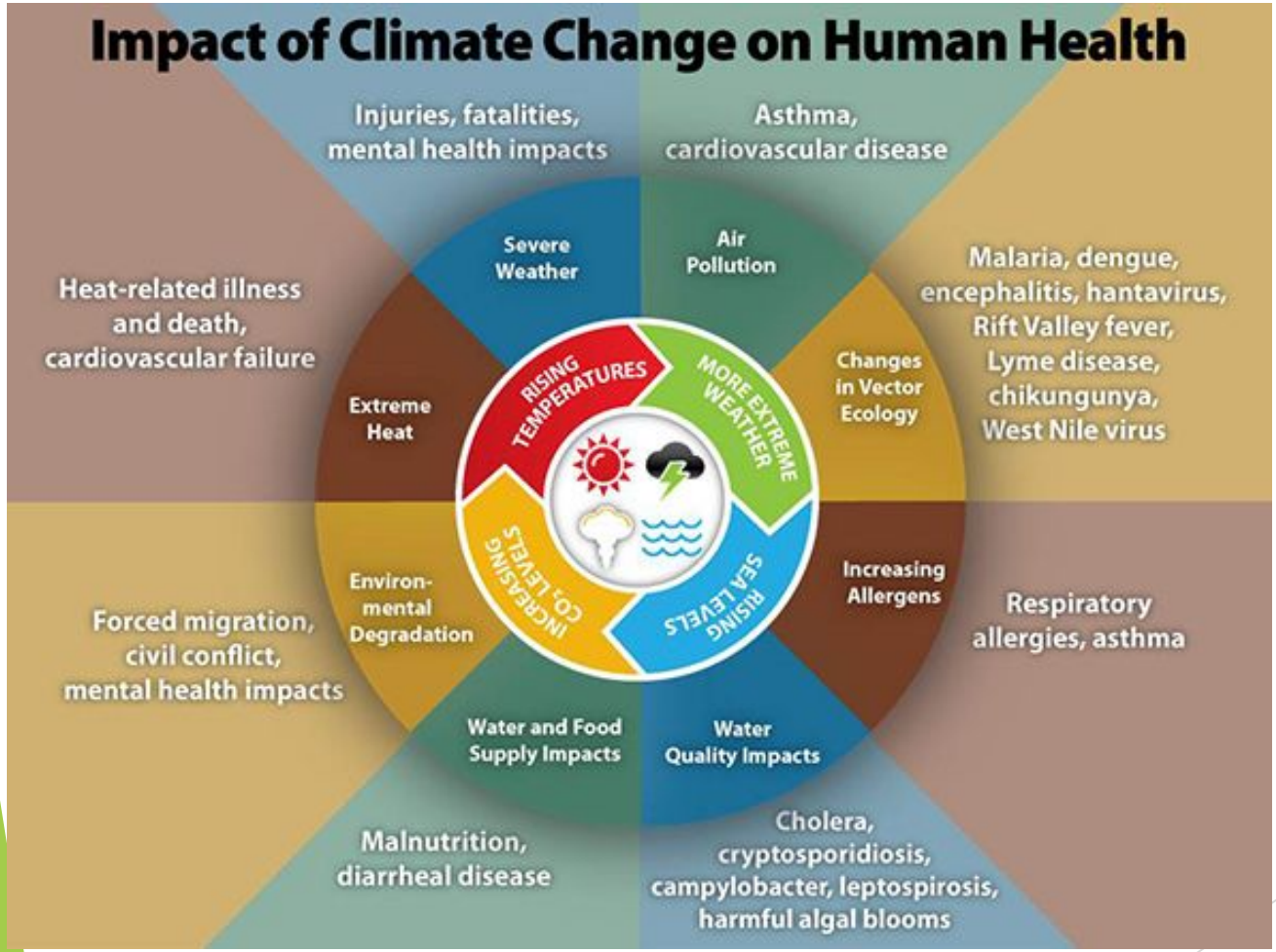
Medication **stability** and heat

… room temperature stability?
… refrigerator stability?



Medication **management** and heat

… renal function?
… impaired sweating?
… narrow therapeutic window?



Subject Matter Impacts (Therapeutics)

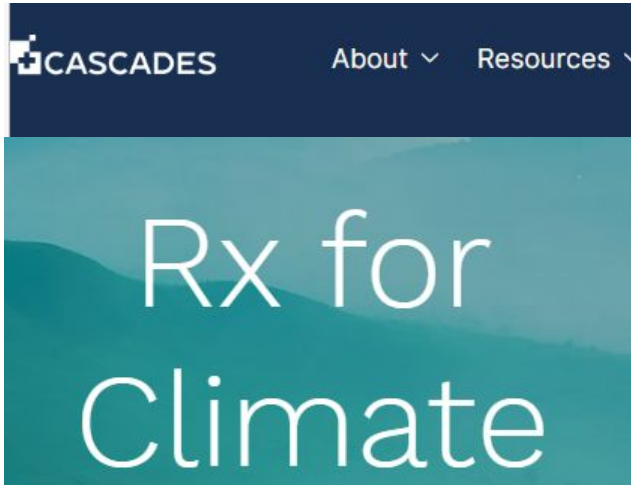
For care plan considerations…

Getting things done…

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

fip ADVANCING PHARMACY WORLDWIDE

CAPhE
Canadian Association of Pharmacy for the Environment



Canadian Pharmacists Association
Association des pharmaciens du Canada

CAPhE Example…

Partnerships focused

Advocacy/ System change

Education / Building champions

cshp scph

Climaceutics
Health Solutions

Thank You

Reach out if you have questions:
climateaction@healthstandards.org

Connect with us

Email us with questions and feedback

Nicoletta Dini
Dalhousie University & The Health and Environment Adaptive Response Task Force (HEART)

The Health and Environment Adaptive Response Task Force (HEART)

CFMS FEMC

Planetary Health Day of Action

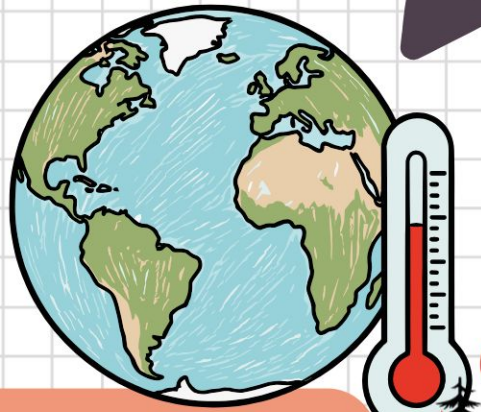
CFMS HEART

Investing in medical student advocacy today shapes future sustainable healthcare leadership tomorrow

We know the problem

5%

Healthcare



Environment

CFMS
FEMC

The Solution? Shaping our Future

- **Medical Students** are future health practitioners, policy makers, and sustainability advocates

- Have both the **interest** in climate's effects on health and the **future patients**

Missed Opportunity

- Lack of knowledge is a **barrier to engagement**

83% 15% 6%

Future Investment

- Mentorship & education now **spark change** in the future

CFMS
FEMC

Circa 1977

Canadian Federation of Medical Students

Health and Environment Adaptive Response Taskforce

Underrepresented

The **Health Impacts** of Climate Change

2017

Established as a taskforce (now under Global Health)

Currciculum

HEART Survey, Climate Wise Slides, PH Compentencies

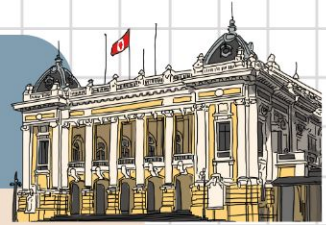
Advocacy

Project Green Healthcare, ++ Partnerships, **AND...**

Planetary Health Day of Action

- **Inaugural** advocacy initiative of CFMS Global Health (HEART x Public Health Committees)
- Coordinated with CAPE's **National Day of Action on Planetary Health** (Oct 6)
- Medical student delegates to **lobby provincial politicians** on planetary health actions

2025 Actions

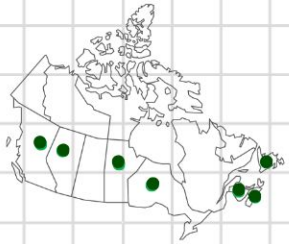


1 **National:** Establish *Sustainable Healthcare Secretariets* pan provincially

POWER
PLANETARY HEALTH ORGANIZATIONS FOR WELLBEING, EQUITY & REGENERATION

2 **Provincial:** Support Pre-existing & Locally Specific Planetary Health Initiatives →

CAPE Canadian Association of Physicians for the Environment
Association canadienne des médecins pour l'environnement ACME



2 Examples

Nova Scotia

PaRx A Prescription for Nature

Protect Urban **Nature Spaces** from Development

Ontario

Implement **Heat Adaptation** in Rental Units

British Colombia

Pause all **LNG & Fracking** to Clarify Health Risks

Manitoba

Adopt an Urban **Tree Canopy** Cover Plan

The Numbers

PLANETARY HEALTH
DAY OF ACTION
OCTOBER 2025

7 Provinces

40 Delegates

12 Med Schools

MEMORIAL UNIVERSITY
DALHOUSIE UNIVERSITY
uOttawa
UBC THE UNIVERSITY OF BRITISH COLUMBIA
Western
UNIVERSITY OF CALGARY
University of Manitoba
UNIVERSITY OF TORONTO
McMaster University
NOSM UNIVERSITY
Queen's
McGill UNIVERSITY

The Plan

PLANETARY HEALTH
DAY OF ACTION
OCTOBER 2025

S	M	T	W	T	F	S
Oct **5**	Oct **6**					
					Oct **17**	

National Training Webinar NDoA on PH! MPP Meetings

Policy Change?

- **Amplify** existing initiatives
- **Leverage** medical student social capital
- **Foster** future relationships

Leadership Development

Lessons **medical students** will carry into future leadership of healthcare

Planetary Health Day of Action

Thank You For Your Attention

heart@cfms.org | @cfmsheart

Greg Allan
Rivercourt Engineering Inc.

Displacement Ventilation: Rethinking Indoor Air for Health and Climate

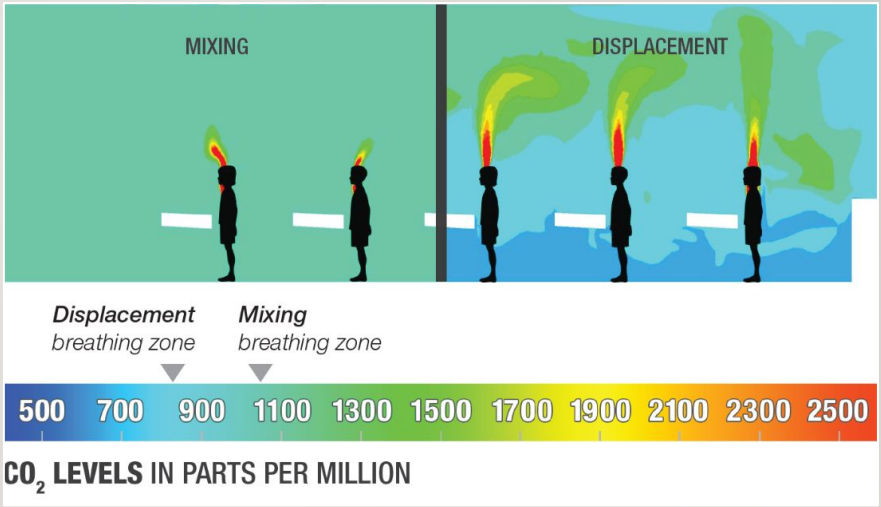
Venting Naturally

DEMAND-CONTROLLED DISPLACEMENT VENTILATION REDUCES COST, ENERGY, GHG, AND HAI

Nanaimo General Hospital

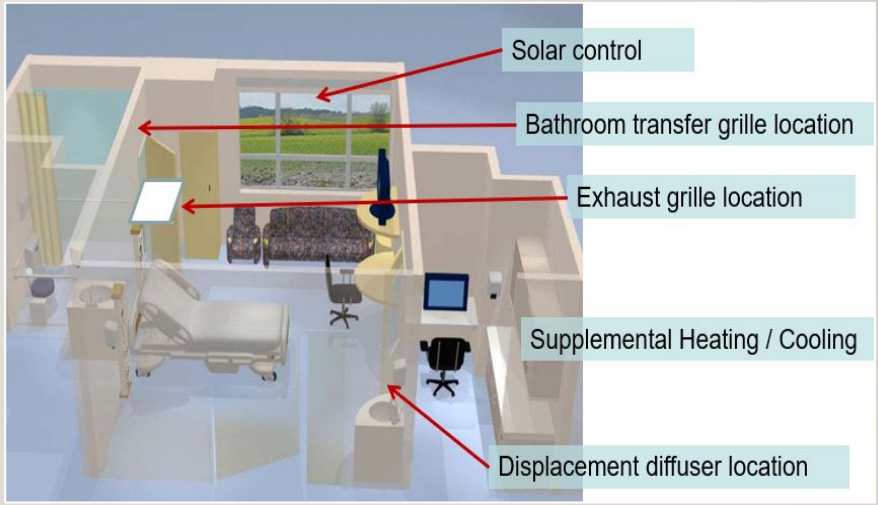
HOW IT WORKS

- Fresh, cool air pools along the floor.
- People and other heat sources cause rising air currents.
- Contaminated air is exhausted from the ceiling.
- Heat, CO2, moisture, and odours are removed.



WHY USE IT

- GHG emissions
- Aerosol transmission
- Energy reduction
- Capex + Opex savings
- Quiet and comfort

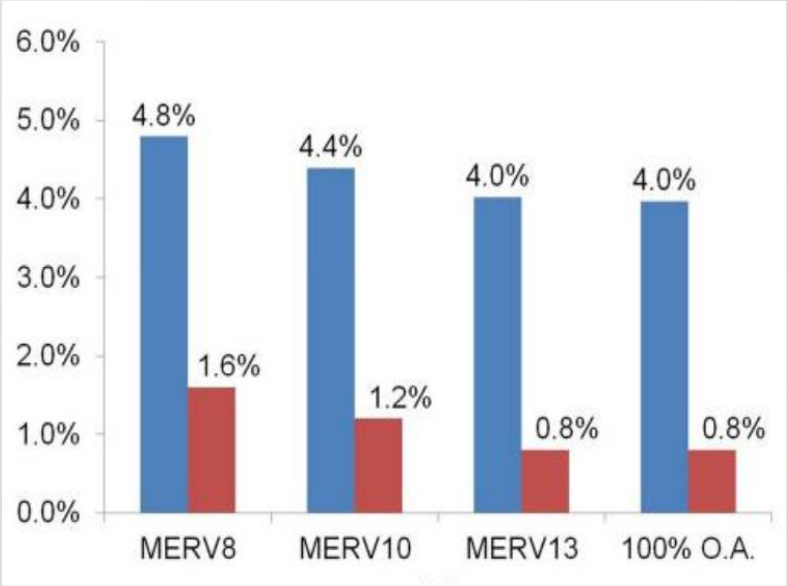


HOW CAPEX IS LOWER

- Ducts are smaller and uninsulated.
- Floor heights are lower due to shallower ceiling plenum.
- Central air handlers are smaller or fewer.
- Cooling plant and boilers are smaller.
- Supporting emergency power capacity is reduced.

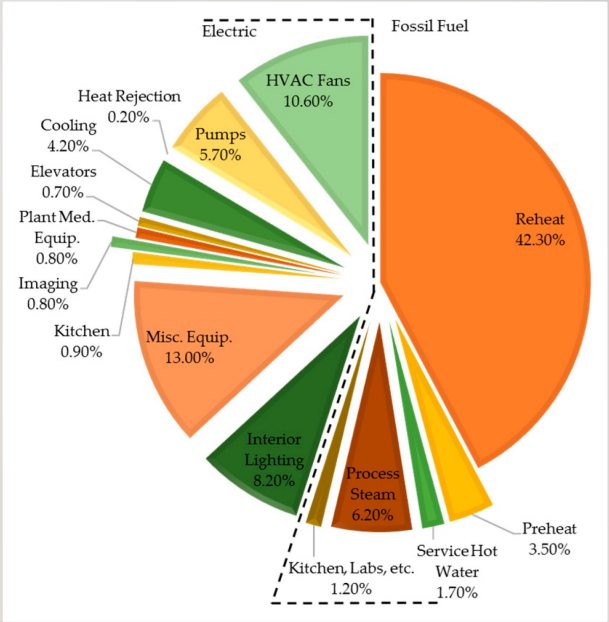
HOW INFECTION RISK IS REDUCED

- Mixing ventilation only dilutes and assures transmission.
- Exhaled aerosols rise while air intake is drawn from below.
- Lower air change rates achieve higher protection.
- CO2 demand control raises rates proportional to occupancy.



HOW ENERGY IS SAVED

- With demand control, reheat is eliminated.
- Cooling loads are met using warmer supply.
- Free cooling is more often available.
- Lower average ventilation rates.
- Much lower fan energy, proportional to cube of flow rate.
- Ventilation heat recovery is sufficient to avoid heating.

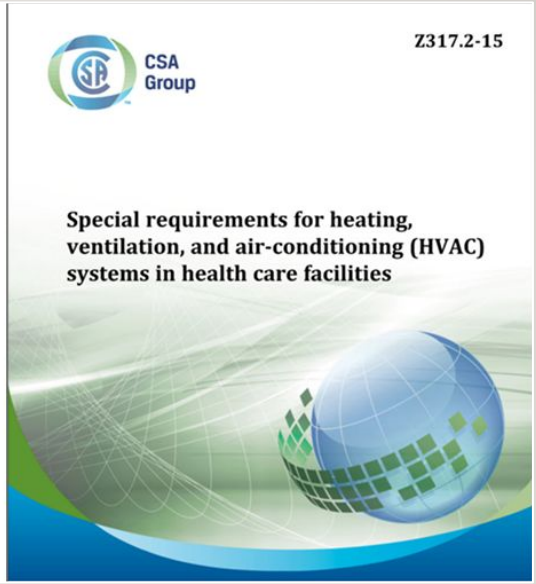


WHAT ARE THE BARRIERS

- CSA Z317.2 does not prescribe DV
- Too few healthcare examples in North America
- Absence of engineering design guidelines
- Lack of research funding
- No patent, no profit motive

WHAT NEEDS TO CHANGE

6.11.2.3
This Standard does not address displacement ventilation. If a system using displacement ventilation is being considered, engineering studies shall be conducted to confirm whether the system can maintain the values specified in Table 1. Displacement ventilation shall not be used unless these studies demonstrate efficacy. **The use of displacement ventilation shall not be used as a rationale for decreasing air exchange rates unless the engineering studies have demonstrated an equivalent level of safety.**



CANADIAN EXAMPLE

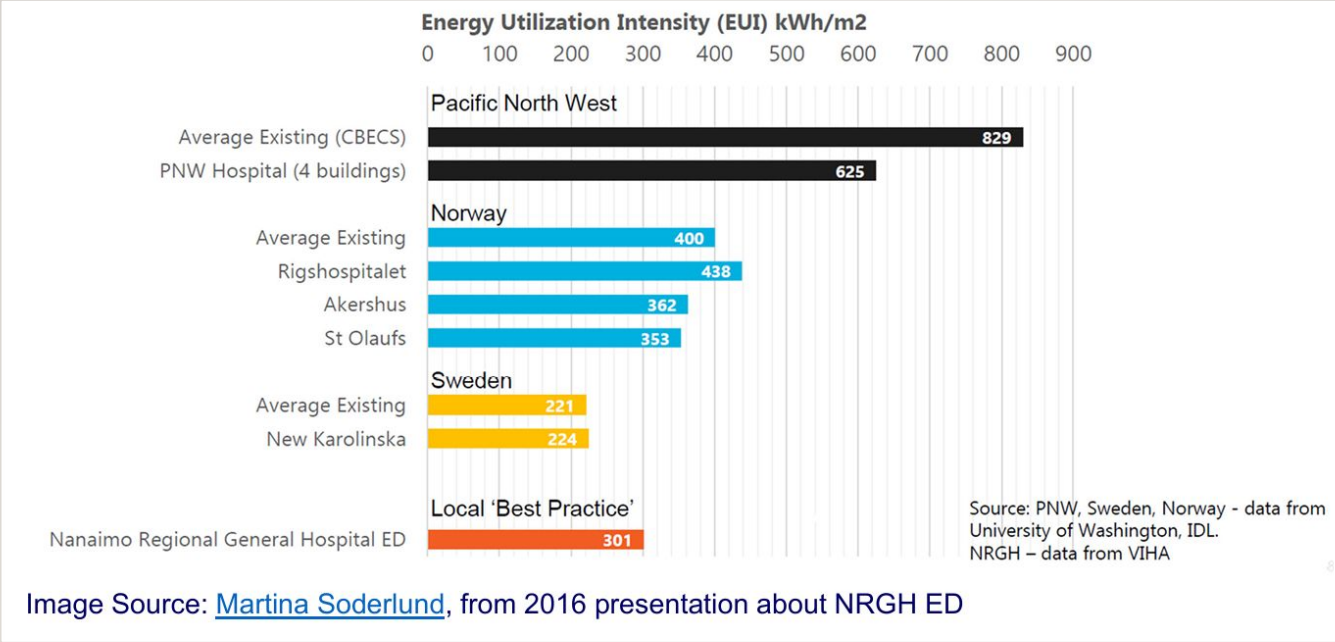


Image Source: Martina Soderlund, from 2016 presentation about NRGH ED

Pierrette Price-Arsenault
Ontario Health

Cut the Carbon:
Reducing Surgical Waste

Cut the Carbon: Reducing Surgical Waste

Towards a sustainable healthcare system

Pierrette Price Arsenault I October 3, 2025

Ontario Health

Hospital Waste


EXIT
DENTAL

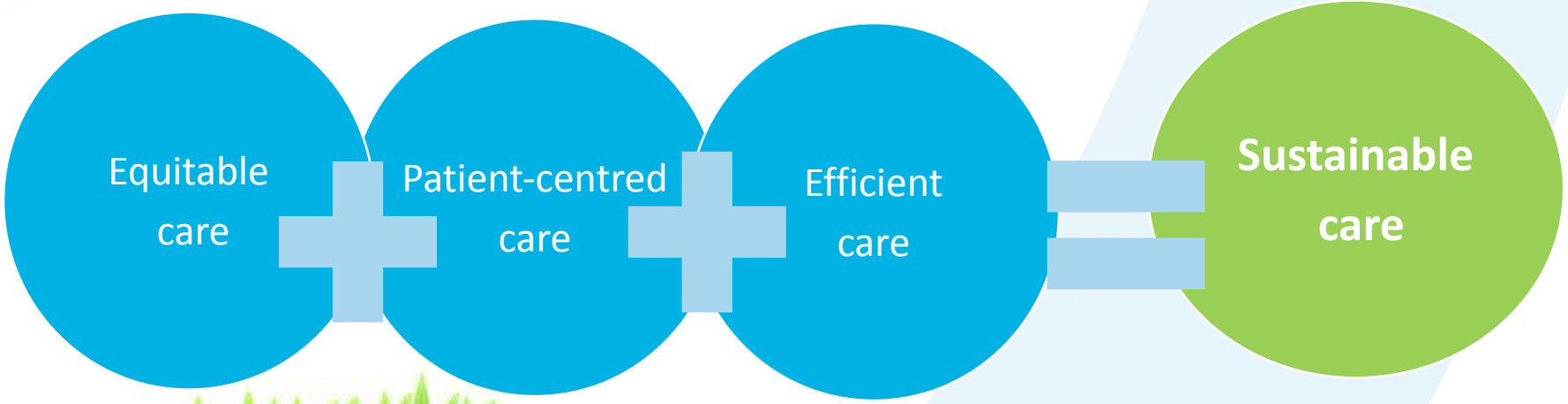
WHAT IS HAPPENING!!!

Ontario Surgical Quality Improvement Network

Cut the Carbon: Reducing Surgical Waste

Maria Koijck and Eva Glasbeek, From: Environmental Footprint of Anesthesia: More than Inhaled Anesthetics! Anesthesiology. 2021;135(6):937-939.

