

Welcome to this week's presentation & conversation hosted by the **Canadian Association for the Club of Rome**, a Club dedicated to intelligent debate & action on global issues.

The views and opinions expressed in this presentation are those of the speaker & do not necessarily reflect the views or positions of CACOR.

The Climate Crisis is a Health Crisis.

Biography:

Our speaker today is Rob Samulack RN BSN BEng a registered nurse currently working in a community setting doing direct patient care. He has degrees in both nursing and biomedical and mechanical engineering. He currently leads the Ontario Nurses for the Environment with RNAO and represented RNAO at COP28 in Dubai. He also attended COP26 in Glasgow with the Christian Climate Observer's Program. He believes that we have a moral duty to care for vulnerable populations – to which climate change disproportionately affects.

Description:

Rob will discuss how the climate crisis is a health crisis – from describing the root causes of climate change, it's direct impacts on human health and how nurses with RNAO are collaborating with partners to both mitigate healthcare's footprint, but also calls to adapt our healthcare system to be prepared for coming crises.

The presentation will be followed by a conversation, questions, & observations from the participants.

CACOR acknowledges that we all benefit from sharing the traditional territories of local Indigenous peoples (First Nations, Métis, & Inuit in Canada) and their descendants.



Website: canadiancor.com

Twitter: [@cacor1968](https://twitter.com/cacor1968)

YouTube: [Canadian Association for the Club of Rome](https://www.youtube.com/channel/UC...)

2024 Mar 06 Zoom #188

The Climate Crisis is a Health Crisis

Rob Samulack RN BSN BEng
13 March 2024
Canadian Club of Rome Presentation



“Climate change - the biggest health threat facing humanity”
-WHO

Root cause of all systemic environmental issues

- Power/wealth imbalance.
- The powerful/ wealthy want to increase or at least maintain their wealth and/or lifestyle.
- Usually done at the expense/exploitation of poorer, less powerful and often racialized or otherwise marginalized people.
- Common buzz words: environmental racism, environmental justice, climate justice, etc.

Society runs on energy

- Both biologically and economically.
- Money is only an abstract quantification of wealth, but at its root, it is based on control of energy and resources.
- Whoever controls the energy and resources has power.

Fall of the Roman Empire

Some possible causes:

- Lead poisoning (pipes, dishes, makeup) - environmental toxins [1]
- Loss of trees from deforestation, increased mosquito-borne disease such as malaria and unsustainable farming practices [2]. Wood was one of the primary sources of energy.

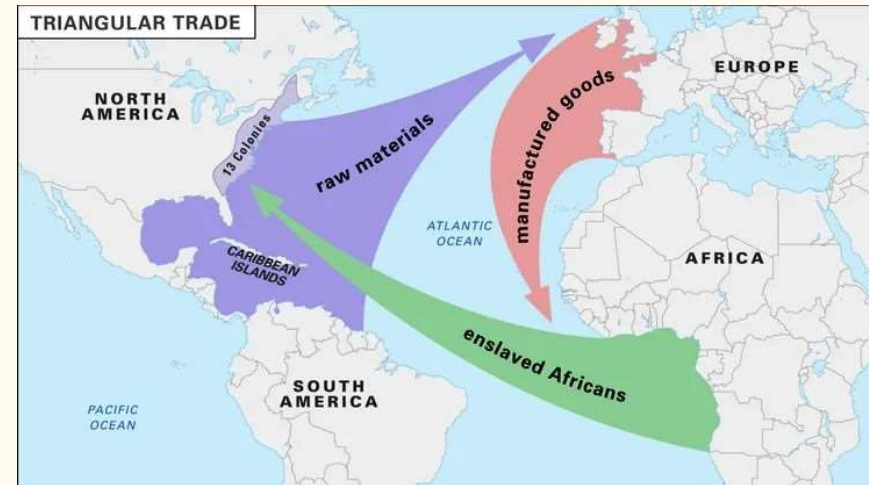
[1]<https://www.washingtonpost.com/news/to-your-health/wp/2016/02/17/lead-poisoning-and-the-fall-of-rome/>

[2]<https://academic.oup.com/bioscience/article/58/8/756/381265?login=false>

The rise of European Colonial Powers

- Exploitation of human energy - the Trans-Atlantic Slave Trade
- Exploitation of any natural resource imaginable both in Europe, but even better somewhere else!
- Trans-Atlantic Slave Triangle : people stolen / kidnapped principally from Africa → the Americas forced labour in agriculture (sugar cane, tobacco, cotton) → raw materials shipped to Europe → manufacturing in Europe and products shipped throughout the world. [3]

[3]<https://www.britannica.com/summary/Transatlantic-Slave-Trade-Timeline>



Global Economic System Change IS Possible!!!

Half a century of abolition advocacy work led to:

- Abolition in British Empire 1833 - went after the Trans - Atlantic Slave Triangle
- Emancipation Proclamation (USA) 1863. American civil war 1861-1865. [3]
- Modern slavery still exists, but in a very different form and much more at the periphery of Western society - human trafficking, forced prostitution, forced marriages, child marriage, domestic servitude, Asian textile industry [4.5].

[4] <https://www.antislavery.org/slavery-today/modern-slavery/>

[5] <https://studentbriefs.law.gwu.edu/ilpb/2021/10/28/fast-fashion-getting-faster-a-look-at-the-unethical-labor-practices-sustaining-a-growing-industry/>

Did Abolition end slavery or did the Industrial Revolution fueled by fossil fuels end it?

- Replace one form of energy exploitation with another?
- British Industrial Revolution fueled by coal 1760 - 1840 [6]
- Oil takes off in United states in the late 1800's. John D. Rockefeller established Standard Oil Trust in 1882. [7]

[6] <https://www.britannica.com/money/topic/Industrial-Revolution>

[7] <https://aoghs.org/oil-almanac/chronology-of-u-s-petroleum-history/>

Svante Arrhenius (1859-1927)

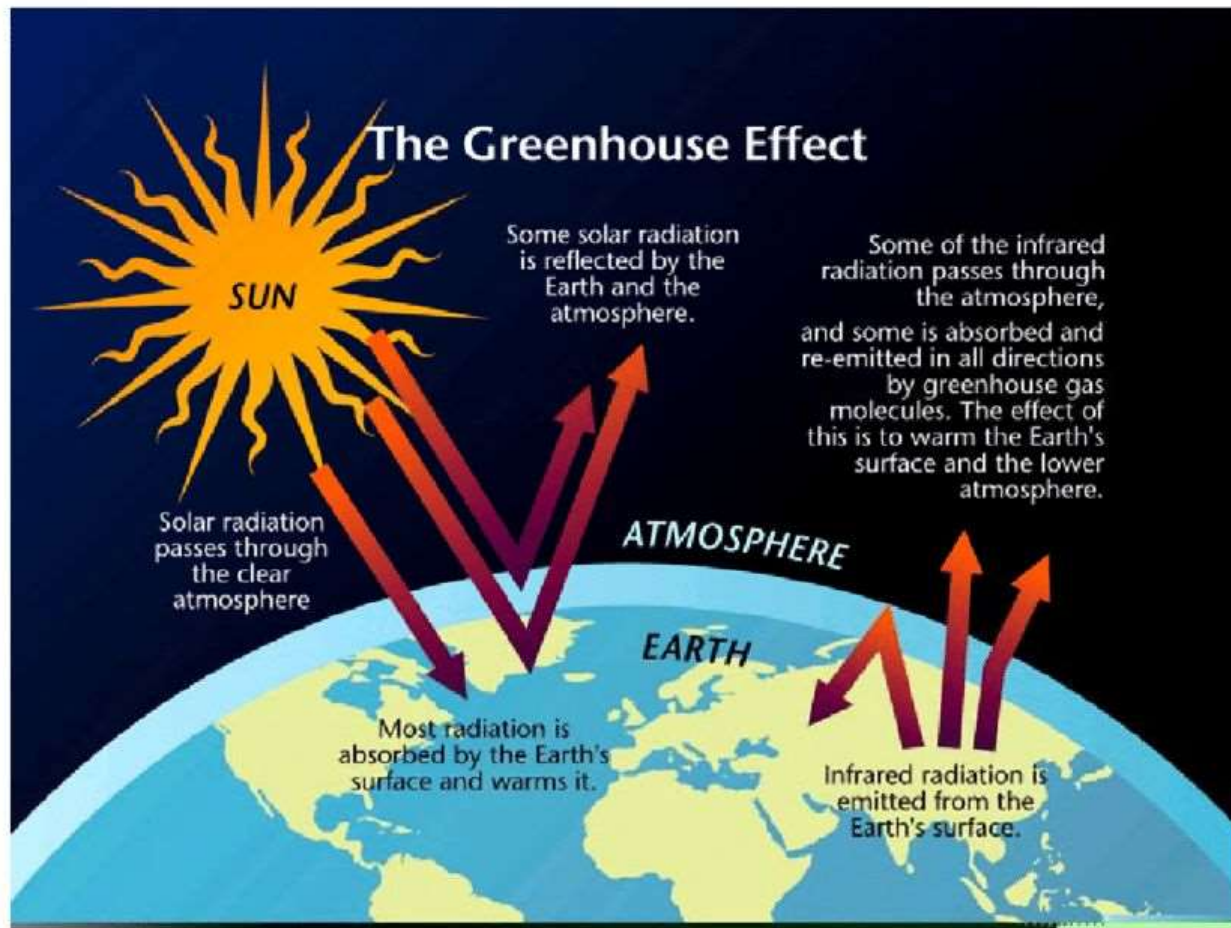
Swedish Nobel Prize winner for Chemistry