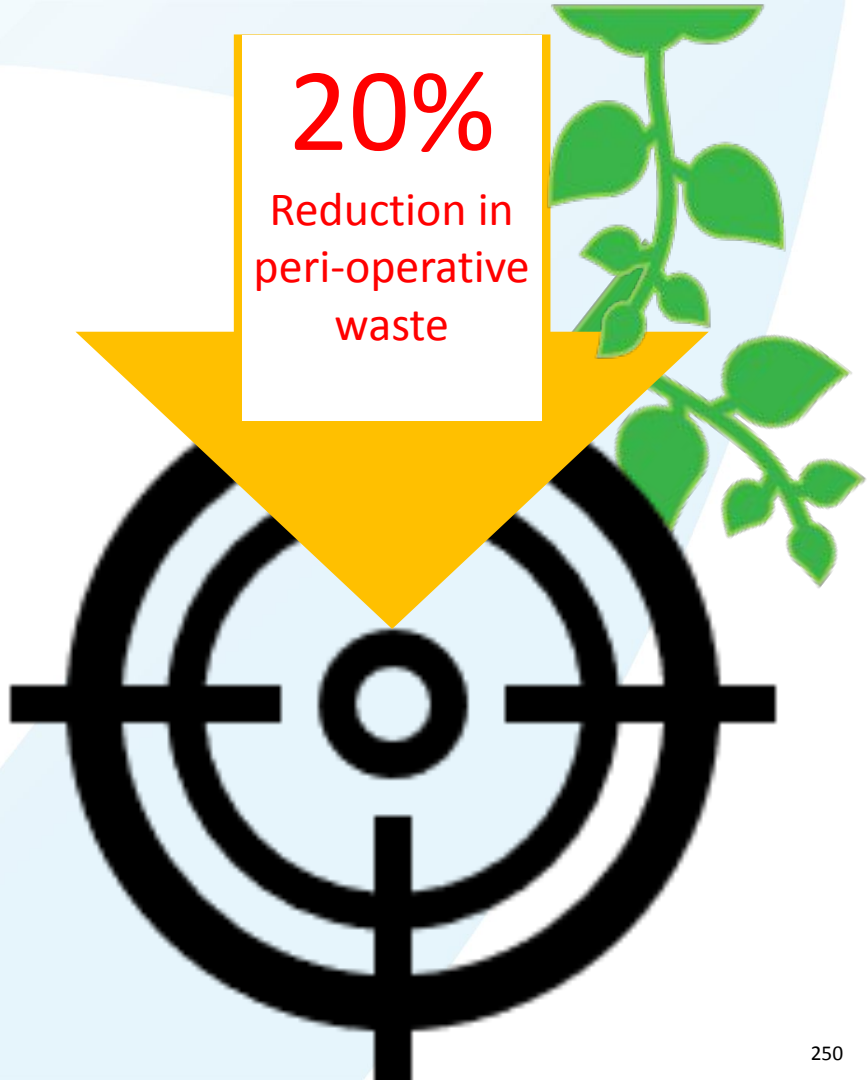
Establishing Buy-in



Campaign Goal

Recognizing that efficient care often means less waste, this campaign encourages the continued implementation of **equitable, patient-centered, and efficient care** but *with a green focus.*

The goal is to improve the patient's journey from pre-admission through the preoperative, intraoperative, and postoperative phases of surgical care *while reducing surgical waste.*



Leveraging Previous Campaigns

ONSQIN Collaborative Established

Cut the Count: Reducing Opioids after Surgery Campaign

Cut the Carbon: Reducing Surgical Waste Campaign

2015	2018-2019	2019-2021	2021-2023	2023 - ?	2024-2027	Total
13 new sites	14 new sites	16 new sites	2 new sites	1 new sites	9 new sites	52 sites

Committed to Better: Reducing Infections after Surgery Campaign

Committed to Better: Enhancing Surgical Recovery Campaign

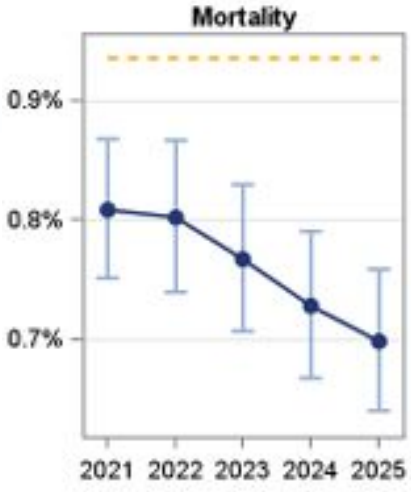
Delirium Aware: Safer Healthcare Campaign

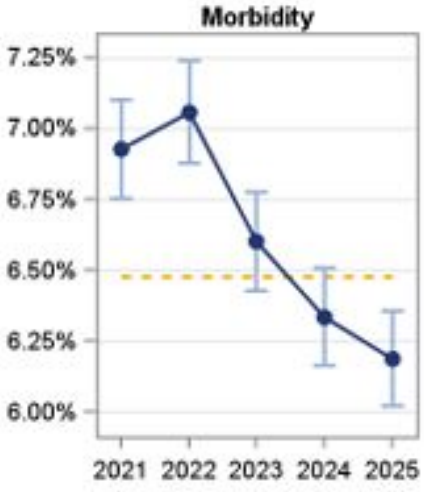
Reduced Carbon Reduced Carbon Reduced Carbon

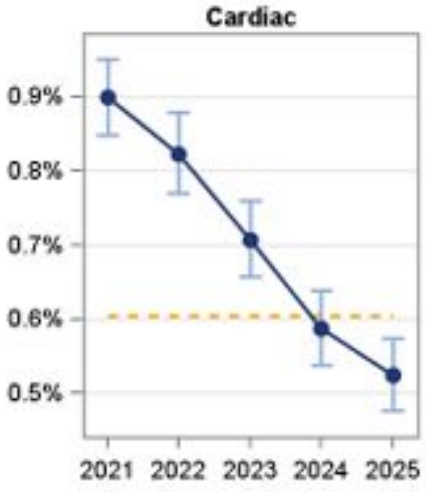
Ontario Surgical Quality Improvement Network

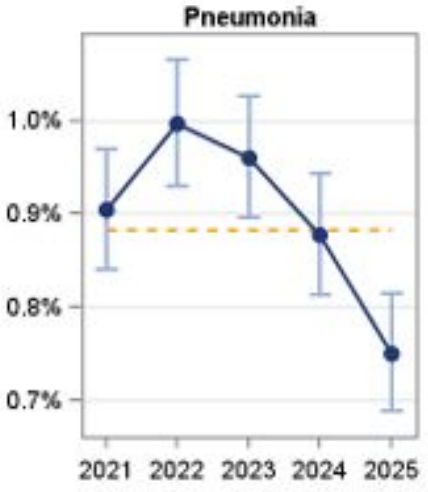
Results and Potential Impact

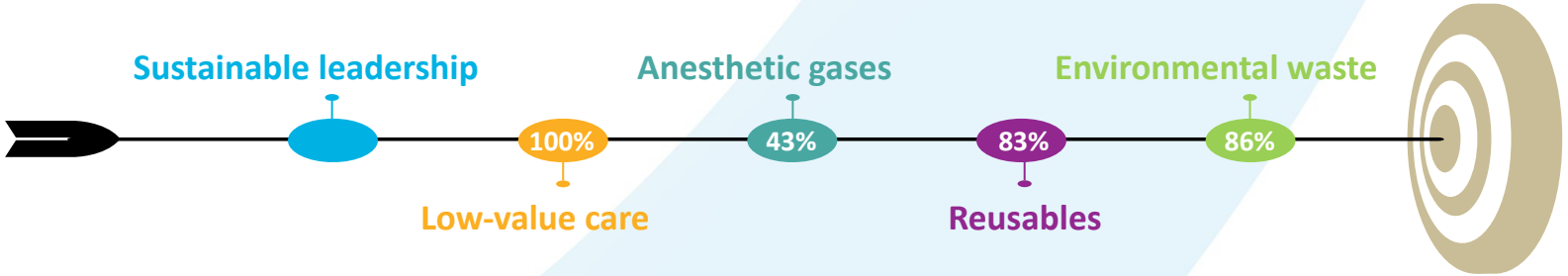
Results





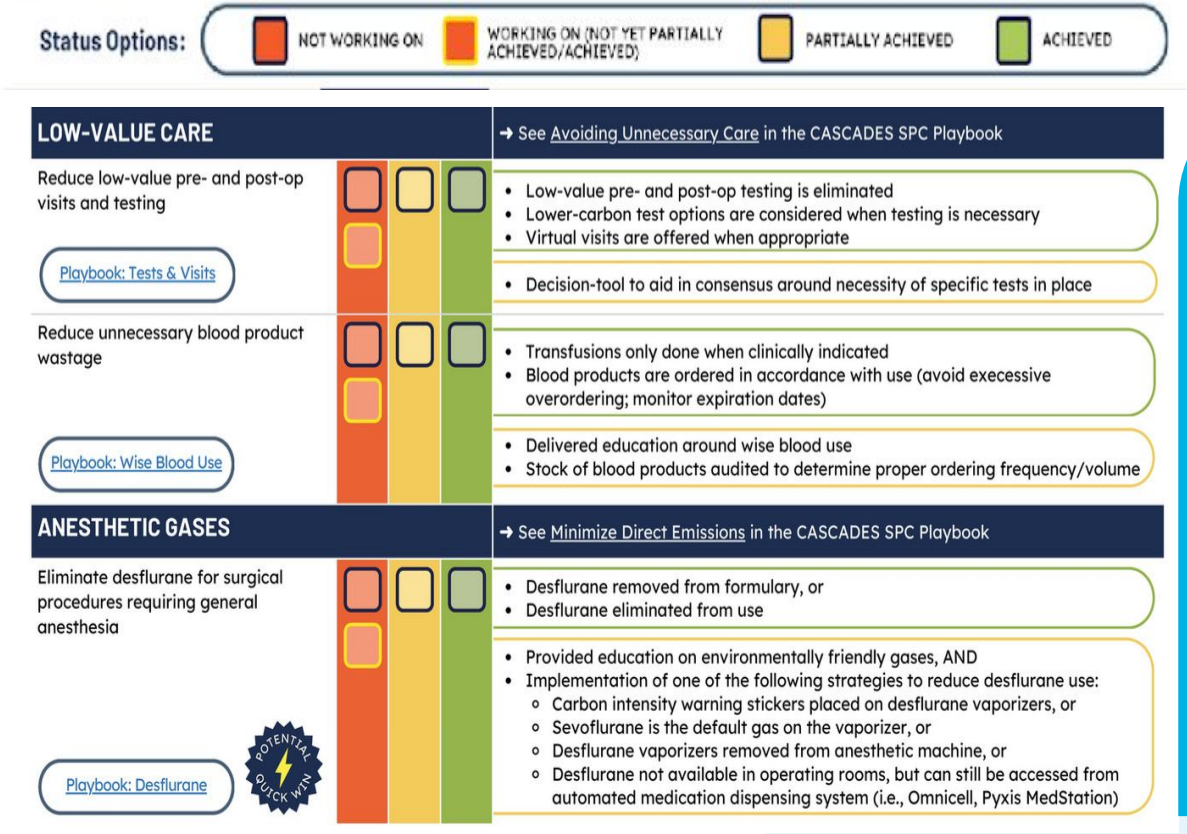






The July 2025 Semi-annual Report depicts risk-adjusted rates for the collaborative for cases that occurred between January and December 2024.

The SQIP and the Surgical Sustainability Scorecard



Surgical Quality Improvement Plan (SQIP)

- Sustainability leadership
- Low-value care
- Anesthetic gases
- Reusables
- Waste

Surgical Sustainability in Action

Real-world change ideas that are making a difference

Sustainability Leaderabip

Formalized perioperative green committees

Low Value Care

UHN campaign to reduce unnecessary RBC transfusions
Pre-op anemia optimization

Virtual First

Reducing in-person pre/post-op visits

Anesthetic Gasses

Eliminating Desflurane & centralized N_2O

Reusables

“Bring your own bag” to the OR

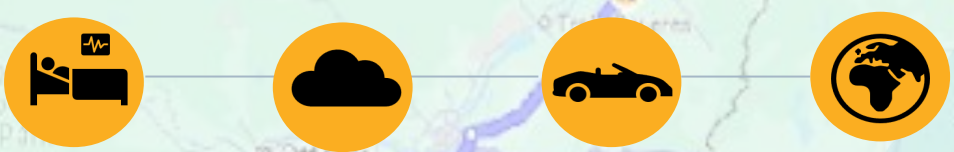
Waste Reduction

Custom surgical packs by procedure
Waste audits & walks

Potential Impact of Reducing Length of Stay

Median number of days* (extended LOS) due to an adverse event such as a surgical site infection:

7.5 days



One hospitalization day is estimated to generate **30.3 kg CO_2e***

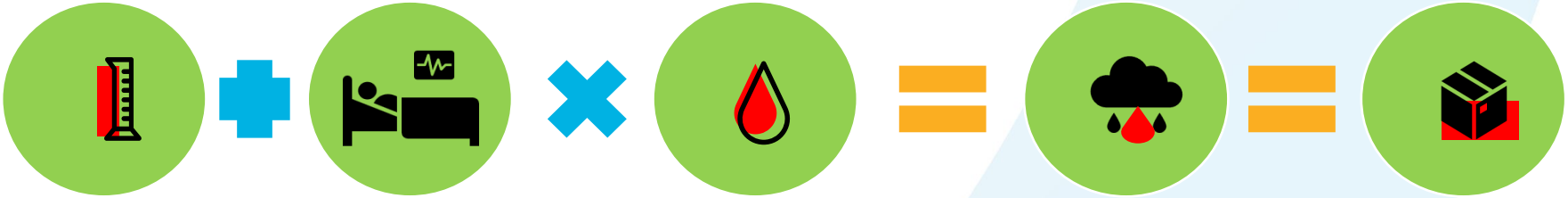
30.3 kg CO_2e × 7.5 days
= **227.25 kg CO_2e**
or
the equivalent of driving**
the approximate **distance between Toronto and New Brunswick**

If all 54 ONSQIN hospitals were able to reduce even 5 adverse events, that could be the equivalent of **251,462 km**
or
circling the planet 6 times

LOS, length of stay.
*https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(24)00048-2/fulltext.
**https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/calculator/ghg-calculator.cfm#result

Example: Potential Environmental Impact of Reducing Low-Value Care

- Approximately 20% of all blood transfusions are unnecessary* and can contribute to increased risk ranging from mild to life-threatening. If we were to reduce even **5 blood transfusions** in each of the **54 ONSQIN hospitals**…



3 Units/surgery **3 extra days** **n = 270** **29,808 kg CO_2e** **122,162 km**

6.5 kg × 3 units RBC/surgery =19.5 CO_2e
+
3 (days) x 30.3 kg CO_2e = 90.9 kg CO_2e
=
110.4 kg CO_2e

5 transfusions in each of the 54 hospitals
(5 × 54)

Or
99,360 Amazon Deliveries#

*Marik PE. Transfusion of Blood and Blood Products. Evidence-Based Critical Care. 2014 Aug 19:585–619. doi: 10.1007/978-3-319-11020-2_38. PMCID: PMC7124112
**https://www.frontiersin.org/journals/medicine/articles/10.3389/fmed.2022.956128/full.
#https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/calculator/ghg-calculator.cfm#results/ Each delivery emits about 0.3 kg of CO_2.

Example: Potential Financial Impact of Reducing Low-Value Care

If we were to reduce even **5 blood transfusions** in each of the **54 ONSQIN hospitals**…

3 days per surgery

Average extended length of stay due to blood transfusion*

$8,618

Average cost per hospital day (acute) = $6,620
+
Average of 3 units** RBC/surgery = $1,998

$25,854

Average extended days + cost of blood#
×
3 extended days due to transfusion

n = 270

54 hospitals
×
5 fewer transfusions

$6,980,580 saved

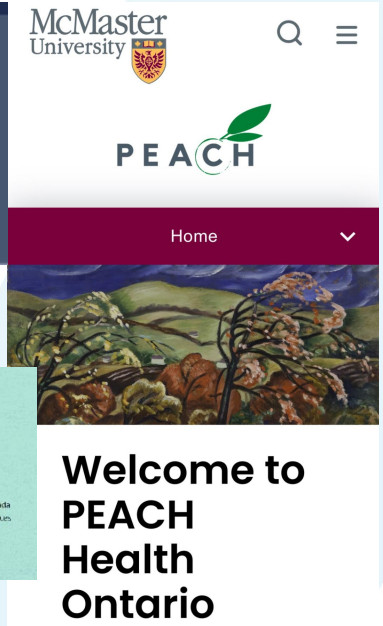
RBC, red blood cell.

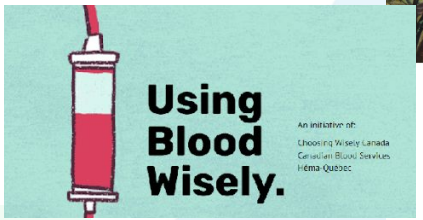
*Marik PE. Transfusion of Blood and Blood Products. Evidence-Based Critical Care. 2014 Aug 19:585–619. doi: 10.1007/978-3-319-11020-2_38. PMCID: PMC7124112.

**https://www.frontiersin.org/journals/medicine/articles/10.3389/fmed.2022.956128/full.

#https://www.researchgate.net/publication/318146361_The_cost_of_transfusing_a_unit_of_red_blood_cells_a_costing_model_for_Canadian_hospital_use.

Partnering Organizations





What You Can Do Today

- **Awareness:** Recognize where carbon lives in healthcare
- Start by understanding the invisible impact:
  - **High-carbon items**: single-use devices, anesthetic gases, PPE, imaging/tests
  - **Energy-intense spaces**: operating rooms, imaging, labs
  - **Overuse/waste**: redundant tests, unnecessary prescriptions, excessive packaging

Ask yourself:

- Is this test or treatment truly necessary?
- Is there a lower-carbon option that would achieve the same result?
- How much waste is generated by this routine, and can it be reduced?

Action: Small Steps, Big Impact

Prescribing

- Choose oral medications when appropriate (less carbon than IV)
- Prefer low-impact inhalers (e.g., dry powder) over metered-dose inhalers
- Avoid overprescribing; review repeat prescriptions regularly

Procedures and supplies

- Switch to reusables where safe (e.g., gowns, laryngoscope handles)
- Champion optimized custom packs

Clinical workflow

- Optimize scheduling
- Use telehealth when safe and appropriate
- Encourage patients to bring their own water bottles and bags

Documentation

- Go digital whenever possible to reduce printing
- Support e-consent and e-charts

Advocacy: Influence and Inspire

You don’t need a title to lead

- Ask green questions in team meetings: *“What’s the carbon impact of this?”*
- Join or start a green team at your site
- Share success stories and carbon wins with colleagues
- Support procurement teams to consider sustainable vendors and product life cycles
- Update policies or order sets that encourage low-carbon practices

The antidote to eco-anxiety is eco-action

Cut the Carbon

Thank you.

For more information or to join our “Cut the Carbon” monthly meetings, contact ONSQIN@OntarioHealth.ca

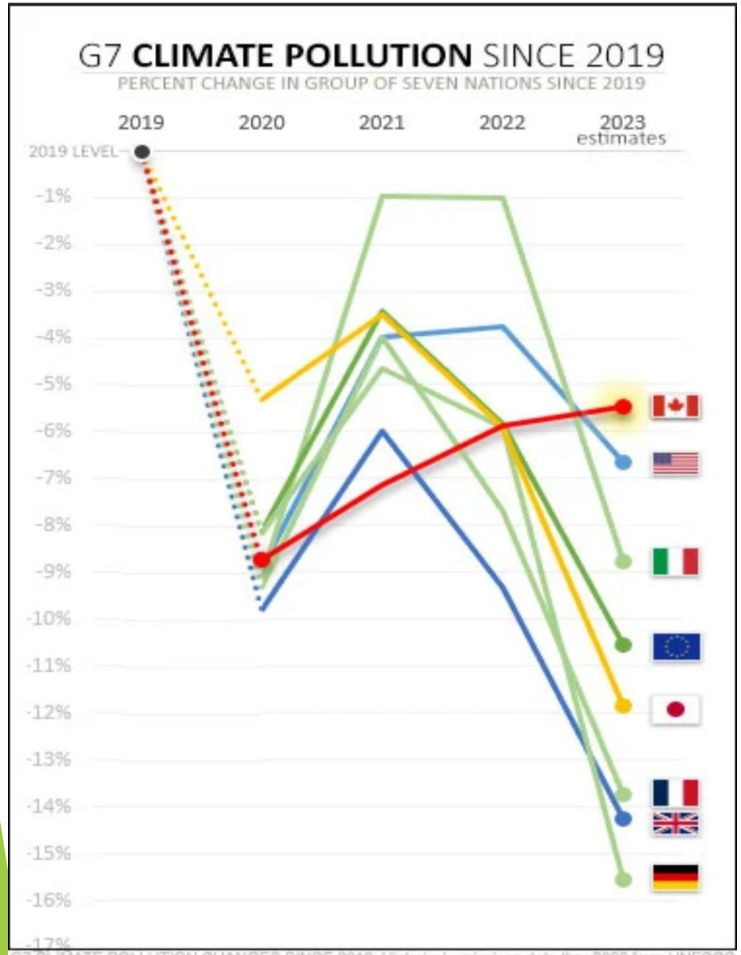
Dr. Laurie Houston
Ontario Dental Association

Greener, Safer Reusable Health Care Items

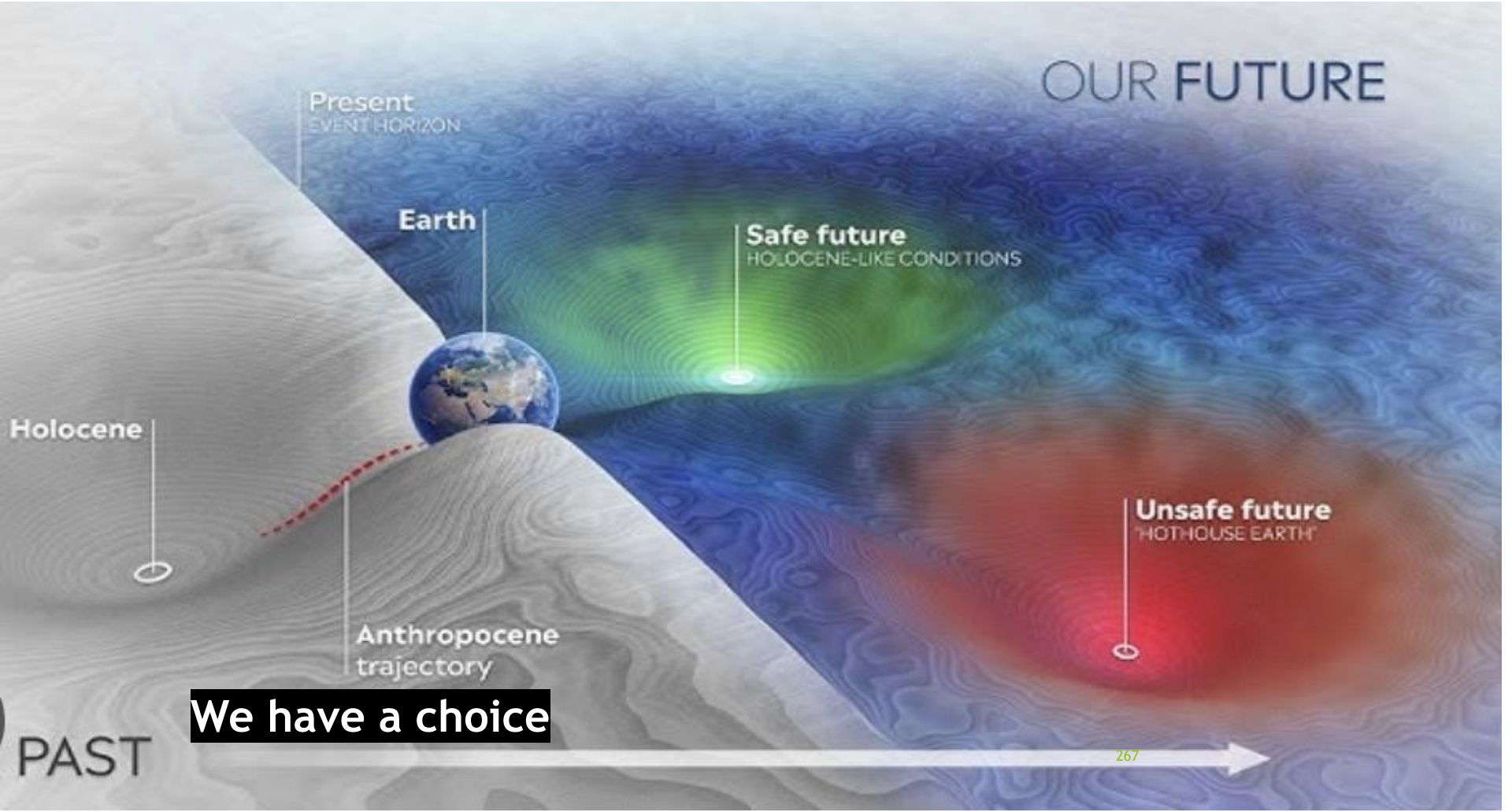
TORONTO CLIMATE WEEK

CONNECT

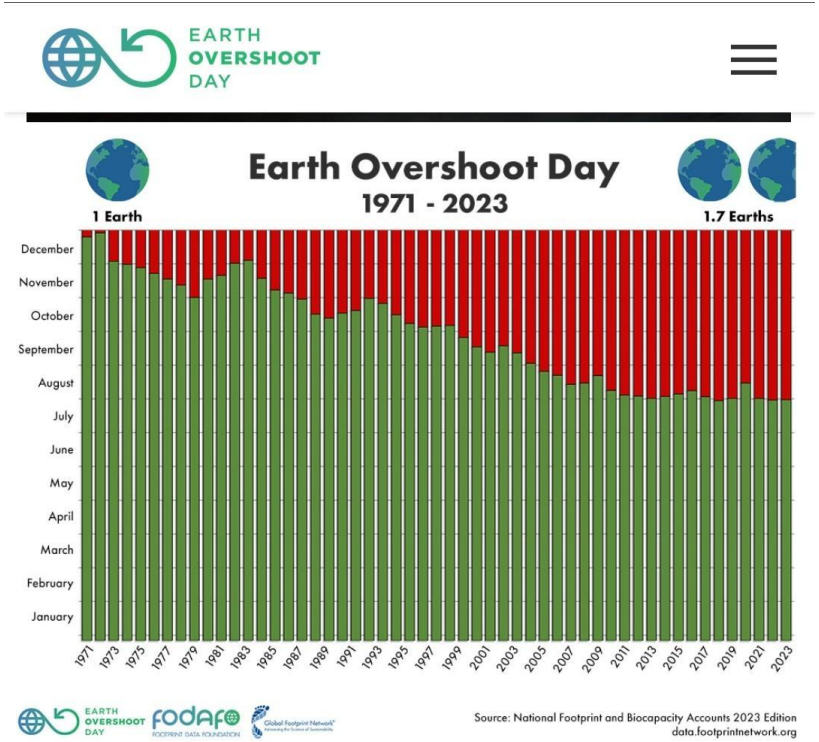
Greener Safer Reusable Healthcare Items: Make the Switch!