Arrhenius Equation $k = Ae^{\frac{-E_a}{RT}}$

“In 1896, he was the first one to predict that a doubling of the concentration of carbon dioxide in the atmosphere will lead to a temperature rise of 5 degrees Celsius.”[8]

[8]<https://www.uni-wuerzburg.de/en/uniarchiv/personalities/eminentscholars/svante-arrhenius/>





Think of a car sitting in the sun on a hot day.

[9]https://www.researchgate.net/figure/The-Greenhouse-Effect_fig1_237730165

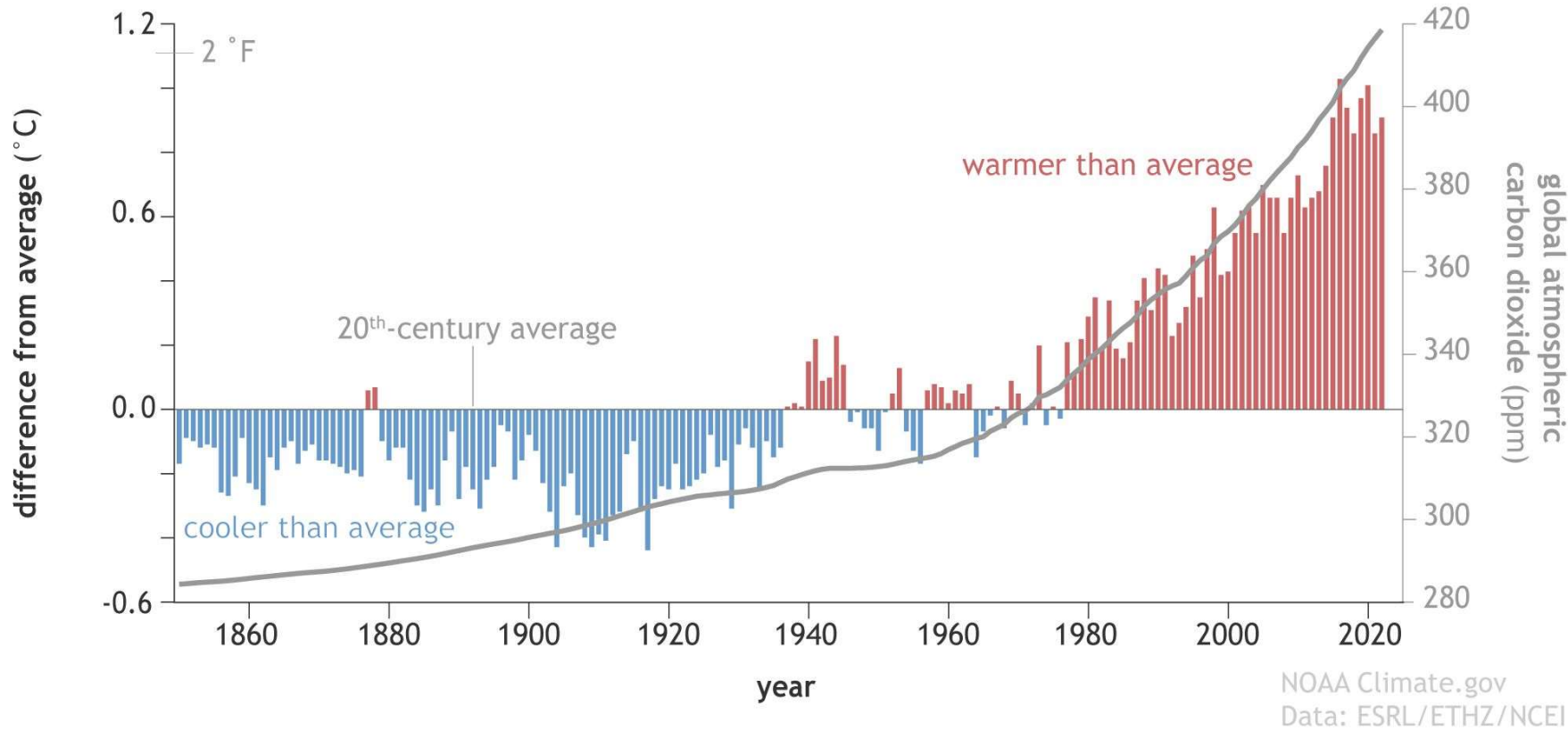
Kyoto Protocol Seven Most Potent GHGs



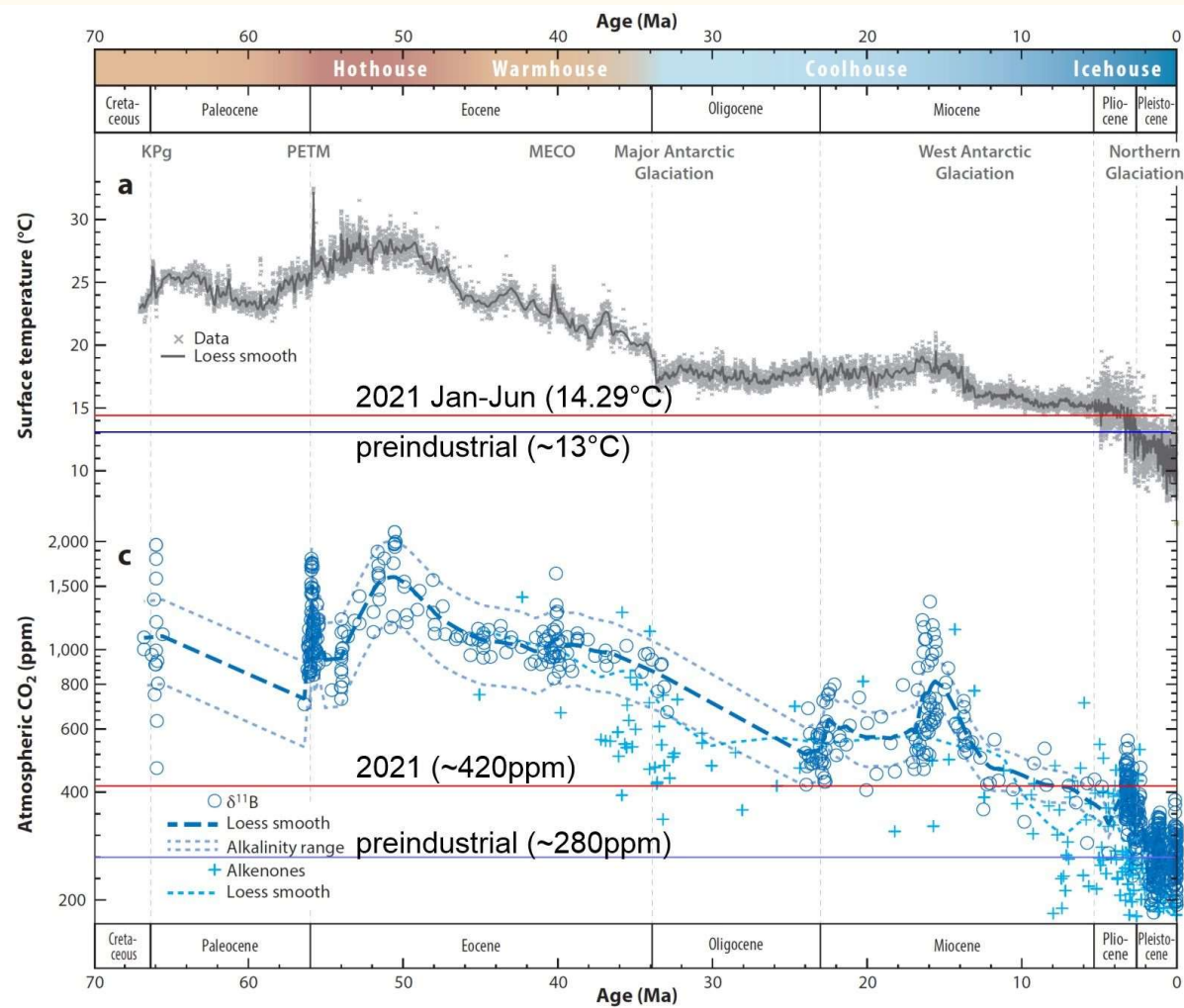
Methane, Nitrous Oxide, Carbon Dioxide, and fluorinated chemicals (chlorofluorocarbons, perfluorinated chemicals, sulfur hexafluoride, hydrofluorocarbons)

[10]<https://www.england.nhs.uk/greenernhs/wp-content/uploads/sites/51/2021/02/NZR-Scopes.png>

Yearly global surface temperature and atmospheric carbon dioxide (1850-2022)



[11] <https://www.climate.gov/news-features/climate-qa/if-carbon-dioxide-hits-new-high-every-year-why-isn%E2%80%99t-every-year-hotter-last>



[12] <https://skepticalscience.com/co2-mgner-in-past-intermediate.html> with data from <https://www.annualreviews.org/doi/10.1146/annurev-earth-082420-063026>

There's a problem...

And, people knew about it!

White House science advisors in 1965 to President Johnson, “Within a few short centuries, we are returning to the air a significant part of the carbon that was extracted by plants and buried in the sediments during half a billion years. By the year 2000 the increase in CO₂ will be close to 25% [relative to pre-industrial times]. This may be sufficient to produce measurable and perhaps marked changes in climate.”

[13]Ad Hoc Study Group on Carbon Dioxide and Climate, *Carbon Dioxide and Climate: A Scientific Assessment*, Climate Research Board, Assembly of Mathematical and Physical Sciences, National Research Council (Washington D.C.: National Academy of Sciences, 1979. Found in *Saving Us*, by Katharine Hayhoe (2021).

ExxonMobil Global Warming Projections 1977-2003

- “Fossil fuel emissions would lead to 0.20 degrees Celsius of global warming per decade, with a margin of error of 0.04 degrees — a trend that has been proven largely accurate.”

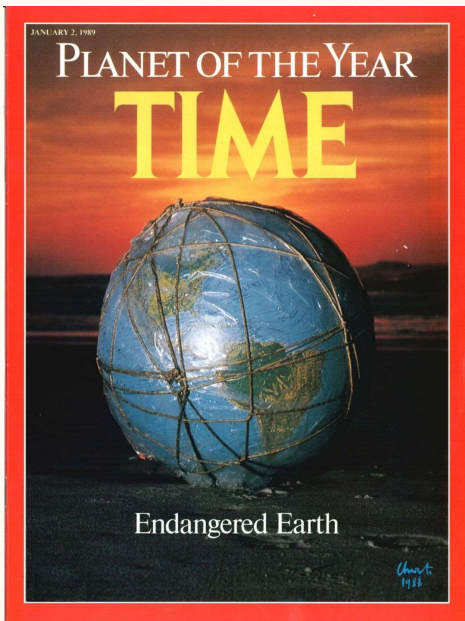
[14]<https://news.harvard.edu/gazette/story/2023/01/harvard-led-analysis-finds-exxonmobil-internal-research-accurately-predicted-climate-change/>