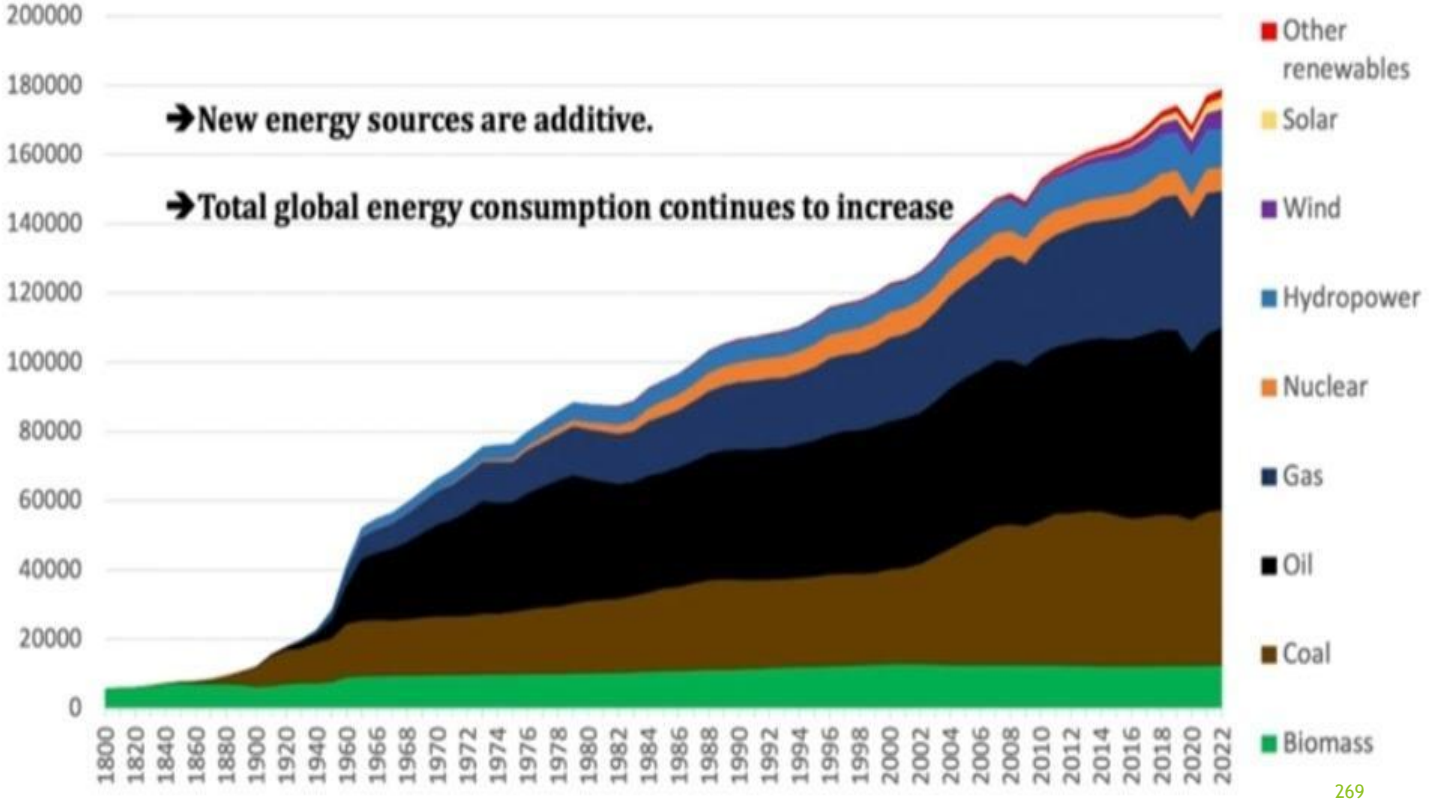
G7 CLIMATE POLLUTION CHANGES SINCE 2019. Historical emissions data thru 2022 from UNFCCC National Inventory Reports for 2024. Emissions estimates for 2023 are from each of the individual


OUR FUTURE
Present
EVENT HORIZON
Earth
Safe future
HOLOCENE-LIKE CONDITIONS
Holocene
Unsafe future
"HOTHOUSE EARTH"
Anthropocene
trajectory
We have a choice
PAST

- Global Footprint Network
- WHEN HUMANITY'S DEMAND FOR RESOURCES IN A YEAR EXCEEDS WHAT THE EARTH CAN REGENERATE



(so far) There has been no green revolution - only a *green addition.*



269

Source: Our World in Data 2021. Data Published by Energy Institute Review of World Energy; Vaclav Smil (2017), Energy Transitions: Global and National Perspectives, 2nd Edition Appendix A.

PLASTICS ARE MADE FROM FOSSIL FUELS

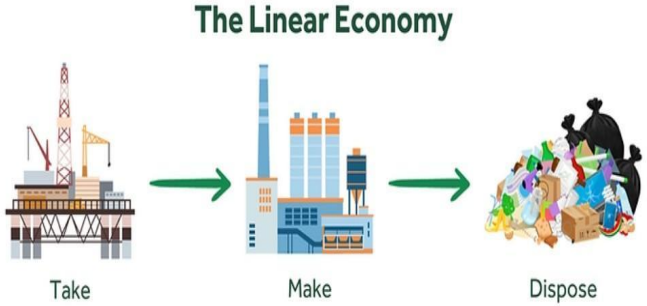
This?

Or this?

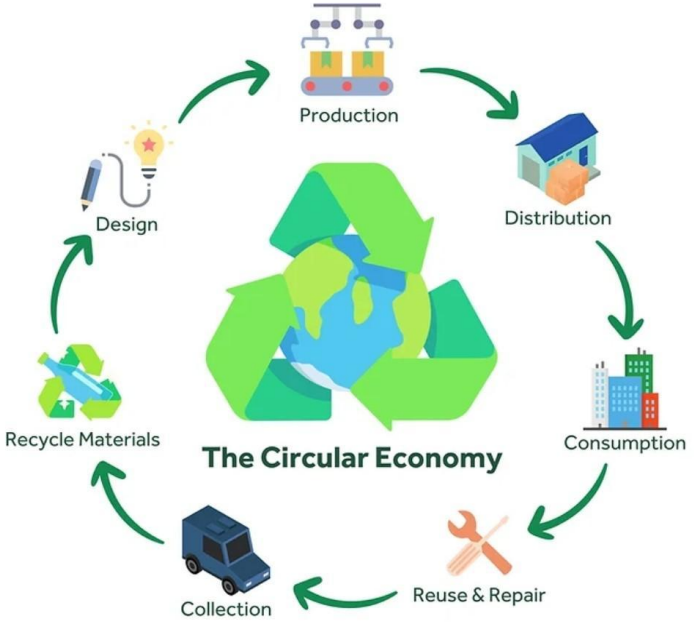
The Globe and Mail

Microplastics are creating huge health problems, and it's time we do something about it

We need to move away from a traditional linear economy to a circular economy…



The current linear economy model supports an unsustainable way of living.



The circular economy shows a positive way forward to help with climate crisis.

Photo credits:

REDUCE SINGLE USE PLASTICS

Choose reusable items whenever possible

WHY???

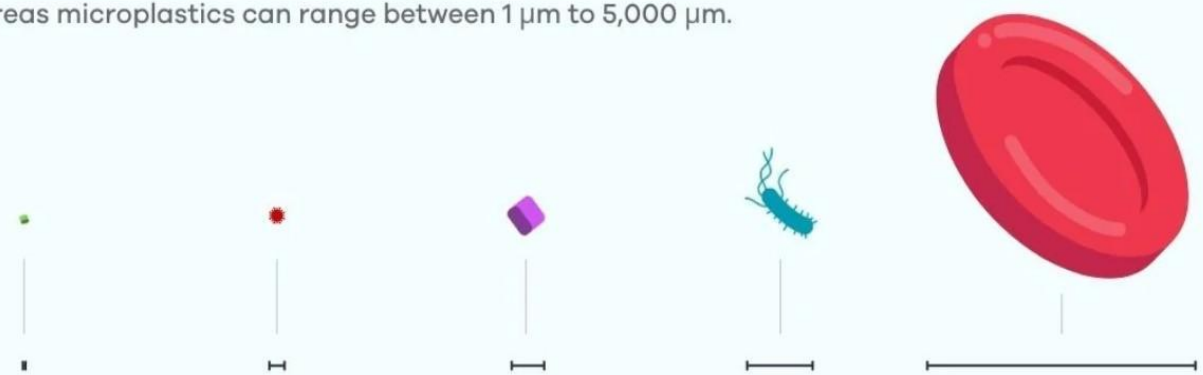
SUPPLY CHAIN

…to mitigate **supply chain issues**, and because of….

Size Chart

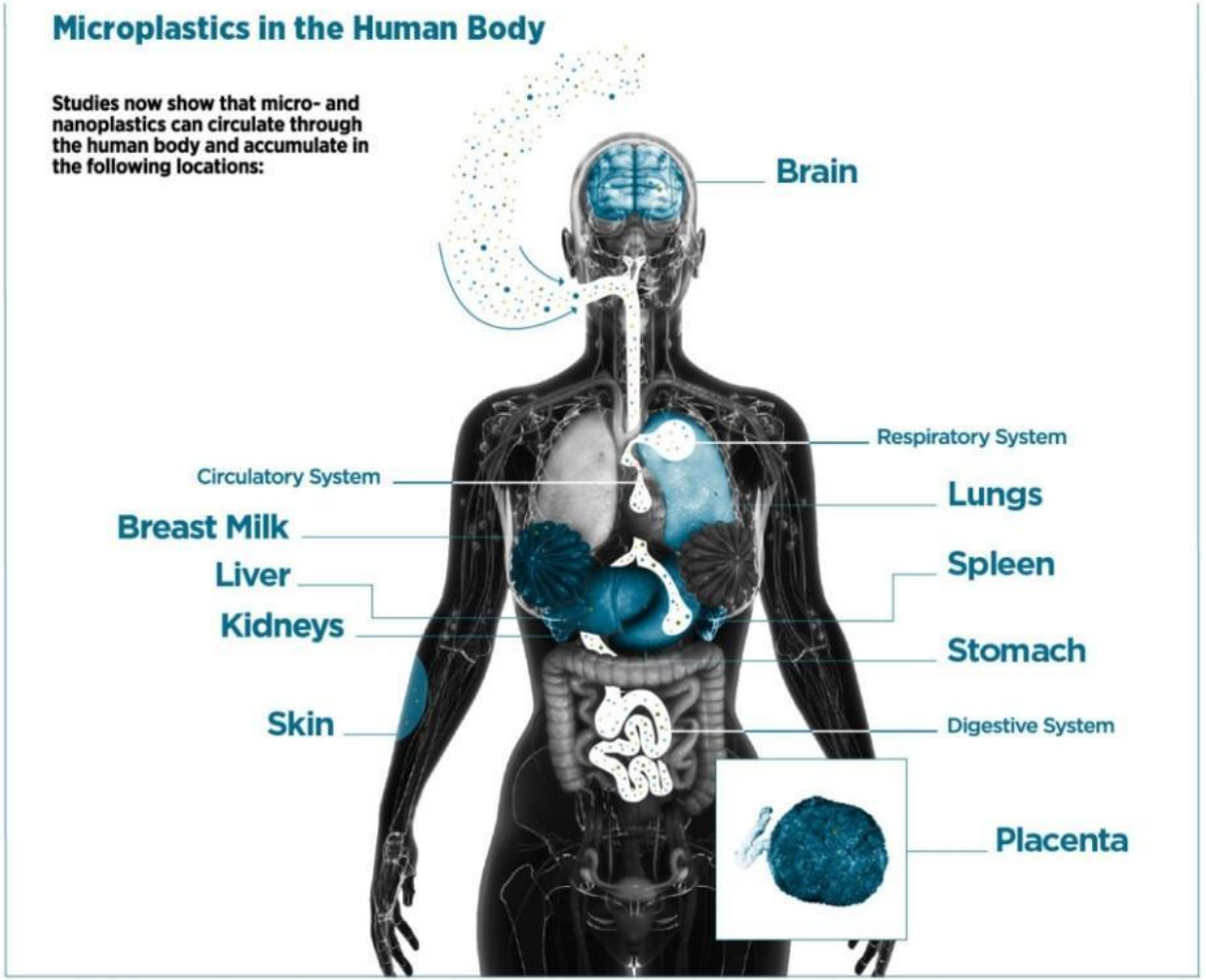
Microplastics to scale

The EPA defines nanoplastics as anything smaller than 1 µm, whereas microplastics can range between 1 µm to 5,000 µm.



0.1 µm	0.4 µm	1 µm	2 µm	8 µm	5000 µm (5 mm)
Nanoplastics (Range: 0.001 to 1 µm)	**Viruses** (Range: 0.04 to 0.4 µm)	**Microplastics** (Smallest)	**E. coli Bacteria** (Range: 0.2 to 2 µm)	**Red Blood Cells** (Range: 7 to 8 µm)	**Microplastics** (Largest)

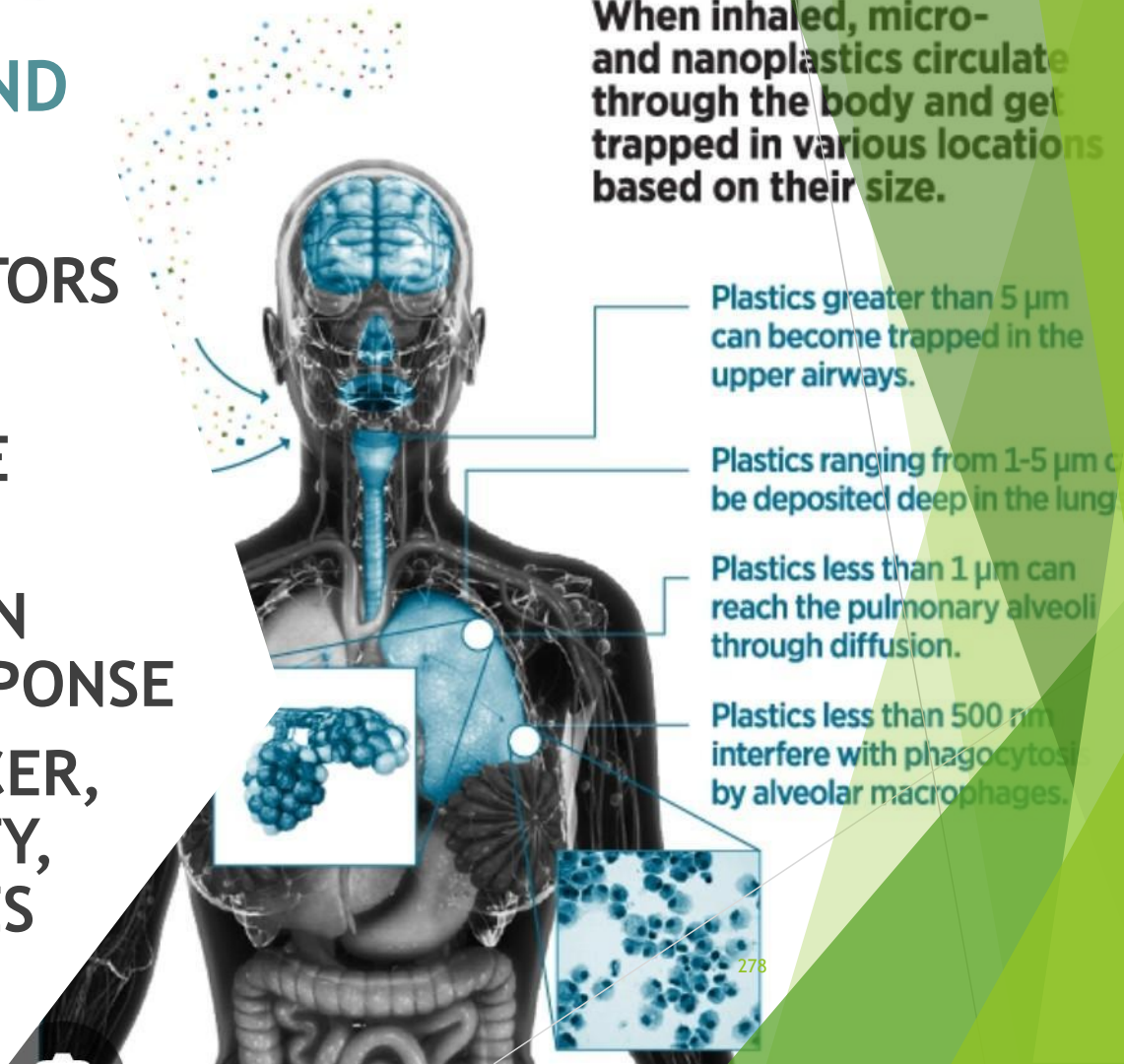
All sizes are approximate diameters. 1 µm = 1 micron



Tiny plastics are accumulating in our bodies

MICROPLASTICS AND NANOPLASTICS…

- ENDOCRINE DISRUPTORS
- IMITATE HORMONES
- TRIGGER AN IMMUNE RESPONSE
- WHICH ACTIVATES AN INFLAMMATORY RESPONSE
- IMPLICATED IN CANCER, INFERTILITY, OBESITY, AND OTHER DISEASES



Human Health Impacts of Exposure to Chemicals in Microplastics

Neurodevelopmental disorders
Attention deficit hyperactivity disorder (ADHD)
Autism
Neurobehavioral deficits
Decreased IQ
Cognitive deficits

Hormonal diseases
Thyroid disease
Thyroid cancer

Cardiovascular disease

Respiratory diseases
Asthma

Male reproductive health impacts
Subfertility
Reduced sperm quality

Female reproductive health impacts
Polycystic ovarian syndrome
Endometriosis
Delayed time to pregnancy
Abnormal Pap smears
Pregnancy-induced hypertension and/or preeclampsia

Metabolic disorders
Type 2 diabetes
Excessive childhood weight gain
Increased waist circumference
Serum lipid levels, e.g., total cholesterol and LDL cholesterol

Other health impacts
Decreased antibody response to vaccines
Physical damage
Carcinogen absorption

Pregnancy outcomes
Preterm birth
Lower birth weight
Abnormal genital structure (anogenital distance)
Altered pubertal timing

Source: Based on visuals from a 2021 report by the United Nations Environment Programme, titled "From Pollution to Solution").

neurodevelopmental
Hormonal
Cardio
Respiratory
Reproductive
Metabolic
Pregnancy

Microplastics Could Trigger Inflammation in Human Brain Cells

HEALTH 20 August 2023
By TESSA KOUMOUNDOUROS

(Alistair Berg/DigitalVision/Getty Images)

Mounting evidence suggests microplastics in our blood are likely capable of crossing our mammalian brain-blood barrier. Now preliminary experiments reveal the potential impact they can have once in there, finding weathered microplastics are far more toxic to human brain cells than

These tiny plastic particles cross the blood-brain barrier

SCI-TECH | News

Tiny plastic shards found in human testicles, study says

Human testicles contain microplastics and nanoplastics at levels three times higher than animal testes and human placentas, a new small study found. (Adrienne Bresnahan / Moment RF / Getty Images via CNN Newsource)

“BESIDES GIVING US ANOTHER SOBERING REMINDER OF HOW PLASTIC POLLUTION IS PENETRATING EVERY PART OF OUR BODIES, THE STUDY RAISES CONCERNS ABOUT IMPACT ON MALE FERTILITY “

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Microplastics and Nanoplastics in Atheromas and Cardiovascular Events

Authors: Raffaele Marfella, M.D., Ph.D., Francesco Prattichizzo, Ph.D., Celestino Sardu, M.D., Ph.D., Gianluca Fulgenzi, Ph.D., Laura Graciotti, Ph.D., Tatiana Spadoni, Ph.D., Nunzia D'Onofrio, Ph.D., +35, and Giuseppe Paolisso, M.D. Author Info & Affiliations

Published March 6, 2024
N Engl J Med 2024;390:900-910
DOI: 10.1056/NEJMoa2309822
VOL. 390 NO. 10

CONCLUSIONS

In this study, patients with carotid artery plaque in which MNPs were detected had a higher risk of a composite of myocardial infarction, stroke, or death from any cause at 34 months of follow-up than those in whom MNPs were not detected. (Funded by Programmi di Ricerca Scientifica di Rilevante Interesse Nazionale and others; ClinicalTrials.gov number, NCT05900947.)

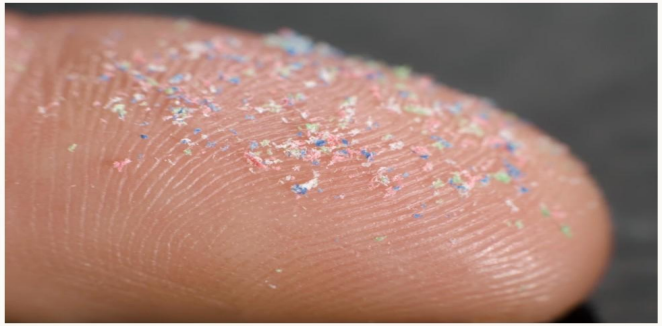
In 2024 human brain samples were 0.5% by weight

YaleEnvironment360

Explore Search About E360

E360 DIGEST
AUGUST 22, 2024

Microplastics Found in Human Brains



Microplastic particles. A-TS / ALAMY STOCK PHOTO

Microplastics have been discovered nearly everywhere, from the bottom of the Mediterranean Sea to the clouds above Mount Fuji, as well as in the food we eat, water we drink, and air we breathe. In people, microplastics have been found in lungs, placentas, testicles, and bone marrow, among other organs, as well as in blood, urine, semen, and breast milk. Scientists are still investigating the potential impact of microplastics, which have been shown to damage human cells.

Troublingly, the new study found more plastic in brain samples gathered in 2024 than in samples gathered in 2016. The 2024 samples were 0.5 percent plastic by weight. "You can draw a line – it's increasing over time," Campen said. "It's consistent with what you're seeing in the environment."