Previously, environmental protections and agreements had bipartisan support in both Canada and the United States:

- Boundary Waters Treaty of 1909
- Trail Smelter Arbitration of 1941
- Great Lakes Water Quality Agreement of 1978
- ECE Convention on Long-Range Transboundary Air Pollution of 1979 (Acid Rain)
- Memorandum of Intent Concerning Transboundary Air Pollution of 1980 (Acid Rain)
- 1986 Joint Report of the Special Envoys on Acid Rain
- Montreal Protocol, 1987 (Ozone)
- Canada-United States Air Quality Agreement, 1991 (Acid Rain)

[15] <https://ijc.org/en/mission/air-quality-agreement>

Then the late 1980's and 1990's came...



The world starts waking up to what was called “global warming” at the time.

This is a direct threat to the oil industry.

[16] Time Magazine Cover January 1989 <https://time.com/vault/issue/1989-01-02/page/1/>

[17] <https://www.imdb.com/title/tt14662590/>

[18] Severn Suzuki <https://lettersbyrwk.wordpress.com/2022/06/09/30th-anniversary-of-rio-earth-summit-severn-suzukis-12-classic-5-min-speech/>

Big Tobacco Playbook

May 1988 - Bill C-204 “amends the Hazardous Products Act to prohibit tobacco advertising” [20] after years of public health advocacy work.

However, it was a hard fought battle and the oil industry learned many lessons from it.

[19] <https://americanhistory.si.edu/blog/2014/03/smoke-gets-in-your-eyes-20th-century-tobacco-advertisements.html>

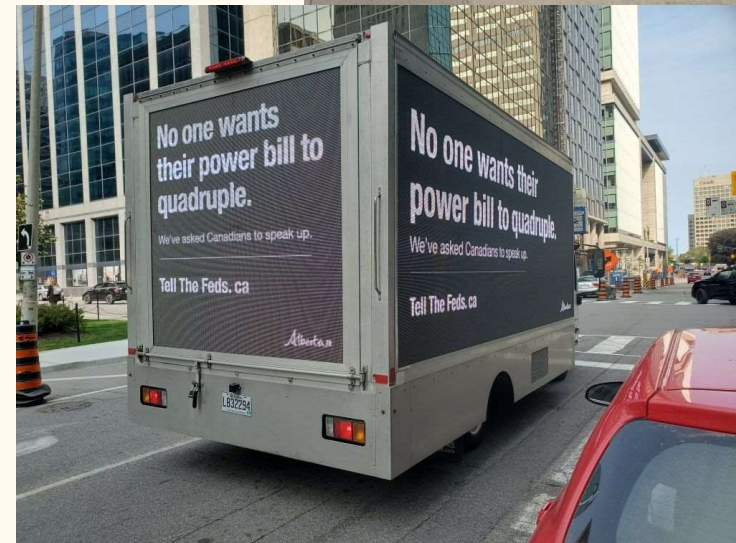
[20] <https://www.cbc.ca/news/health/a-legal-history-of-smoking-in-canada-1.982213#:~:text=June%2028%2C%202007%20The%20Supreme%20Court%20of%20Canada,which%20severely%20restricts%20tobacco%20companies%27%20right%20to%20advertise.>

The figures quoted have been checked and certified to by LORLAND, BOYD, BRIDGEMAN and MONTGOMERY, Accountants and Auditors.

20,679* Physicians
say “**LUCKIES**
are less irritating”
“**It's toasted**”
Your Throat Protection against irritation against cough

Misinformation Campaigns Work

- Sow seeds of doubt. This started in the 1990s when people started debating the science - climate change denial.
- Now the changes are undeniable, so the tactics have changed.
- Make it a partisan issue based on fear - higher cost of living (Carbon Tax), or job losses (Just Transition).
- These campaigns are all well funded by the oil industry. They have power and they do not want to lose it.