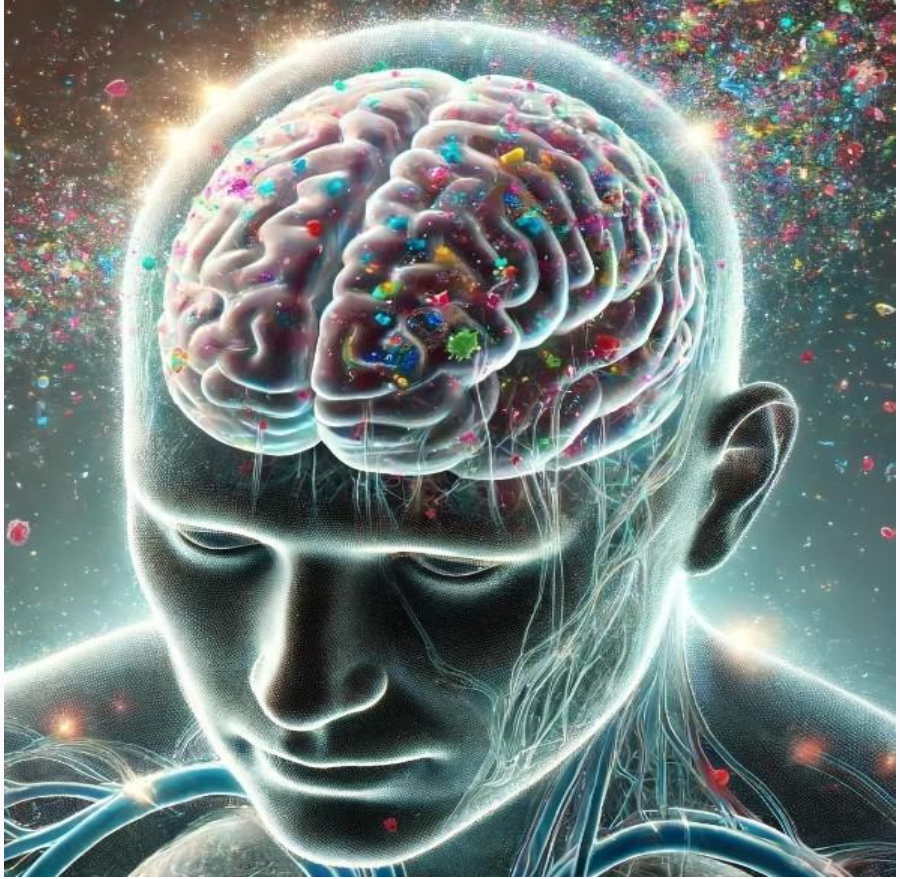
nature medicine

Download PDF

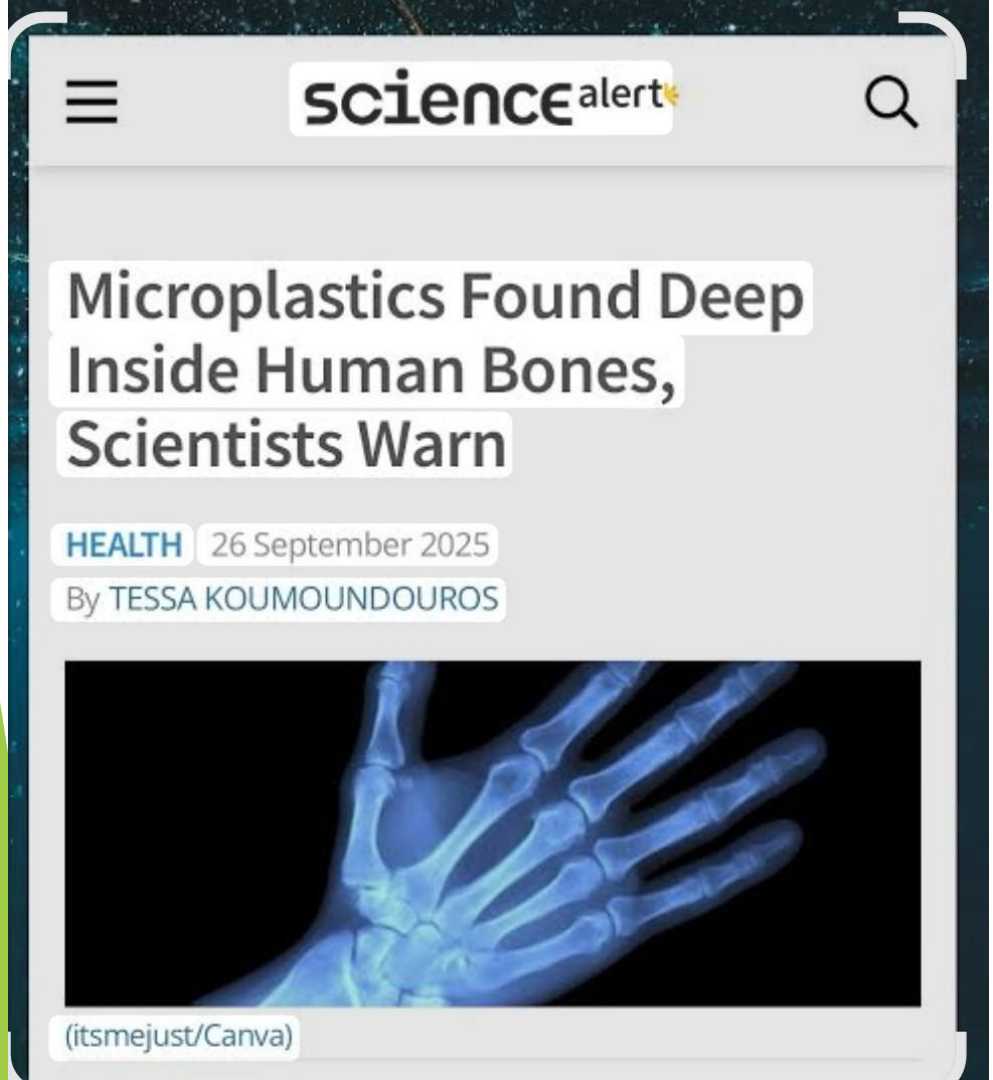
Brief Communication | Open access |
Published: 03 February 2025

Bioaccumulation of microplastics in decedent human brains

Alexander J. Nihart, Marcus A. Garcia, ... Matthew J. Campen + Show authors



A startling study has found microplastics and nanoplastics accumulate at higher levels in the human brain than in the liver and kidneys—and at significantly higher concentrations over the last eight years. There are particularly alarming findings for people **with dementia**.



Science News *from research organizations*

Scientists discover microplastics deep inside human bones

Plastic waste isn't just choking oceans—it's infiltrating our bodies in ways that scientists are only beginning to uncover.

Date: September 19, 2025

Source: Fundação de Amparo à Pesquisa do Estado de São Paulo

Summary: Microplastics have been detected in human blood, brain tissue, and even bones, where they may weaken skeletal structure and accelerate cell aging. Recent studies suggest that these particles could worsen metabolic bone diseases like osteoporosis, a risk that's especially concerning as fractures are projected to rise sharply in the coming decades.

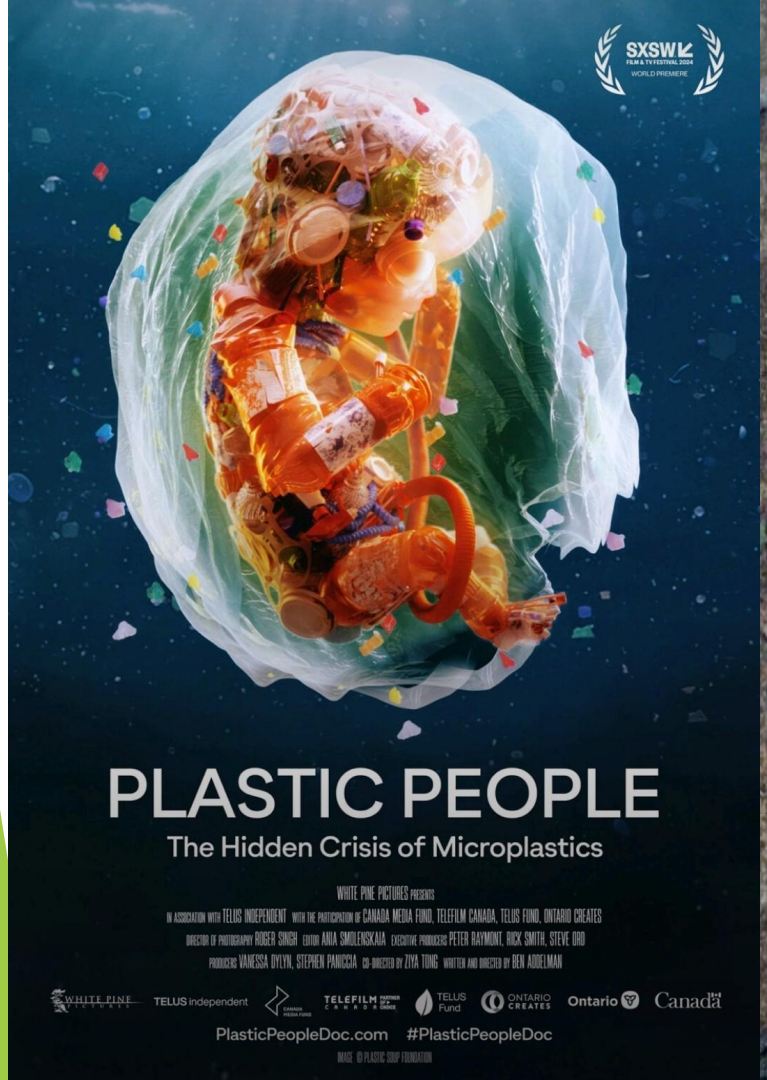

SXSW
FILM & TV FESTIVAL 2024
WORLD PREMIERE
PLASTIC PEOPLE
The Hidden Crisis of Microplastics
WHITE PINE PICTURES PRESENTS
IN ASSOCIATION WITH TELUS INDEPENDENT WITH THE PARTICIPATION OF CANADA MEDIA FUND, TELEFILM CANADA, TELUS FUND, ONTARIO CREATES
DIRECTOR OF PHOTOGRAPHY ROGER SINGH EDITOR ANIA SMOLENSKAIA EXECUTIVE PRODUCERS PETER RAYMONT, RICK SMITH, STEVE ORO
PRODUCERS VANESSA DYLYN, STEPHEN PANUCCIA CO-DIRECTED BY ZIYA TONG WRITTEN AND DIRECTED BY BEN ADDELMAN
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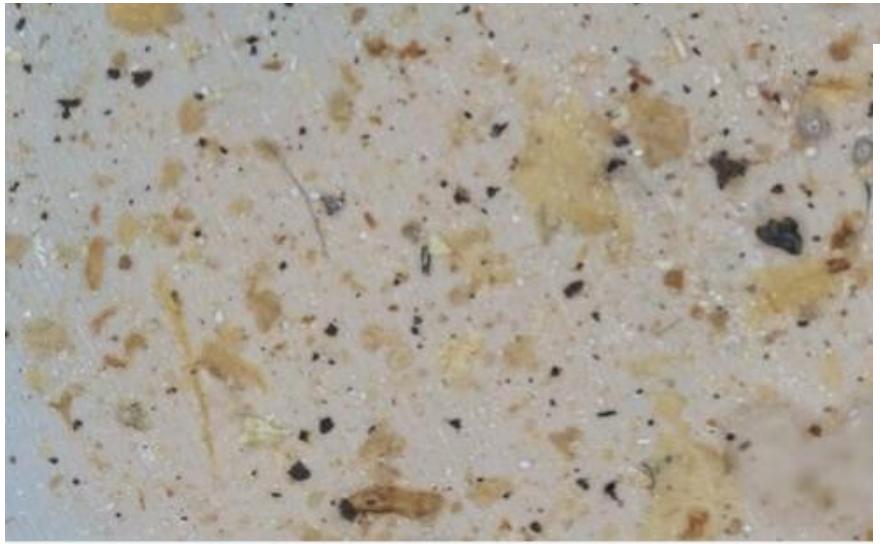
IMAGE © PLASTIC SOUP FOUNDATION


a Plague of Plastics



Plastic pollution linked to rise of killer superbugs, Oxford scientists discover

phys.org

Could microplastics in soil introduce drug-resistant superbugs to the food supply?

A recent study utilizing machine learning to analyze 157 prior investigations reveals that microplastics are disrupting photosynthesis, with potentially... more

Plastics

Microplastics hinder plant photosynthesis, study finds, threatening millions with starvation

Researchers say problem could increase number of people at risk of starvation by 400m in next two decades

288

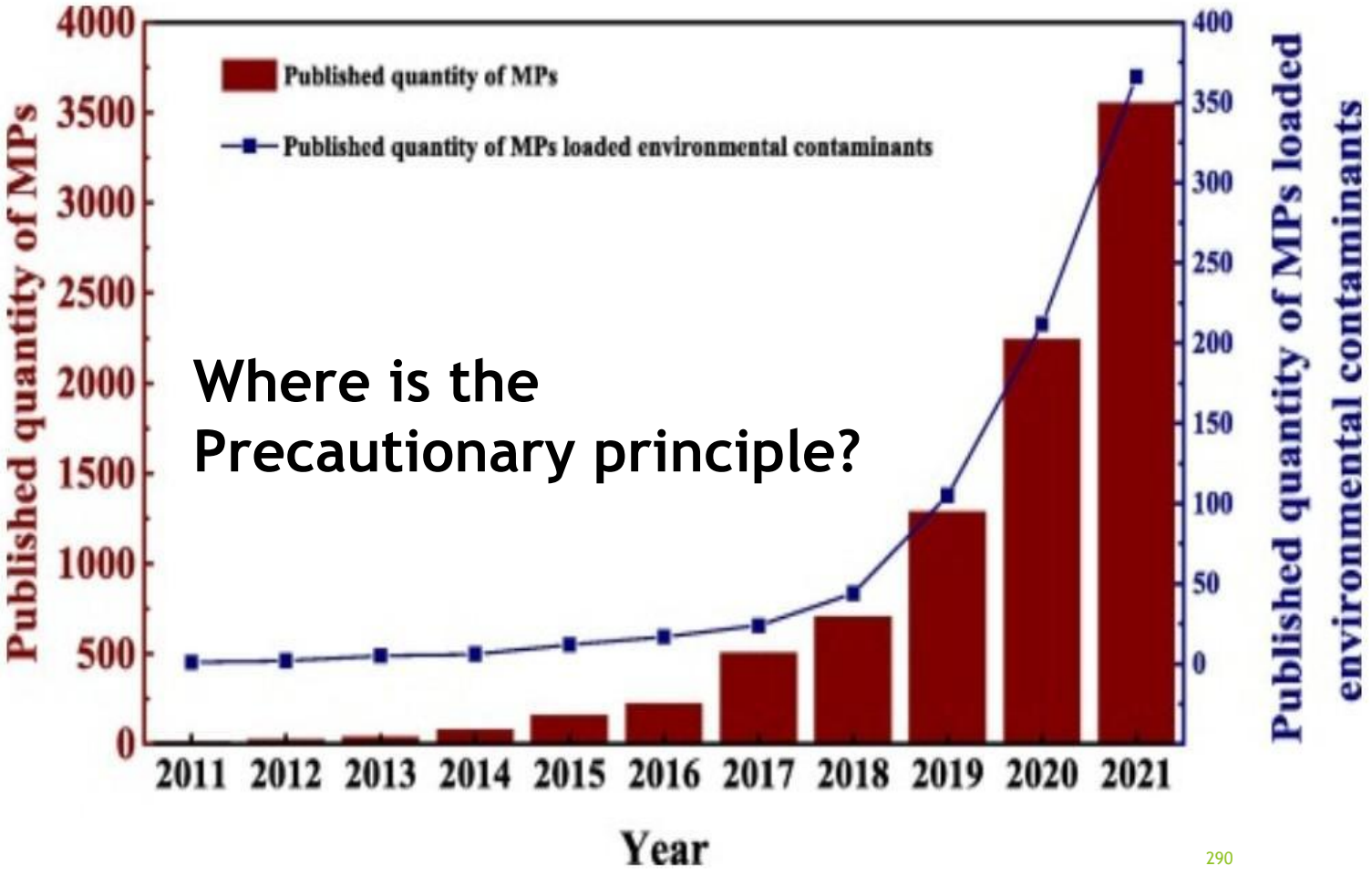
Damian Carrington *Environment editor*

Mon 10 Mar 2025 19.00 GMT

Warning Over Microplastics in the Air We Breathe After Bird Lung Discovery

Newsweek · 2d

"Our research highlights an urgent need to address plastic pollution in our environments, as these contaminants can have far-reaching impacts on ecosystem health, as well as human health," DuBay said in a statement.



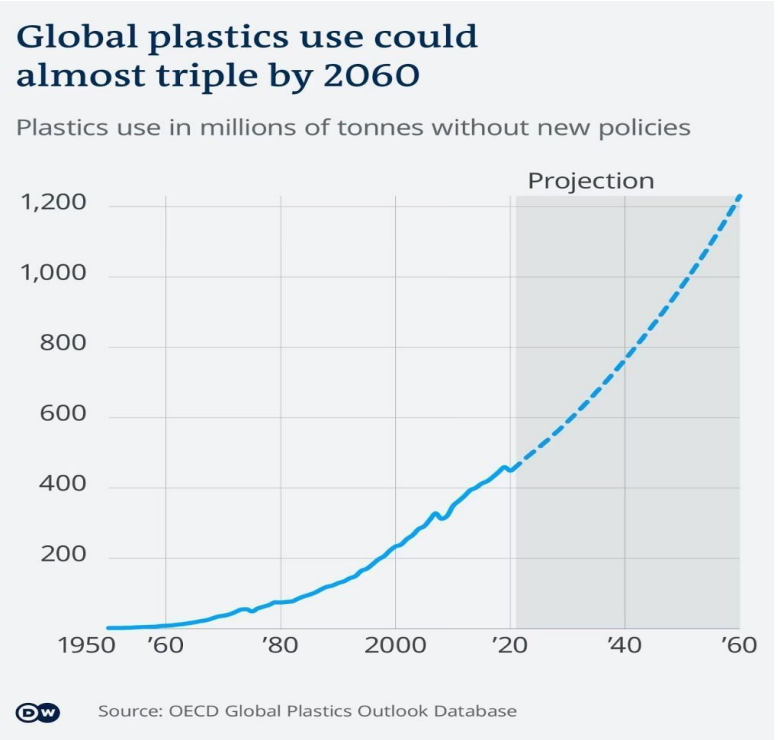
Where is the Precautionary principle?

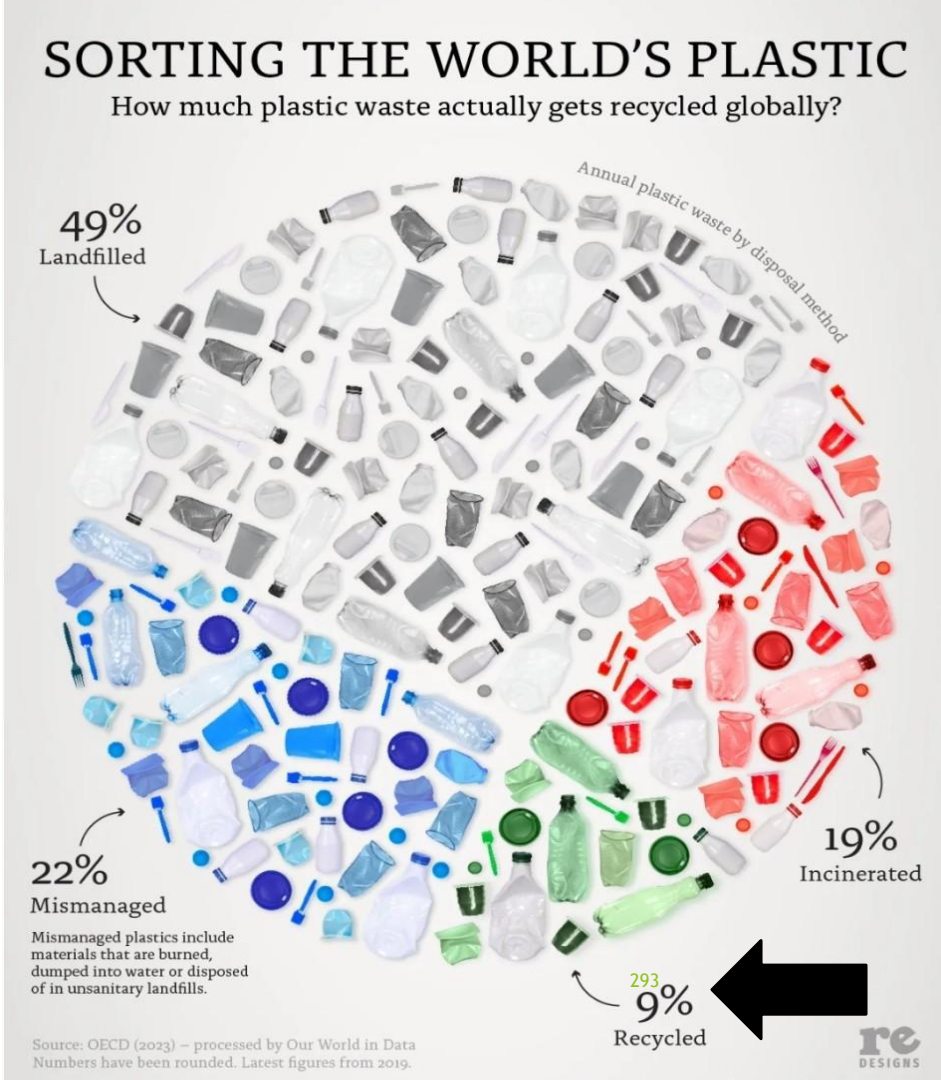
WE NEED TO SHUT OFF THE PLASTIC TAP

11-09-2023

Global plastics treaty tackles the pollution problem directly at the source

Plastic Recycling: The truth





Here is a table with plastic recycling codes 1-7 with examples and recyclability:

Energy Theory, April 9, 2024, Olivia Bolt

Underpinning the plastic waste crisis is a campaign of fraud and deception that fossil fuel and other petrochemical companies have created and perpetuated for decades.

WHO SAID RECYCLING WAS GREEN?

6-13% becomes microplastics in the wastewater

https://insideclimatenews.org:

Bioplastics as toxic as regular plastics; both need regulation, say researchers

Mongabay · 1d

Position Statement:

-emphasizes integrating environmental stewardship and sustainability into IPAC

-recognizes global impact and the need for resource stewardship

- encourages;
risk-benefit analyses
sustainability teams
reprocessing of medical devices
waste reduction
holding manufacturers responsible for LC impact
innovation to reduce pollution

REUSABLE PRODUCTS

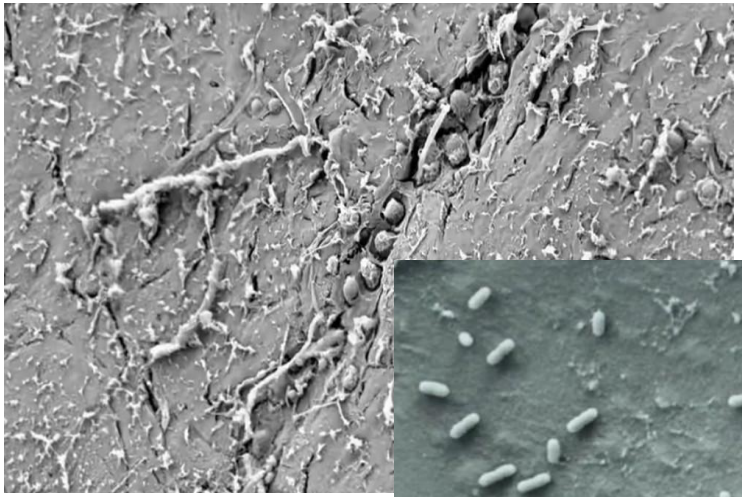

VISUAL CAPITALIST DATASTREAM
DISPOSABLE MASKS
A new pollution threat
In response to government mandates, the world's factories produced 52 billion disposable face masks in 2020. It's estimated that 1.6 BILLION of them ended up in our oceans.
Here's how long they'll take to biodegrade.
Mask pollution from 2020 is equal to 7% of the Great Pacific Garbage Patch, a mass of plastic debris that floats in the Pacific Ocean.
Masks ~5,500T
Great Pacific Garbage Patch 80,000T
10Y CIGARETTE BUTT
20Y PLASTIC GROCERY BAG
50Y STYROFOAM CUP
200 YEARS ALUMINUM CAN
PLASTIC BOTTLE
DISPOSABLE MASK
DISPOSABLE DIAPER
450 YEARS
SINGLE-USE MASKS include N95 respirators and surgical masks.
Source: Statista, Oceans Asia, Plastic Collectors

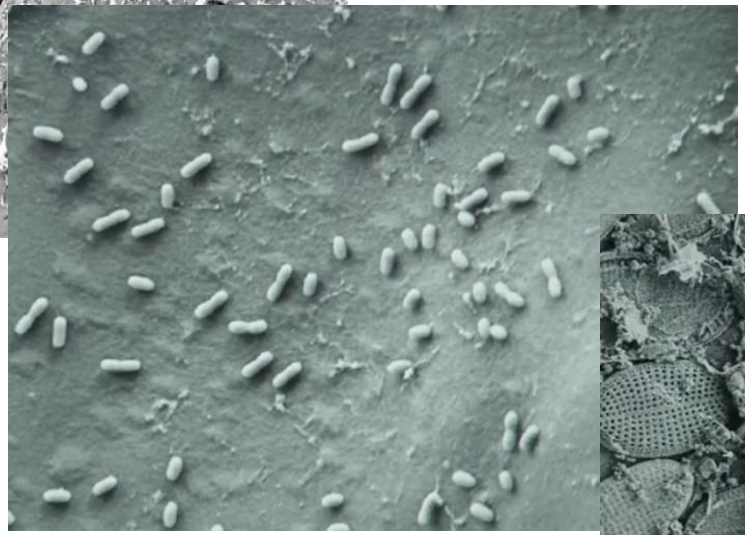
One estimate indicates that up to 91 BILLION single use masks are thrown out every year

QUESTION:

- How much microplastic, nanoplastic, and PFAS are we breathing in to our noses with these single use masks??

PATHOGENIC BACTERIA ON MICROPLASTICS





Edvard Munch, The Scream

Ecotoxicology and Environmental Safety

Volume 275, 15 April 2024, 115858

Wearing face masks as a potential source for inhalation and oral uptake of inanimate toxins – A scoping review

Kai Kisielinski [a], Stefan Hockertz [b], Oliver Hirsch [c], Stephan Korupp [d], Bernd Klosterhalfen [e], Andreas Schnepf [f], Gerald Dyker [g]

Highlights

- Face masks filter bacteria, dirt, plastic fibres, but may also cause health harms.
- Inhalation of particles and potentially toxic substances from the mask is possible.
- We found high micro- and nanoplastics release and content.
- we evidenced exceedances for volatile organic compounds, acrolein, phthalates.
- also for xylene, per/polyfluoroalkyl substances and for Pb, Cd, Co, Cu, Sb and TiO_2.

Per- and Polyfluoroalkyl Substances (PFAS) in Facemasks: Potential Source of Human Exposure to PFAS with Implications for Disposal to Landfills

Derek J Muensterman [1,∇], Liliana Cahuas [2,∇], Ivan A Titaley [3,∇], Christopher Schmokel [4], Florentino B De la Cruz [5], Morton A Barlaz [6], Courtney C Carignan [7], Graham F Peaslee [8], Jennifer A Field [9]

Refuse products that can harm the environment and us, unnecessarily

Global face mask pollution: threats to the environment and wildlife, and potential solutions

Limin Wang [a,e,1], Shengxuan Li [b,1], Ibrahim M Ahn [a], Guiying Zhang [a], Yanfeng Sun [c], Yang Wang [a,e], Congnan Sun [a,e], Chuan Jiang [a,e], Peng Cui [d], Dongming Li [a,e,*]

▸ Author information ▸ Article notes

▸ Copyright and License information

PMCID: PMC10174332 PMID: 37178835

Original Investigation | Environmental Health

September 16, 2024

Microplastics in the Olfactory Bulb of the Human Brain

Luís Fernando Amato-Lourenço, PhD[1,2]; Katia Cristina Dantas, PhD[2]; Gabriel Ribeiro Júnior, PhD[2]; et al

» Author Affiliations | Article Information

JAMA Netw Open. 2024;7(9):e2440018. doi:10.1001/jamanetworkopen.2024.40018

Key Points

Question Can microplastics reach the olfactory bulb in the human brain?

Findings This case series analyzed the olfactory bulbs of 15 deceased individuals via micro-Fourier transform infrared spectroscopy and detected the presence of microplastics in the olfactory bulbs of 8 individuals. The predominant shapes were particles and fibers, with polypropylene being the most common polymer.

Meaning The presence of microplastics in the human olfactory bulb suggests the olfactory pathway as a potential entry route for microplastics into the brain, highlighting the need for further research on their neurotoxic effects and implications for human health.

CANADIAN INNOVATION

HUMAN HEALTH and ENVIRONMENTAL CARE

Etrema

etrëma

The only ecoresposible reusable masks approved as medical devices by Health Canada

etrëma® protects us, and protects the Planet.

50 000 single-use mask discarded every **second** worldwide

How are etrëma masks the best?

The unique worlwide patented structure of our multilayered membrane **ëncore®** and our really more air-tight design allow both exceptional **integral protection** and exceptional breathability.

minimum **35%** more breathable

minimum **30%** more protective than disposable medical masks

Why the etrëma reusable masks?

Disposable masks are a major source of plastic pollution. We provide a sustainable, more protective, comfortable and convenient alternative to this ecological disaster.

1 etrëma mask only = minimum **200** single-use masks

more than **98%** plastic saved from production alone

ZERO WASTE

What is Health Canada's Medical Device Establishment Licence?

This is the guarantee that we are authorised to manufacture suitable products for use in medical environments.

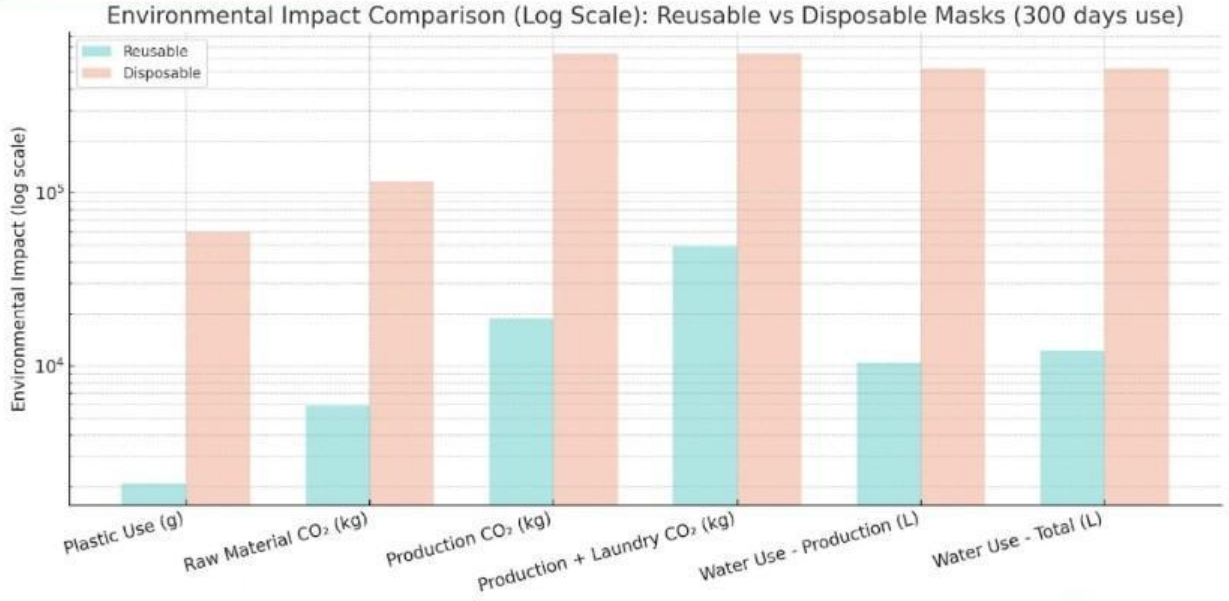
Anti-fogging

Anti-moisture

CE

CHESST & INSPQ

Comparison of impacts



ë
frëtt solutions

- 96,5% of plastic produced

- 93% of GHG including washing

The convenience that's destroying us

SOURCES:
https://www.sciencedirect.com/science/article/pii/S2590332223003883, https://pmc.ncbi.nlm.nih.gov/articles/PMC9807258/, https://www.cihi.ca/sites/default/files/document/hip-knee-replacements-in-canada-cjrr-annual-report-2020-2021-en.pdf, https://www150.statcan.gc.ca/n1/pub/82-003-x/2010002/article/11235-eng.htm, https://www.cihi.ca/sites/default/files/document/hip-knee-replacements-in-canada-cjrr-annual-report-2020-2021-en.pdf, https://www150.statcan.gc.ca/n1/pub/82-003-x/2010002/article/11235-eng.htm, https://ecoinvent.org/

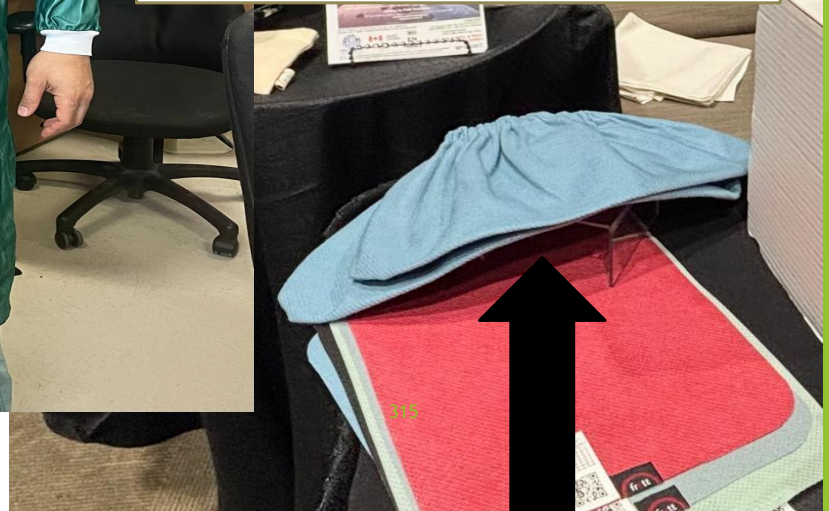
Reusable face shields protect your mask from contamination/moisture and your face!!

Studies demonstrate that reusable surgical textiles are superior to the products of 20 years ago. **66% reduction in greenhouse gas emissions • 87% reduction in total water consumed**. Source: AORN March 2020 Issue – An Environmental Analysis of Reusable and Disposable Surgical Gowns. Jun 19, 2024

https://iahtm.com PDF

Reusable vs. Disposable Surgical Gowns - iahtm

…Reusables



Head to toe…..

What are we throwing out reprocessing?

Edvard Munch, The

An efficient, safe, sustainable reprocessing protocol….

STERILIZATION

Safety above all

Double-layered
Wraps

etrëma
frëtt solutions

Easy Laundering Cycles

ëncore & ëncore Up to 100 uses

etrëma

Step 1

Take and use the clean item*

Step 2

Place in a mesh laundry bag

Step 3

Machine wash and dry **in** the bag

(hot water and high-temperature dryer, detergent without additives - no fabric softener)

Step 4

Check or scan to track the number of washes

Step 5

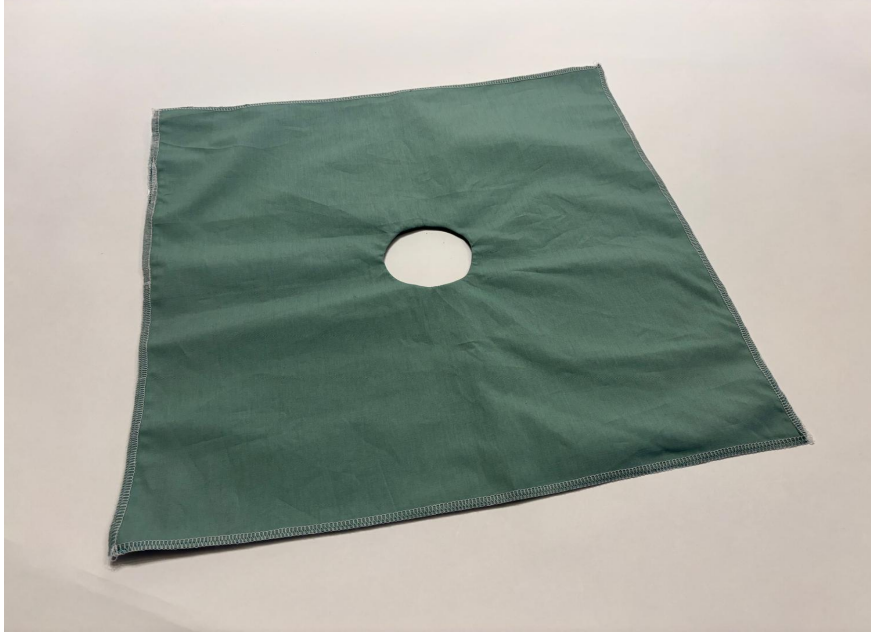
Store neatly until next use

*Same protocols as disposable products. The **ëncore** technology ensures effectiveness for an entire day, **eliminating** the need for replacement every 4 hours like disposable products.

ZERO WASTE

After 100 washes, at Frëtt Solutions, we take our products back for complete recycling.

Contact us. etrema.ca | service@frettsolutions.com



Reusable wrap, pouches, drapes

On-site laundering of reusable gowns, scrubs, caps, masks, wrap, and pouches makes the most sense for sustainability, infection control, and COST …

Laundering synthetic clothing is a huge problem
Up to 35% of ocean plastic is from microplastic shedding during laundering

Global Village Speakers Series

Laurie Houston · 1d ·

collingwoodtoday.ca

Collingwood project catches billions of microplastics

My Canadian-made microplastic filter

Reusable Patient Bibs

Made in Quebec wipeable and washable choices

2000 BIBS BECOME 1

Ditch unnecessary paper

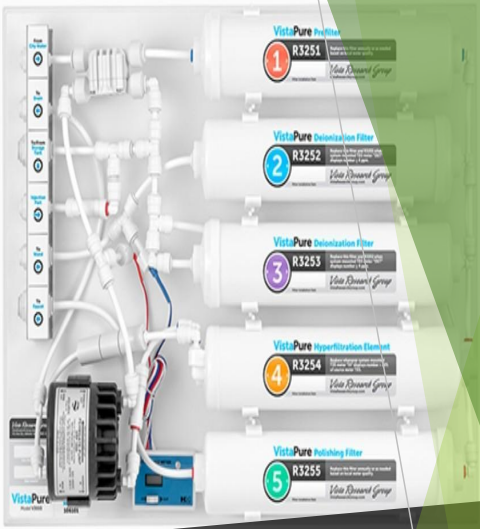
Freepik

Plastic barriers…WHY???

Instagram

-European MIFU: wipe down between patients with disinfectant
-Optical?
-Unsustainable
-Microplastics

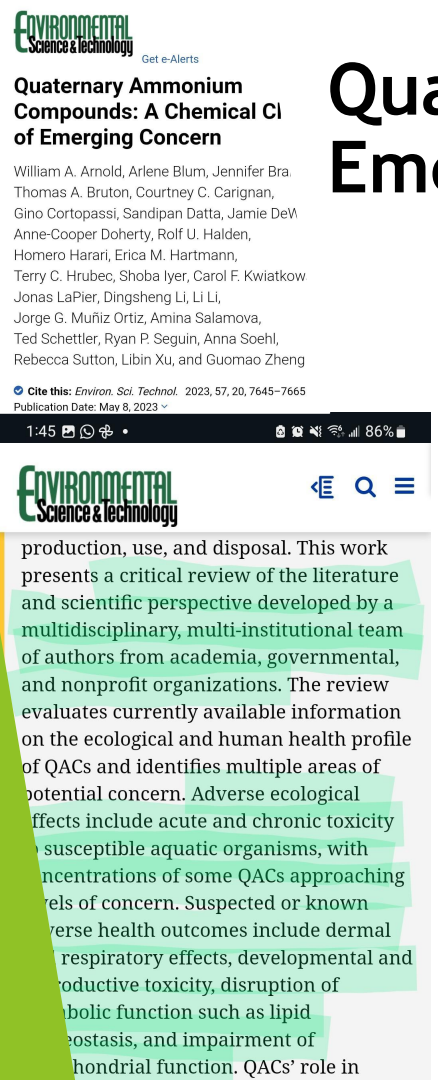
- Eliminates the inconvenience and expense of buying bottled water
- Lets you bottle your own water at a fraction of the cost
- Produces up to 24 liters of pure water per day
- Prevents mineral build-up and increases the life of water
- Eliminates Cysts, Bacteria and Viruses



DISTILLED WATER

Best Solution:
onsite/reduced transportation and manufacturing footprint

- Disinfection products have substantial environmental impact
- There are adverse effects with several common disinfectants
- Hypochlorous acid (HOCl) has a minimal toxicity profile and can be made on site



Quaternary Ammonium Compounds Emerging concerns…

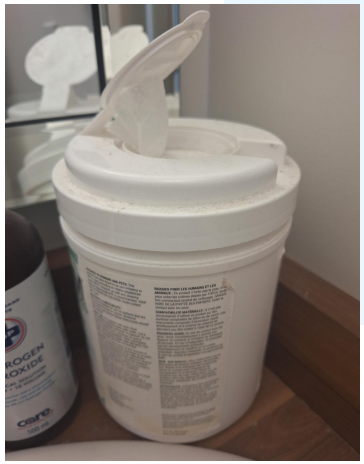
- Toxicity to susceptible aquatic organisms
- Dermal and respiratory effects
- Developmental and reproductive toxicity
- Disruption of metabolic function such as lipid homeostasis and impairment of mitochondrial function

65$ FOR 3000 USES

30$ FOR 160 USES

Super Absorbent Cotton Sheets

Class 1 Medical Device : ISO Class 5-8 : USP <797>



Reusable/NO MICROPLASTICS

Hypochlorous acid

Made on site


PURE
HYPOCHLOROUS
pH | PPM OPTIMIZED
DIN 02527553
EnviroNize
PURE HYPOCHLOROUS
PUR HYPOCHLOREUX
HAISAN
HOSPITAL | HEALTH CARE
KILLS 99.999%

HOSPITAL & HEALTH CARE

Disinfectant | Sanitizer | Bactericide | Broad Spectrum Virucide

CRITICAL DISINFECTION: Use EnviroNize® HAISAN™ to disinfect areas such as medical equipment, accessories, patient rooms, reception areas, high-touch surfaces, bathroom fixtures, and any washable food and non-food contact surface where disinfection is required.

KILLS 99.999%
✓ Bacteria ✓ Viruses ✓ Germs

DEODORIZER | FRAGRANCE FREE

EFFECTIVE AGAINST

- Human Coronavirus
- Human Adenovirus type 5
- Staphylococcus aureus
- Pseudomonas aeruginosa
- Enveloped and Non-Enveloped viruses
- Other Bacteria

Proactive Prevention of Pathogens™

Sustainable Disinfectant

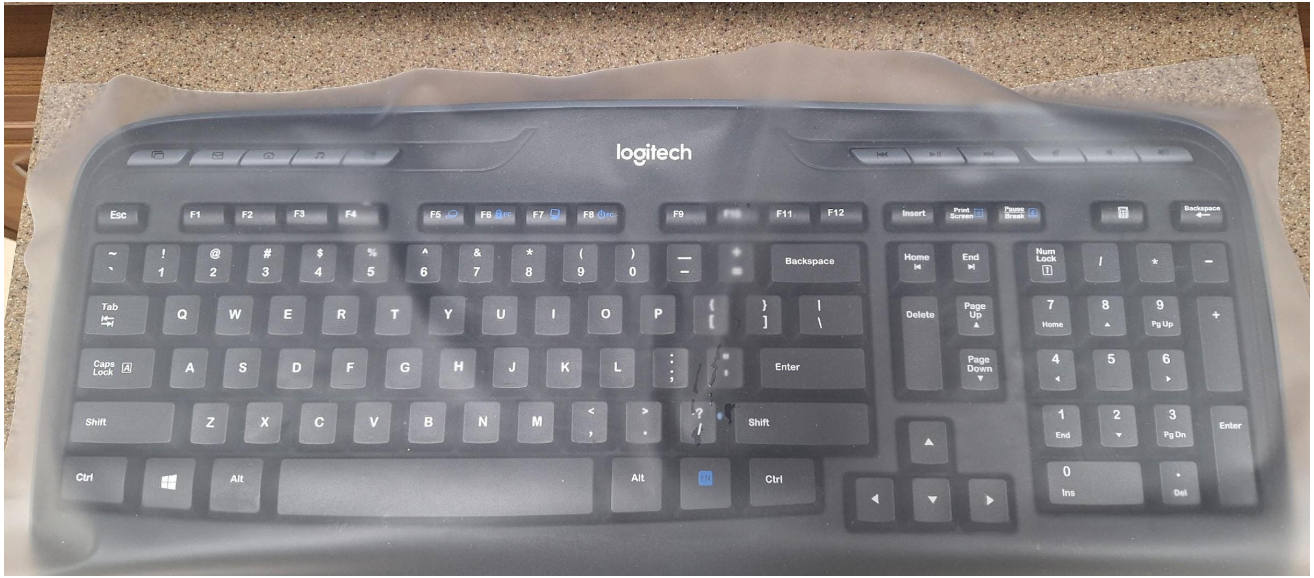
HOW HEALTHCARE INSTITUTIONS CAN INCORPORATE SUSTAINABLE AND ETHICAL SCRUBS

Amazonia Carbon

-the fashion industry accounts for roughly 10% of global CO_2 emissions

-choose sustainable fabrics with no microplastics

-use the same scrubs for as long as possible



Use a reusable wipeable silicone barrier for your operatory keyboard

Plastics pollution led to $250 billion in disease over one year

BY SAUL ELBEIN - 01/11/24 9:00 AM ET

MIFUs…

- A 2023 article in the Journal of the American Medical Association categorically asserts that **to promote profits manufacturers simply designate items as single use**

MIFUs/Single Use…

- overuse of natural products
- excessive production of solid wastes
- environmental degradation
- inherently unsustainable
- There is an absence of substantiating evidence that single use disposables reduce health care acquired infections


COST

LEADERSHIP

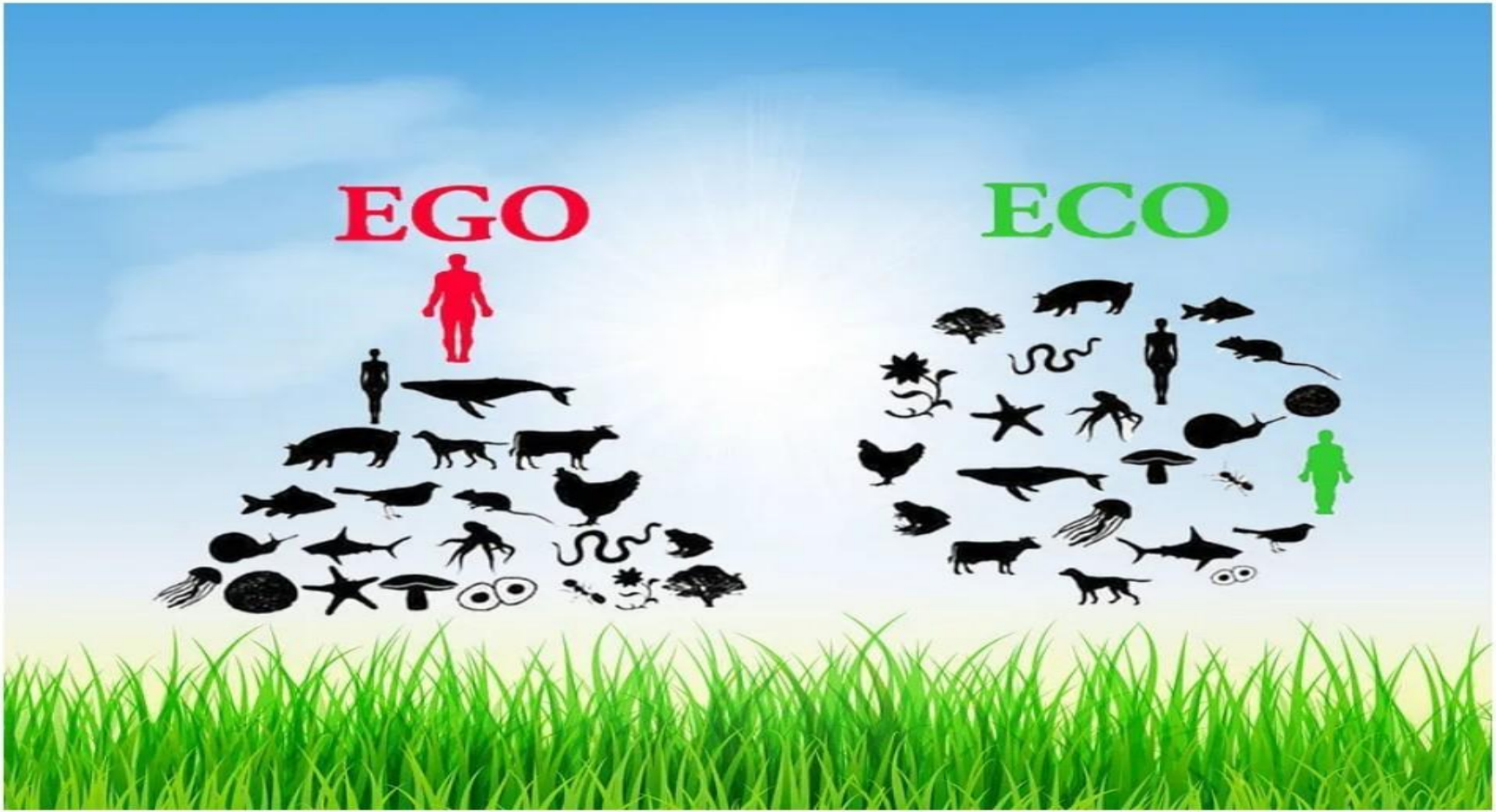
Communicate

Consider your personal footprint

Educate

PLANETARY HEALTH

- Healthcare workers are trained to DO NO HARM
- That should include caring for the planet



https://darachcroft.com/news/from-ego-to-eco

Every child deserves a future with a livable planet


Amiin Caaqil


The world is changed by your example not by your opinion.
-PAUL COELHO

HELP ME BE THE CHANGE

Panel:
Feeding Decarbonization: The Food System's Role in Climate Action

THE PANELISTS:

Amy Ford
Nourish

Wendy Smith
Mohawk Medbuy

Dr. Zahra Kassam
Stronach Regional Cancer Centre & University of Toronto

Sarah Jarvis
University of Toronto

Brittany Maguire
University of Toronto

Panel:
Catalyzing Impact: How Funders are Shaping Climate and Health Action

THE PANELISTS:

Lucy Lu
Peter Gilgan Foundation

Ed Rubinstein
University Health Network

Arielle Campbell
Canadian Coalition for Green Health Care

Presentation:
When the Smoke Clears: Lessons from Yellowknife on Resilient and Sustainable Healthcare

THE SPEAKER:

Dr. Courtney Howard
Emergency Physician, Yellowknives Dene Territory (Canadian subarctic)
Clinical Associate Professor, University of Calgary
Chair, Global Climate and Health Alliance
Founder, POWER
President, Northwest Territories Medical Association

When the Smoke Clears

Lessons from Yellowknife on Resilient and Sustainable Healthcare

Canadian Coalition for Green Healthcare Conference 2025

Dr Courtney Howard, MD, CCFP-EM, Twitter: @courtghoward

Emergency Physician, Yellowknives Dene Territory
Clinical Associate Professor, Cumming School of Medicine, University of Calgary
Community Research Fellow, DahDaleh Institute for Global Health
Chair, Global Climate and Health Alliance
Founder, POWER-PlanetaryHealth Organizations for Wellbeing, Equity & Regeneration

POWER
PLANETARY HEALTH ORGANIZATIONS FOR WELLBEING, EQUITY & REGENERATION

THE GLOBAL CLIMATE & HEALTH ALLIANCE

Faculty/Presenter Disclosure

- Faculty: Courtney Howard
- Relationships with financial sponsors:
  - Speakers honoraria from various academic institutions and the Climate and Health Foundation
  - Paid board member Canadian Medical Association—term ended 2024
  - Paid consultant—, Health Canada, Trottier Foundation for POWER

THE LANCET
Planetary Health

(Planetary Health Nest Image in Supplement)

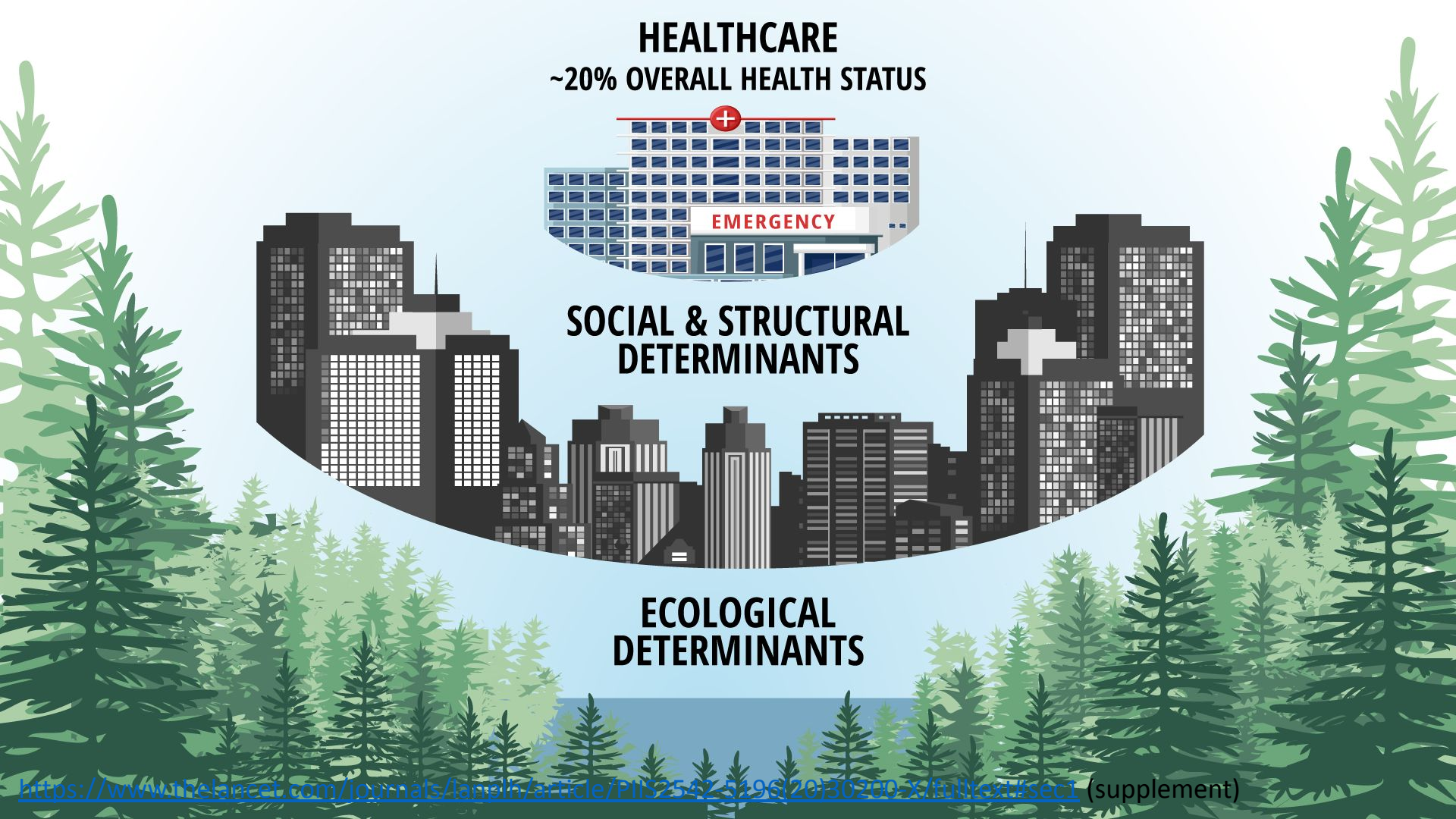
COMMENT | VOLUME 4, ISSUE 9, E372-E374, SEPTEMBER 01, 2020

Targeted change making for a healthy recovery

Courtney Howard

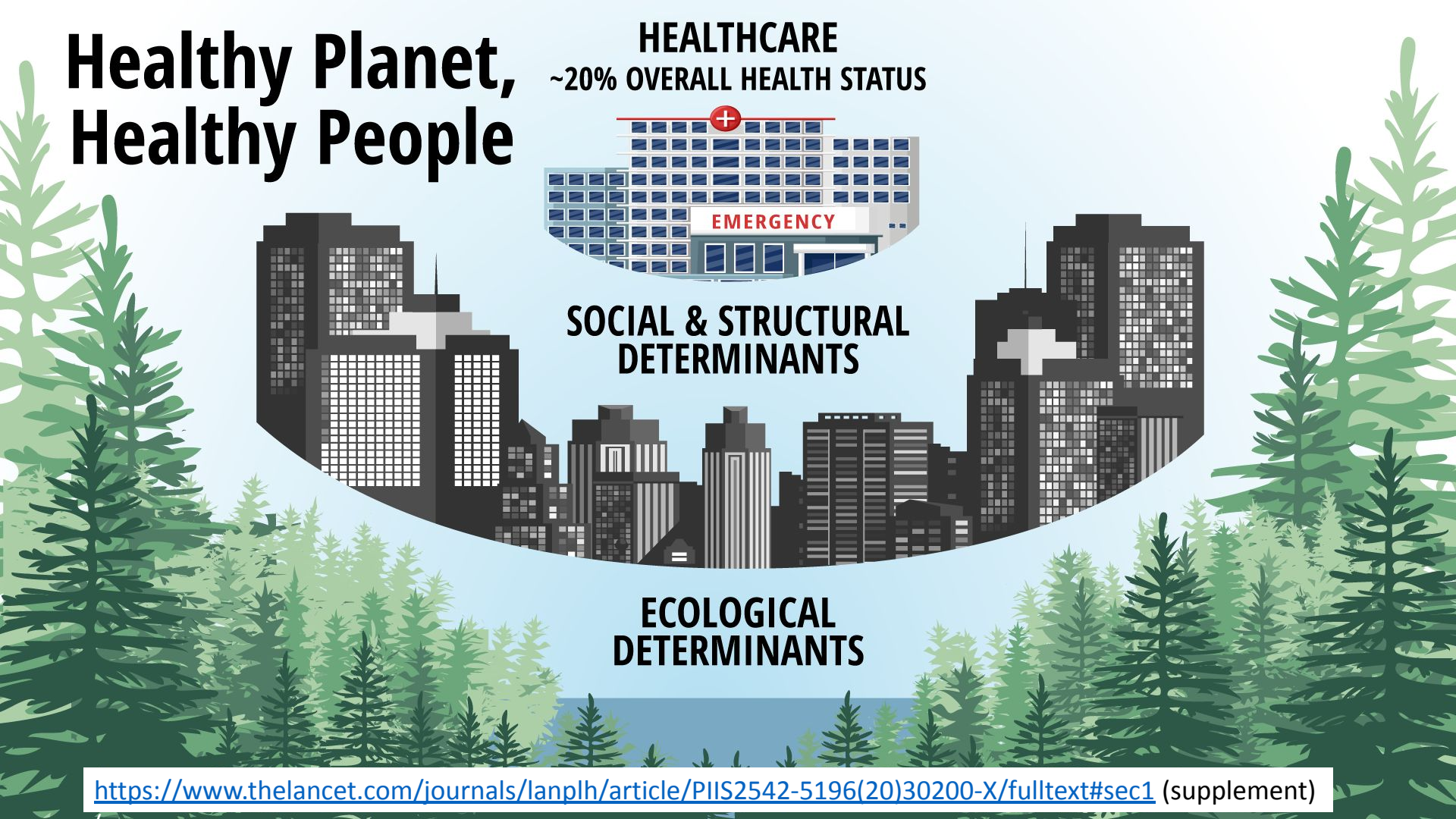
Open Access • Published: September, 2020 • DOI: https://doi.org/10.1016/S2542-5196(20)30200-X •

https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30200-X/fulltext#sec1



https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30200-3/fulltext#sec1 (supplement)

Healthy Planet, Healthy People



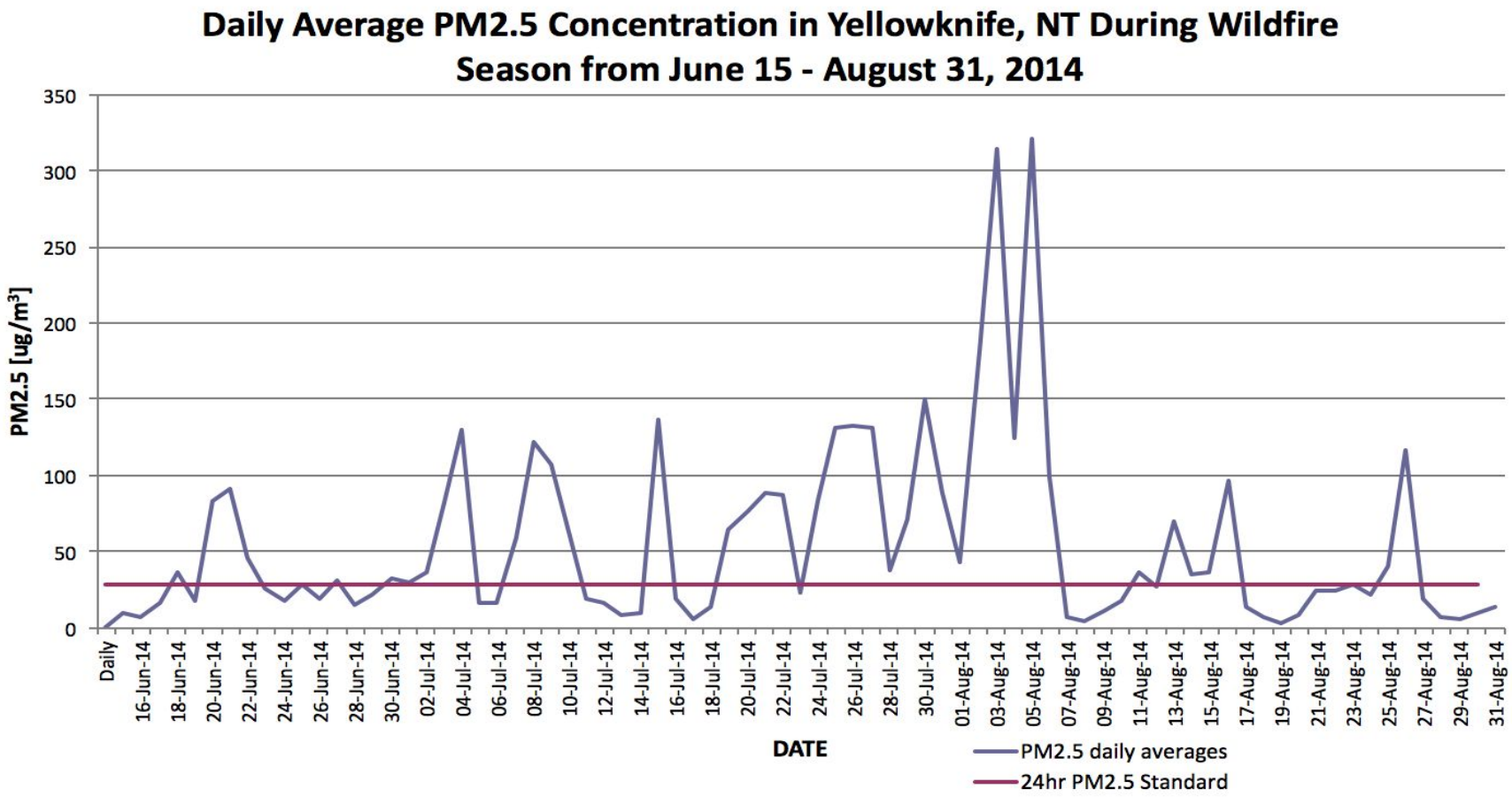
https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30200-X/fulltext#sec1 (supplement)

@courtghoward

2014 Yellowknife: SOS-Summer of Smoke

2x usual ER visits for asthma over 2.5 months[1]
Separation from the land, loneliness, reduction in physical activity, pride at adaptation manoeuvers, + ecoanxiety & ecological grief

1-https://pubmed.ncbi.nlm.nih.gov/29981098/
2-https://pubmed.ncbi.nlm.nih.gov/29981098/



Howard C, Rose C, Dodd W, *et al*
SOS! Summer of Smoke: a retrospective cohort study examining the cardiorespiratory impacts of a severe and prolonged wildfire season in Canada's high subarctic
BMJ Open 2021;**11:**e037029. doi: 10.1136/bmjopen-2020-037029

From the Centers for Disease Control and Prevention. Surveil- lance of morbidity during wildfires—Central Florida, 1998. JAMA 1999; 281: 789–90.

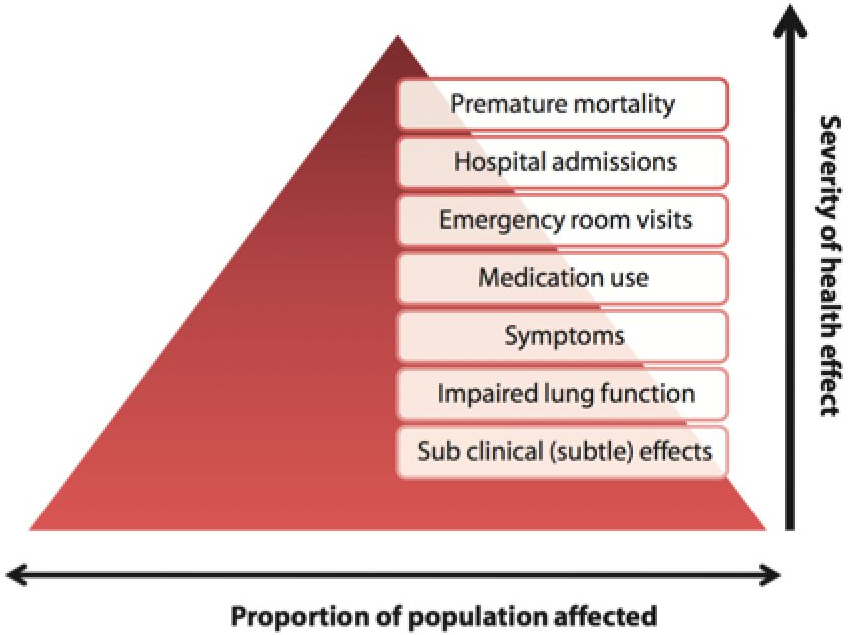


Figure 2 The air pollution health effects pyramid (adapted from American Thoracic Society 2000).[43]

Circulation
Volume 146, Issue 10, 6 September 2022; Pages 788-801
https://doi-org.ezproxy-prd.bodleian.ox.ac.uk/10.1161/CIRCULATIONAHA.121.058058

IN DEPTH

Protecting Cardiovascular Health From Wildfire Smoke

Michael B. Hadley, MD, Sarah B. Henderson, PhD, Michael Brauer, ScD, and Rajesh Vedanthan, MD

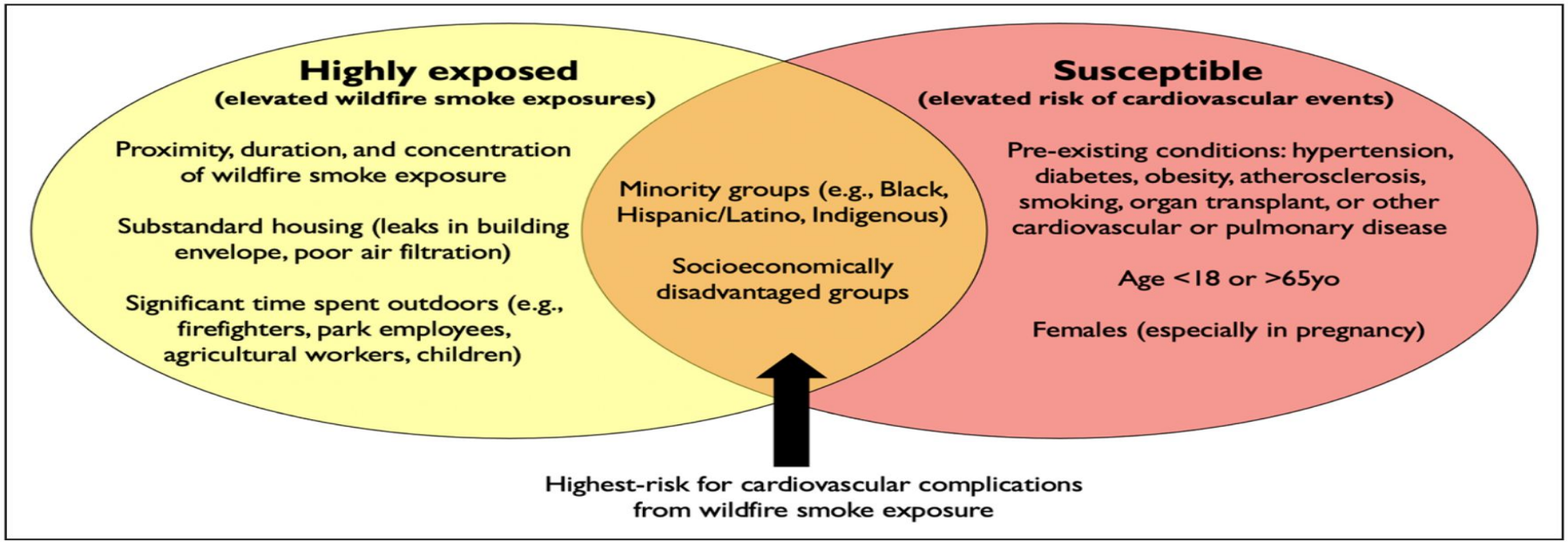
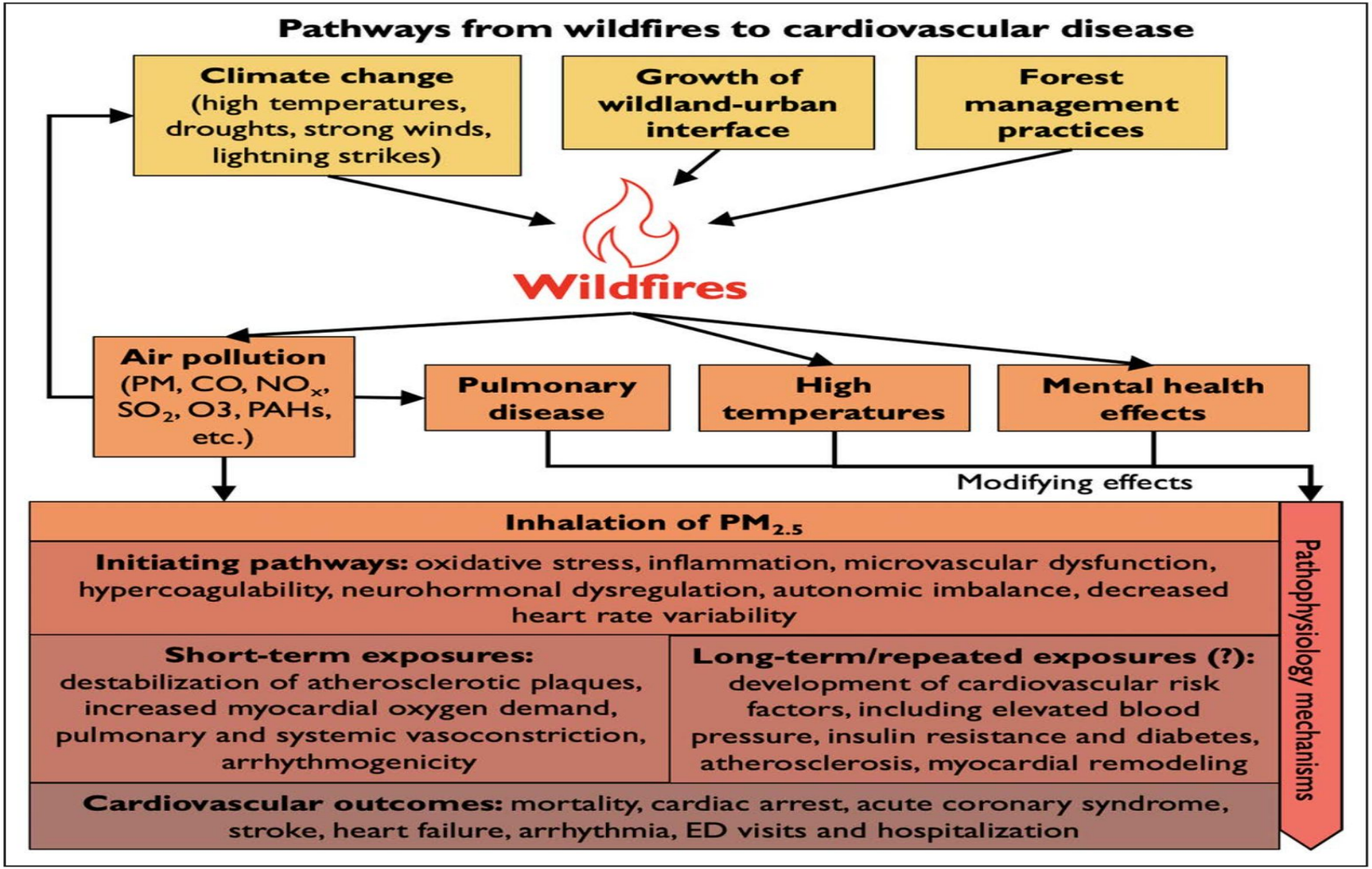


Figure 4. Risk assessment: factors determining exposure and susceptibility.
Highly exposed individuals are exposed to higher concentrations of wildfire smoke. Susceptible individuals are at elevated risk of cardiovascular complications for any given level of wildfire smoke exposure. Individuals at highest risk are both highly exposed and susceptible. Clinicians can screen for these factors to identify patients at elevated risk, for whom interventions to reduce exposures may be warranted.


Pathways from wildfires to cardiovascular disease
Climate change (high temperatures, droughts, strong winds, lightning strikes)
Growth of wildland-urban interface
Forest management practices
Wildfires
Air pollution (PM, CO, NO_x, SO_2, O3, PAHs, etc.)
Pulmonary disease
High temperatures
Mental health effects
Modifying effects
Inhalation of $PM_{2.5}$
Initiating pathways: oxidative stress, inflammation, microvascular dysfunction, hypercoagulability, neurohormonal dysregulation, autonomic imbalance, decreased heart rate variability
Short-term exposures: destabilization of atherosclerotic plaques, increased myocardial oxygen demand, pulmonary and systemic vasoconstriction, arrhythmogenicity
Long-term/repeated exposures (?): development of cardiovascular risk factors, including elevated blood pressure, insulin resistance and diabetes, atherosclerosis, myocardial remodeling
Cardiovascular outcomes: mortality, cardiac arrest, acute coronary syndrome, stroke, heart failure, arrhythmia, ED visits and hospitalization
Pathophysiology mechanisms

Long-term exposure to wildfires and cancer incidence in Canada: a population-based observational cohort study

Jill Korsiak, Lauren Pinault, Tanya Christidis, Richard T Burnett, Michal Abrahamowicz, Scott Weichenthal

Lancet Planet Health 2022; 6: e400–09

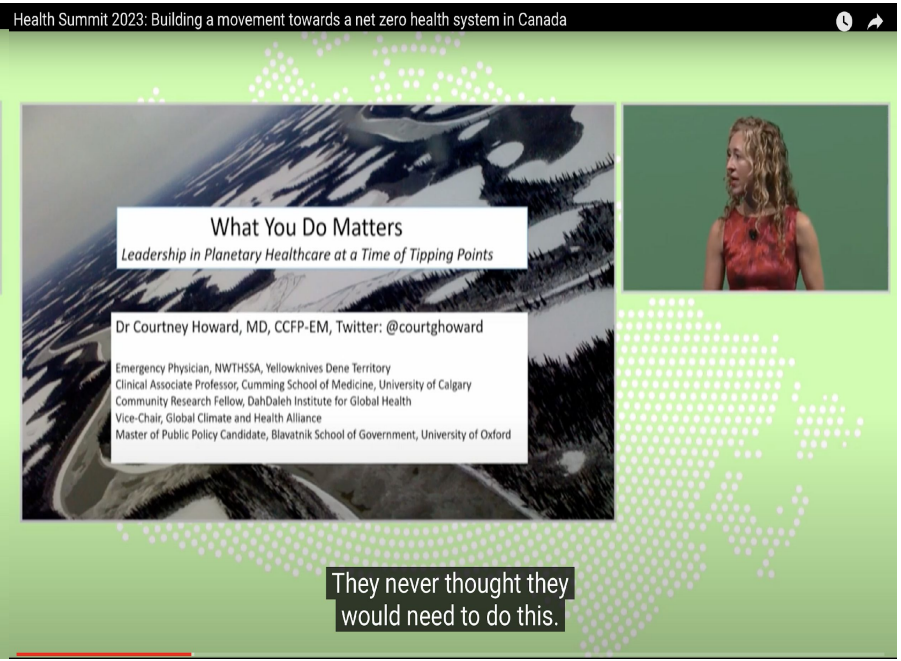
Department of Epidemiology, Biostatistics, and Occupational Health, McGill University, Montreal, QC, Canada

Added value of this study

To our knowledge, this is the first study in the world to examine associations between wildfires and the incidence of several cancer outcomes, including lung cancer, brain tumours, and numerous haematological cancers. In this longitudinal study of more than 2 million Canadians followed for 20 years, we defined residential wildfire exposure as area of forest burned within a 20 km and 50 km radius of residential locations, updated annually. Compared with unexposed populations, cohort members who were exposed to a wildfire within 50 km of residential locations in the past 10 years had a 4·9% (95% CI 2·8–7·1) relatively higher incidence of lung cancer than unexposed populations in adjusted models, and a 10% (2·6–17·9) relatively higher incidence of brain tumours. Similar associations were found for the 20 km radius.

N95s are Our Friends


Health Summit 2023: Building a movement towards a net zero health system in Canada
What You Do Matters
Leadership in Planetary Healthcare at a Time of Tipping Points
Dr Courtney Howard, MD, CCFP-EM, Twitter: @courtghoward
Emergency Physician, NWTHSSA, Yellowknives Dene Territory
Clinical Associate Professor, Cumming School of Medicine, University of Calgary
Community Research Fellow, DahDaleh Institute for Global Health
Vice-Chair, Global Climate and Health Alliance
Master of Public Policy Candidate, Blavatnik School of Government, University of Oxford
is being emergently evacuated.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Community Research Fellow, DahDaleh Institute for Global Health
Vice-Chair, Global Climate and Health Alliance
Master of Public Policy Candidate, Blavatnik School of Government, University of Oxford
They never thought they
would need to do this.

Members of the Canadian Armed Forces Air Task Force carry patients from the hospital in Yellowknife on board a CC-177 Globemaster III from 429 Transport Squadron as they prepare to transport patients during the evacuations from Yellowknife on Friday. (Lt. (Navy) Alex Roy/Canadian Armed Forces)

Need Indoor Air Quality Monitoring in Health Facilities & Clean Air Shelters

Aim for a $PM_{2.5}$ of under 30 mcg/m^3 in clean air shelters, understanding that no level of $PM_{2.5}$ is without risk, and that the WHO 24 hour target level is under 15mcg/$m^{3.73}$
Low-risk=0-30 mcg/m^3;
Moderate Risk=31-60;
High Risk=61-100;
Very High Risk=100+.

Review

Seasons of smoke and fire: preparing health systems for improved performance before, during, and after wildfires

Attila J Hertelendy, Courtney Howard*, Cecilia Sorensen, Jamie Ranse, Ejemai Eboreime, Sarah Henderson, Jeffrey Tochkin, Gregory Ciottone*

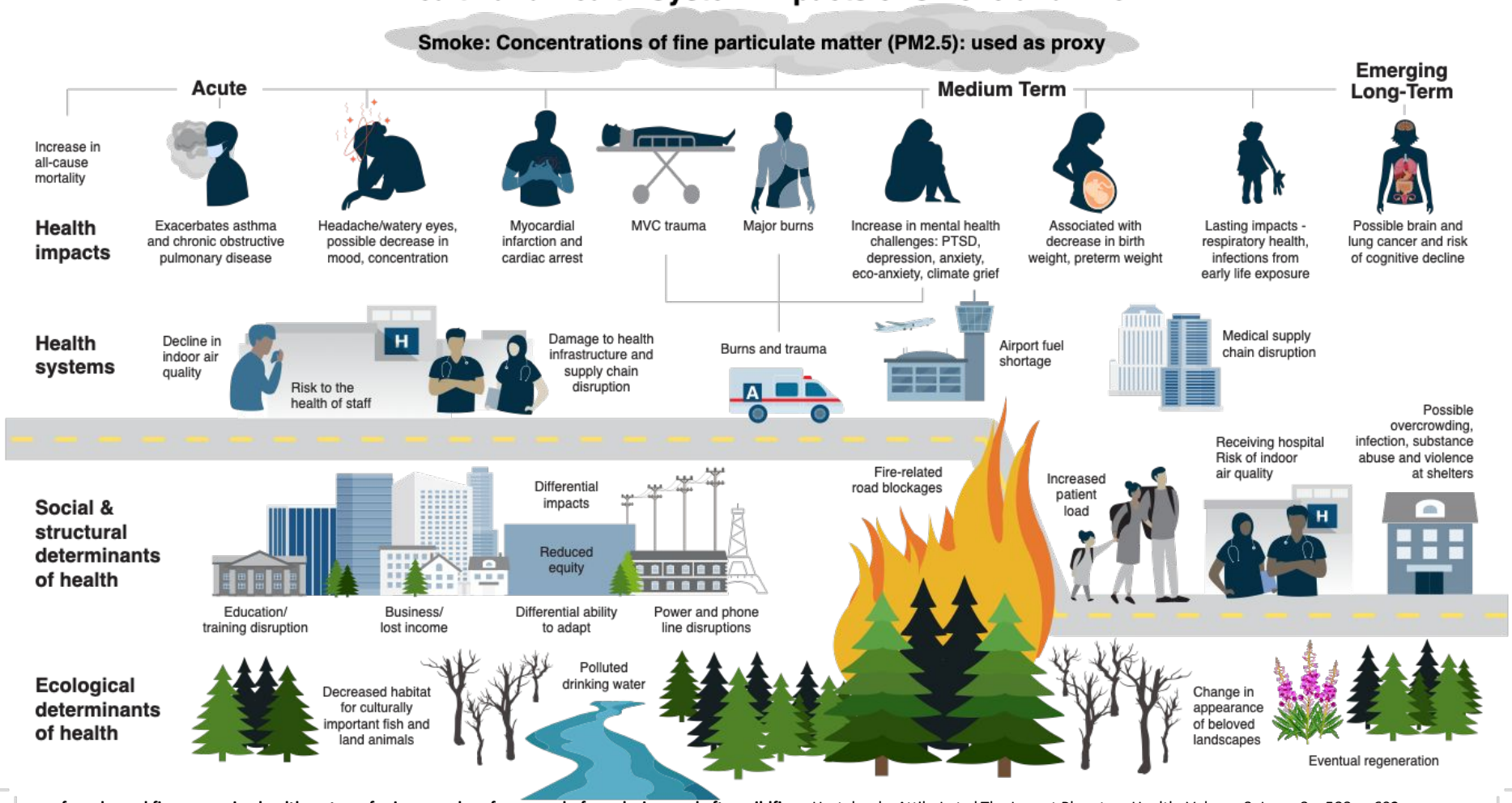
Increased frequency, intensity, and duration of wildfires are intensifying exposure to direct and smoke-related hazards in many areas, leading to evacuation and smoke-related effects on health and health systems that can affect regions extending over thousands of kilometres. Effective preparation and response are currently hampered by inadequate

Lancet Planet Health 2024; 8: e588–602

*Joint first authors

Seasons of smoke and fire: preparing health systems for improved performance before, during, and after wildfires, Hertelendy, Attila J et al.The Lancet Planetary Health, Volume 8, Issue 8, e588 - e602

Health and Health System Impacts of Smoke and Fire



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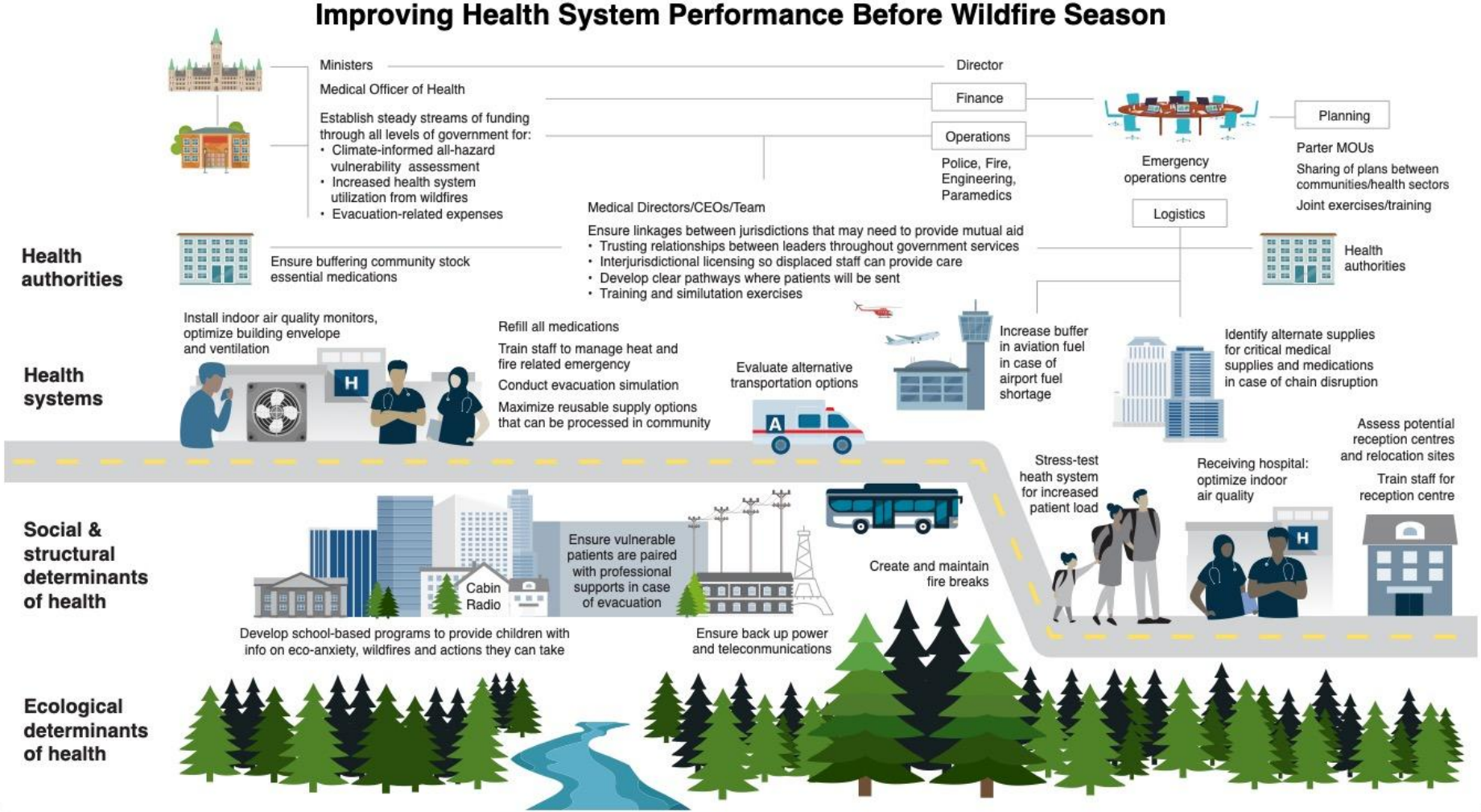

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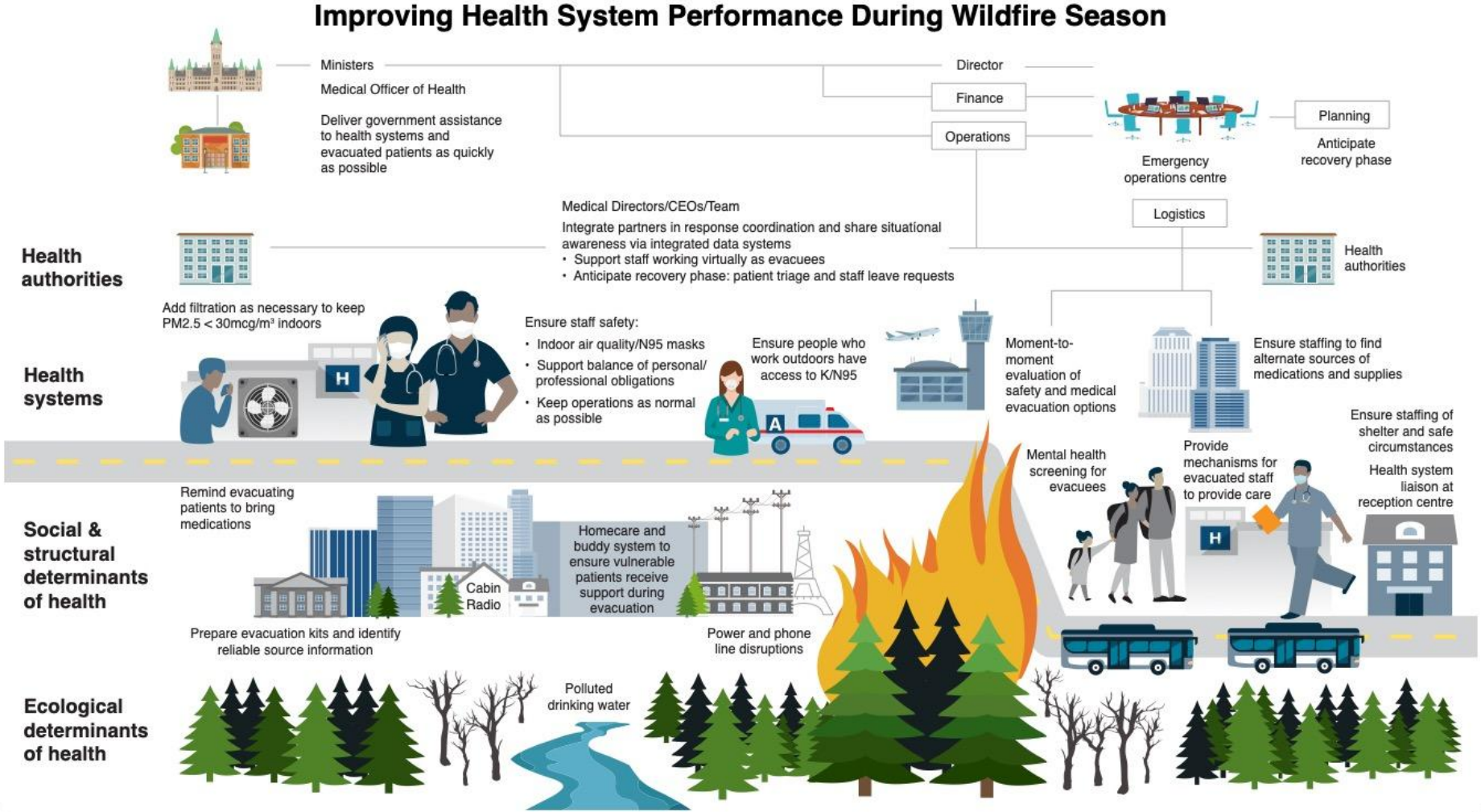
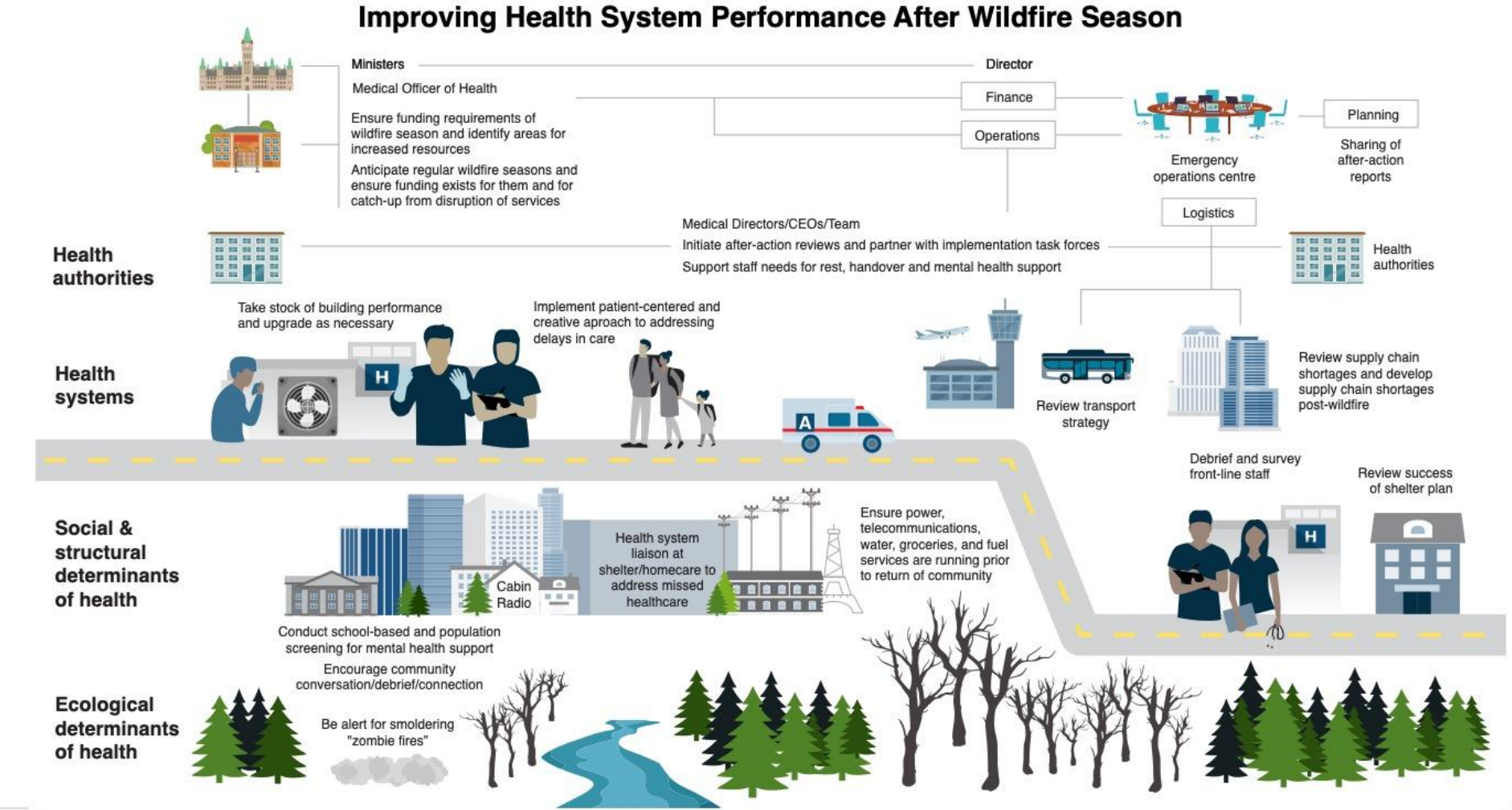


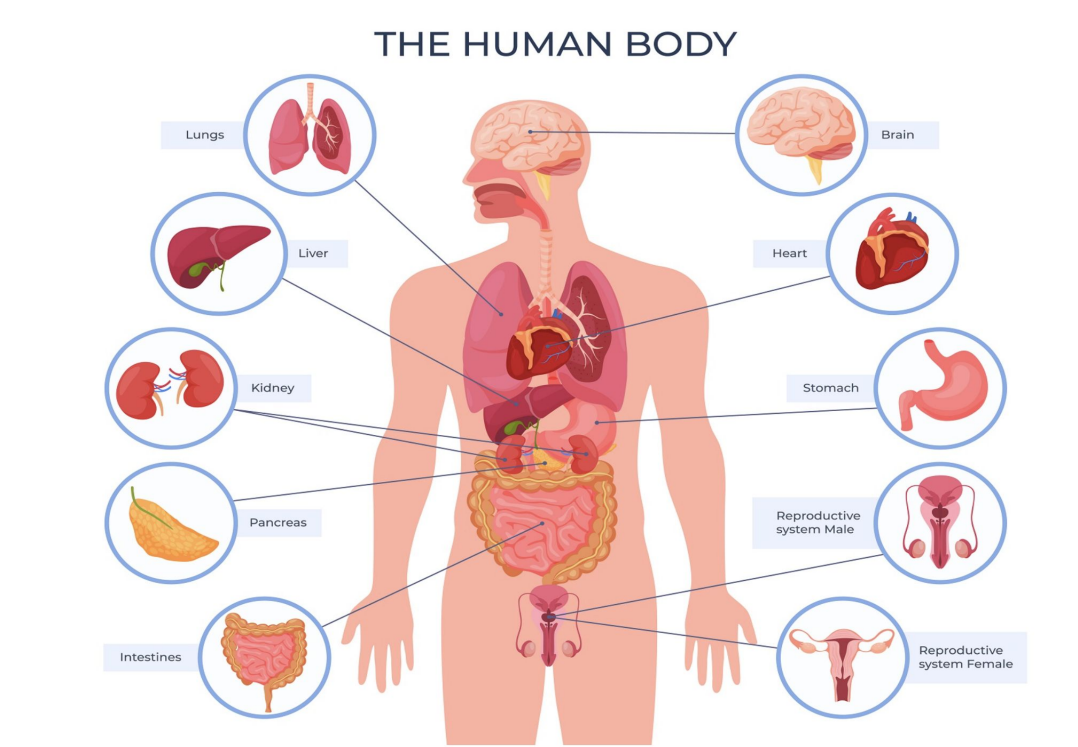
Seasons of smoke and fire: preparing health systems for improved performance before, during, and after wildfires, Hertelendy, Attila J et al.The Lancet Planetary Health, Volume 8, Issue 8, e588 - e602

Improving Health System Performance After Wildfire Season



Seasons of smoke and fire: preparing health systems for improved performance before, during, and after wildfires, Hertelendy, Attila J et al.The Lancet Planetary Health, Volume 8, Issue 8, e588 - e602

The Complex, Self-Regulating System that We Walk Around in Everyday



Internal human body organ location scheme infographic visual, teaching aid, study guide vector flat illustration. Inside anatomical structure diagram with names isolated. Medical info learning

MSF Balballa Slum Pediatric Malnutrition Project, Djibouti, 2010Photo by MSF National Staff Nurse Abdelkadir Osman Omar,

The Complex, Self-regulating System We Walk Around ON Everyday.

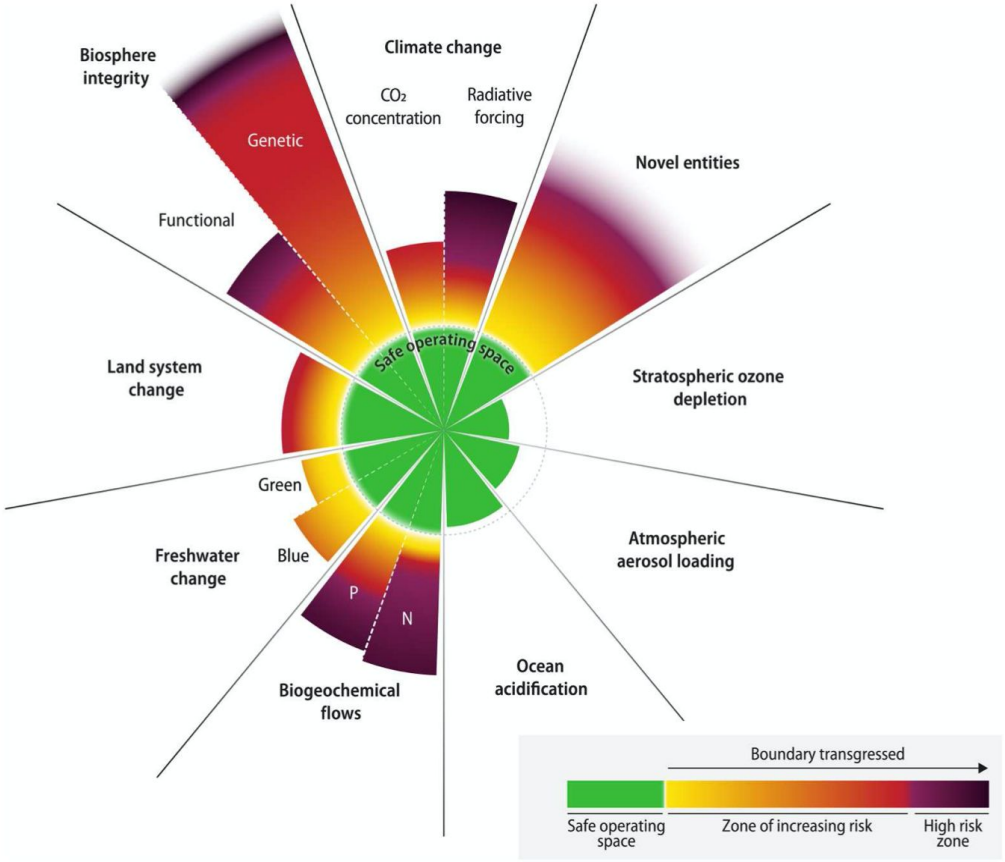
WHAT ELEMENTS ARE CRITICAL TO EARTH SYSTEM STABILITY?

SCIENCE ADVANCES | RESEARCH ARTICLE

ENVIRONMENTAL STUDIES

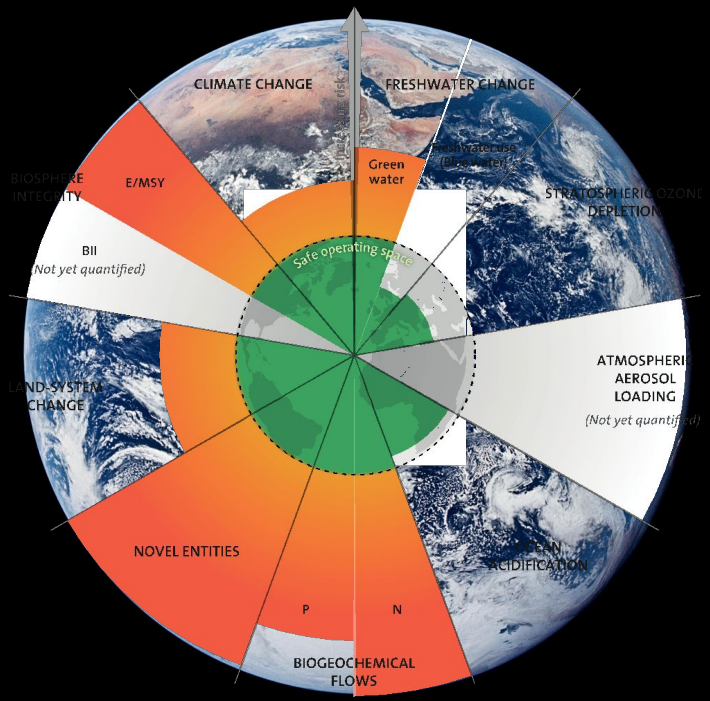
Earth beyond six of nine planetary boundaries

Katherine Richardson[1]*, Will Steffen[2†], Wolfgang Lucht[3,4], Jørgen Bendtsen[1], Sarah E. Cornell[2], Jonathan F. Donges[3,5], Markus Drüke[3], Ingo Fetzer[5,6], Govindasamy Bala[7], Werner von Bloh[3], Georg Feulner[3], Stephanie Fiedler[8], Dieter Gerten[3,4], Tom Gleeson[9,10], Matthias Hofmann[3], Willem Huiskamp[3], Matti Kummu[11], Chinchu Mohan[6,12,13], David Nogués-Bravo[1], Stefan Petri[3], Miina Porkka[11], Stefan Rahmstorf[9,14], Sibyll Schaphoff[3], Kirsten Thonicke[3], Arne Tobian[3,5], Vili Virkki[11], Lan Wang-Erlandsson[3,5,6], Lisa Weber[8], Johan Rockström[3,5,15]

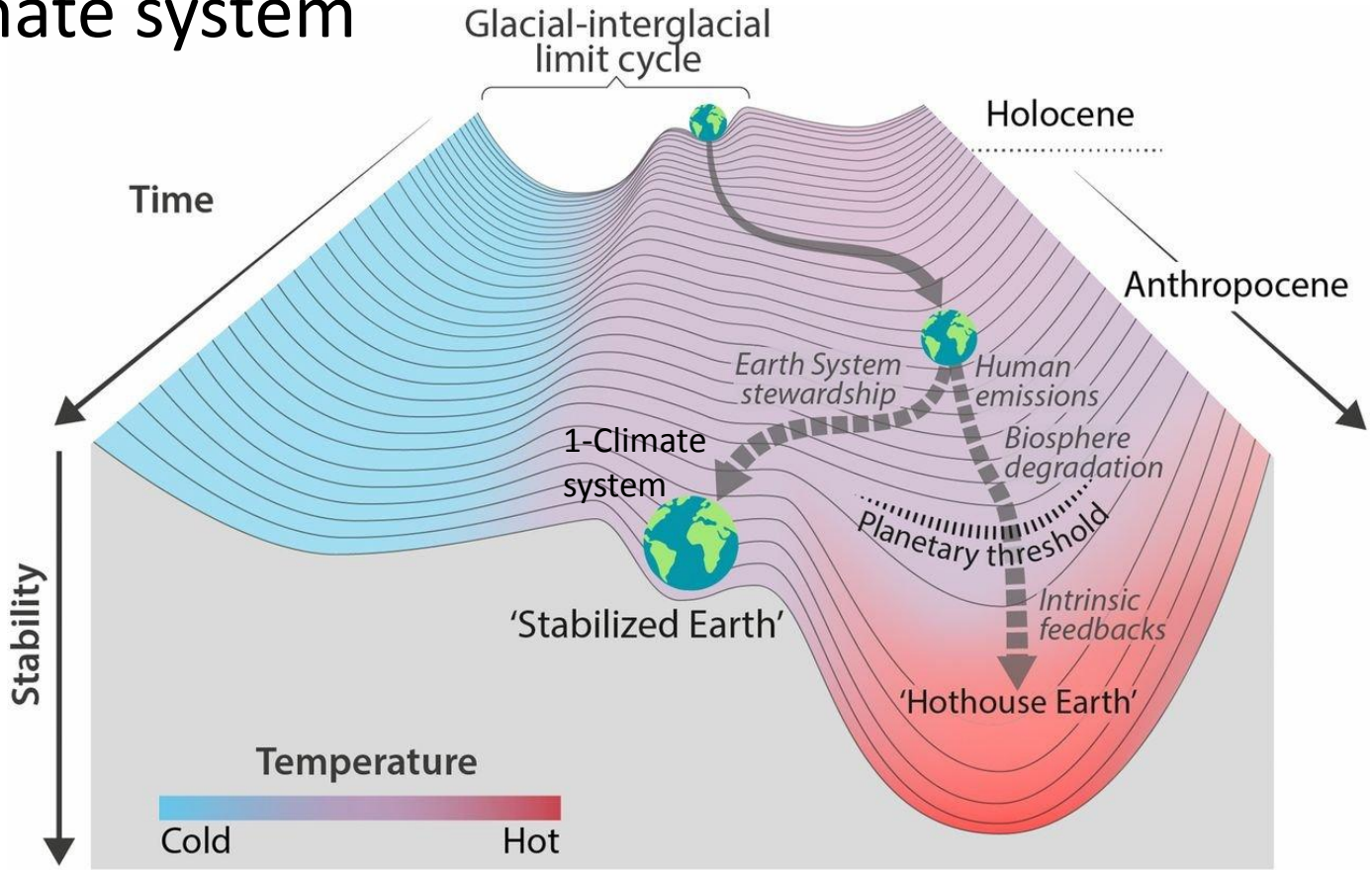


Richardson *et al.*, *Sci. Adv.* **9**, eadh2458 (2023) 13 September 2023

The Complex, Self-regulating System We Walk Around ON Everyday.



1-Climate system



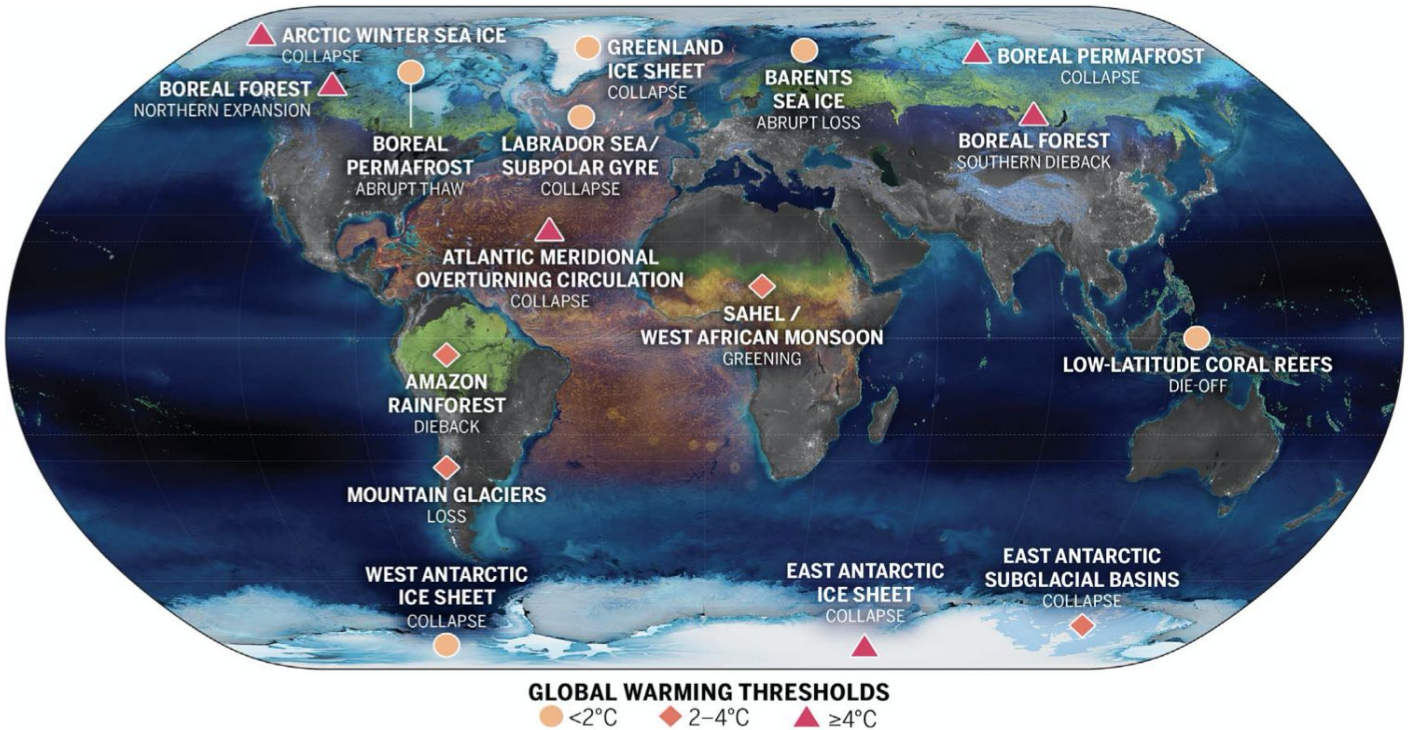
Trajectories of the Earth System in the Anthropocene
PNAS **August 6, 2018**, 115 (33) 8252-8259, https://doi.org/10.1073/pnas.1810141115

RESEARCH ARTICLE SUMMARY

CLIMATE CHANGE

Exceeding 1.5°C global warming could trigger multiple climate tipping points

David I. Armstrong McKay*, Arie Staal, Jesse F. Abrams, Ricarda Winkelmann, Boris Sakschewski, Sina Loriani, Ingo Fetzer, Sarah E. Cornell, Johan Rockström, Timothy M. Lenton*



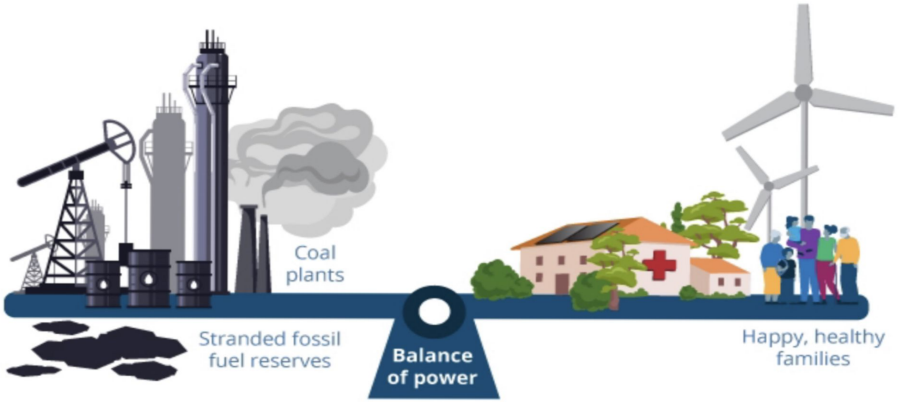
The location of climate tipping elements in the cryosphere (blue), biosphere (green), and ocean/atmosphere (orange), and global warming levels at which their tipping points will likely be triggered. Pins are colored according to our central global warming threshold estimate being below 2°C, i.e., within the Paris Agreement range (light orange, circles); between 2 and 4°C, i.e., accessible with current policies (orange, diamonds); and 4°C and above (red, triangles).

n August 04, 2023


Canada's National Adaptation Strategy
• Reducing the risk of climate-related disasters
• Improving health outcomes
• Protecting nature and biodiversity
• Building and maintaining resilient infrastructure
• Supporting workers in the transition to a low carbon economy

Figure 8. National Adaptation Strategy systems

Tipping Point: a critical threshold beyond which a system re-organizes, often abruptly or irreversibly[1]

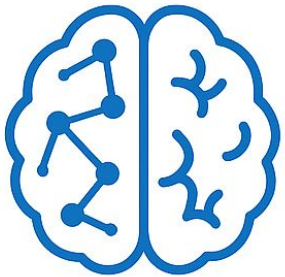


1-Climate system
2-Clean Technology
3-Mainstreaming of planetary health in the health sector.

The balance of these will have consequences for health and health systems that affect all future generations.

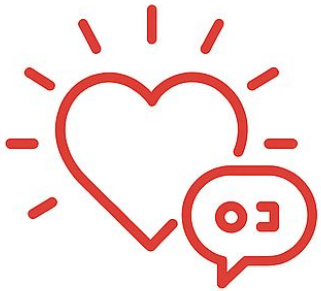
[1]https://www.oecd-ilibrary.org/environment/climate-tipping-points_abc5a69e-en

Head · Heart · Hands



HEAD

Evidence
& Strategy



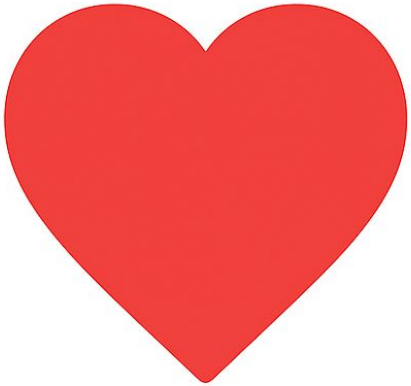
HEART

Emotion &
Narrative

HANDS

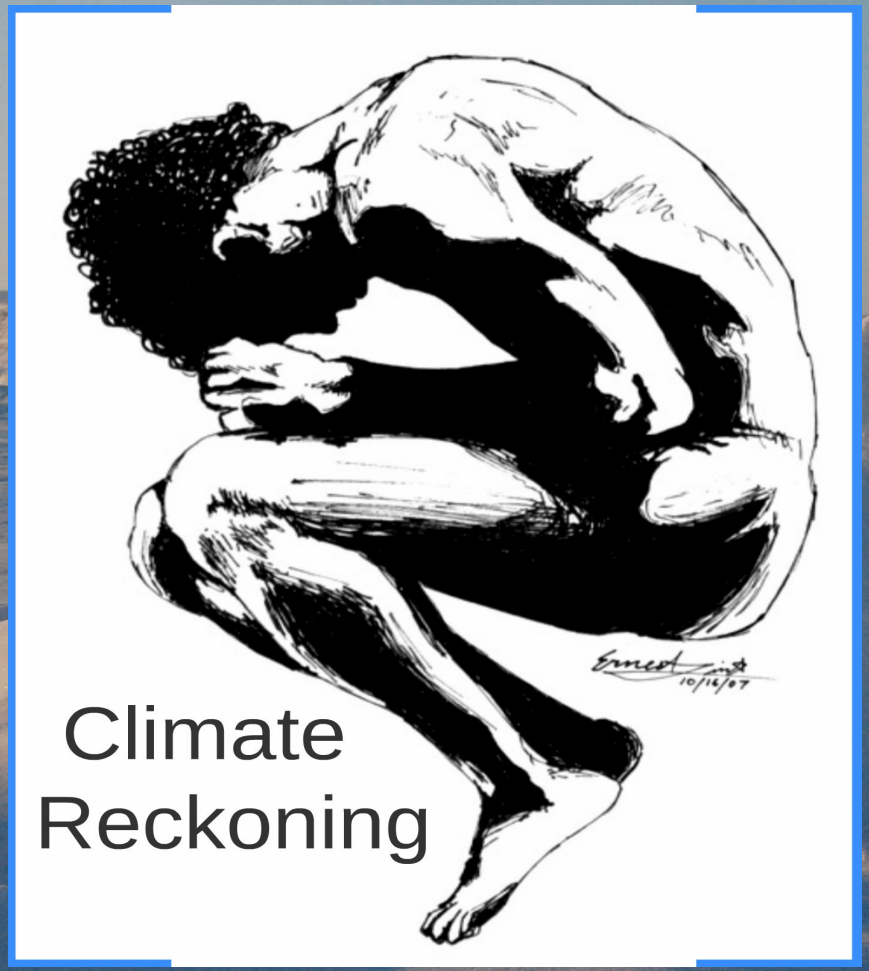
Power &
Implementation

With thanks to the wonderful Marshall Ganz from the Harvard Kennedy School



HEART

Emotion
& Narrative



@courtghoward

Process Model of Eco-anxiety and Ecological Grief

Panu Pihkala
Sustainability 2022

Direction chronologically ➡

Coping and changing

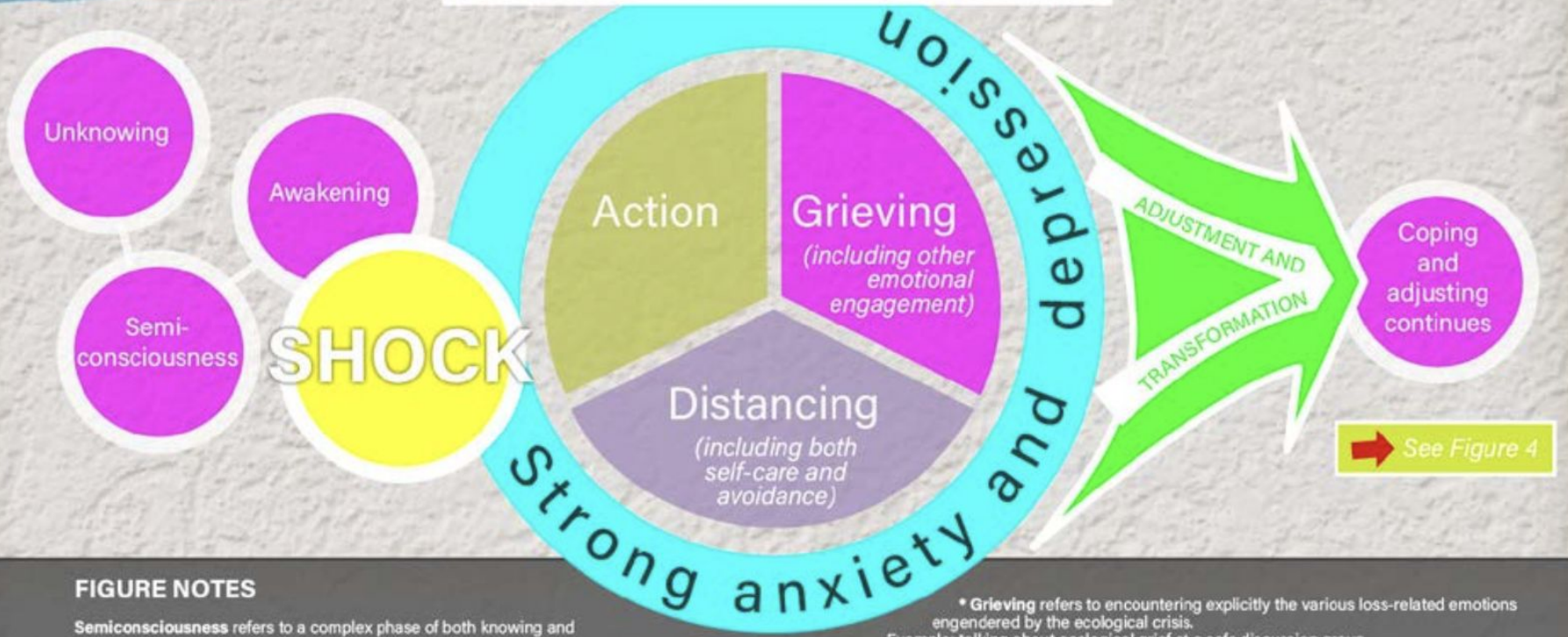


FIGURE NOTES

Semiconsciousness refers to a complex phase of both knowing and not knowing about the severity of the ecological crisis.

Awakening refers to a realization of the severity of the crisis. Sometimes people try to repress this Awakening and return to Semiconsciousness, but that is not completely possible and causes dissonance.

Shock and trauma may result in various ways from Awakening.

* **Grieving** refers to encountering explicitly the various loss-related emotions engendered by the ecological crisis.
Example: talking about ecological grief at a safe discussion group.

* **Distancing** refers to various means of taking distance from the ecological crisis.
Example: staying away from environmental news on Sunday (self-care) or denial of outcome severity for oneself (disavowal/denial).

* **Strong Anxiety and/or Depression** refers to various possible manifestations of strong and difficult mental states which are significantly impacted by the ecological crisis. These include anxiety states

bucket fillers

bucket drainers

love

companionship

sense of purpose

patience

sleep

kindness

humour

excercise

practical help

time in nature

time with loved ones

time to create

uncertainty

$ worries

inefficiencies

bereavement

loss of sense of place/role in the world

….and gets stuff done

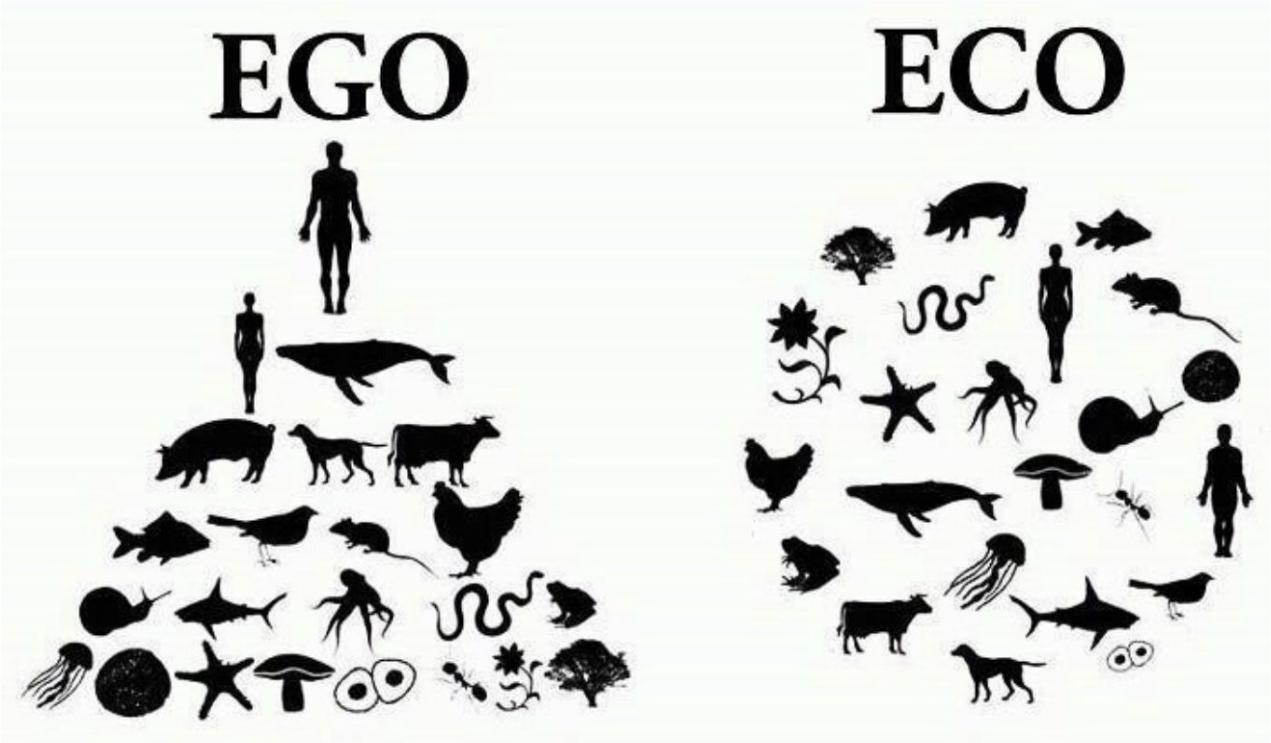


Figure 1. Diagram 'Ego-Eco' – Humankind is part of the ecosystem, not apart from or above it. This diagram depicts this simple fact clearly (diagram: S. Lehmann, 2010).

POWER OVER **POWER WITH**

EMPOWERING PLANETARY HEALTH TOGETHER

P  WER

Join a pan-Canadian network dedicated to wellbeing, equity, and regeneration for future generations.

EVIDENCE-BASED

Too often publicly-funded research languishes behind paywalls in difficult-to-read journals, becoming stranded intellectual assets. We believe that achieving long term wellbeing for all requires us to source the smartest thoughts from different knowledge traditions, to express them in alignment with communication sciences, and to influence their implementation by working with best practices in policy and political science.

ETHICS-DRIVEN

We believe that everyone, now and into the future, deserves a chance to thrive and that we have the best chance of achieving this if we reduce our blind spots by having people with different points of view and a variety of life journeys around the table.

POWER-INFORMED

Understanding power as the ability to get things done, we take an eco-centric approach which centers each individual's "*power to*" effect change and the potential for our organized collective to create enough "*power with*" one another to set a path towards healthy people on a healthy planet.

Closing Session:
A Message from the Coalition's Board of Directors

Jérôme Ribesse
Co-fondateur et Directeur général,
Synergie Santé Environnement

Thank you!

Please leave us some feedback: https://forms.gle/b3hkyE1JNtc44ttr6