[21] <https://twitter.com/freetransitott/status/1662093198263549953>

[22] <https://daveberta.ca/2023/09/net-zero-a-no-go-for-albertas-ucp-government/>

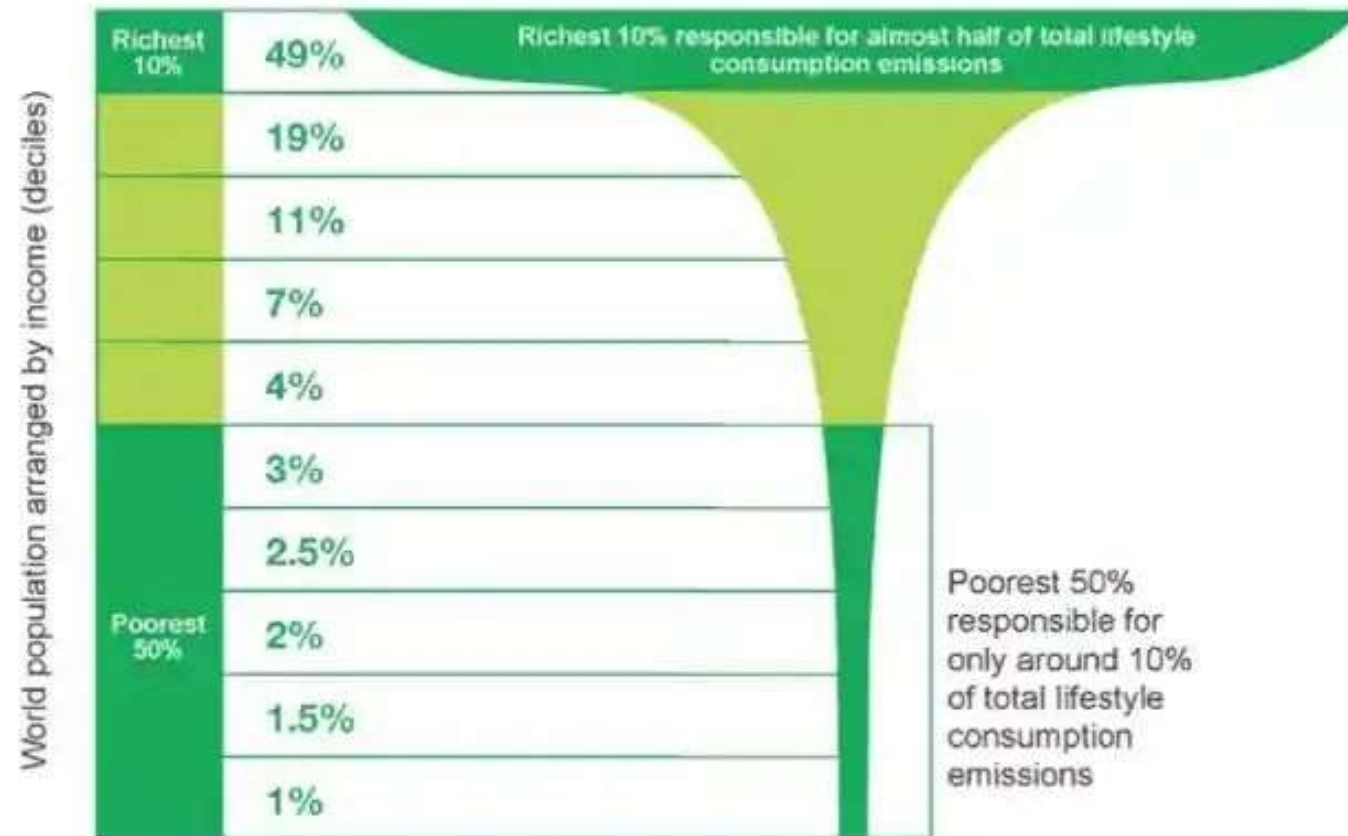
Climate Justice

The richest can shield themselves from many of the effects of climate change while much of the world is poor and cannot.

- Air Conditioning
- Pay high food prices
- Relocation if their becomes inhospitable.
- Control rights to water

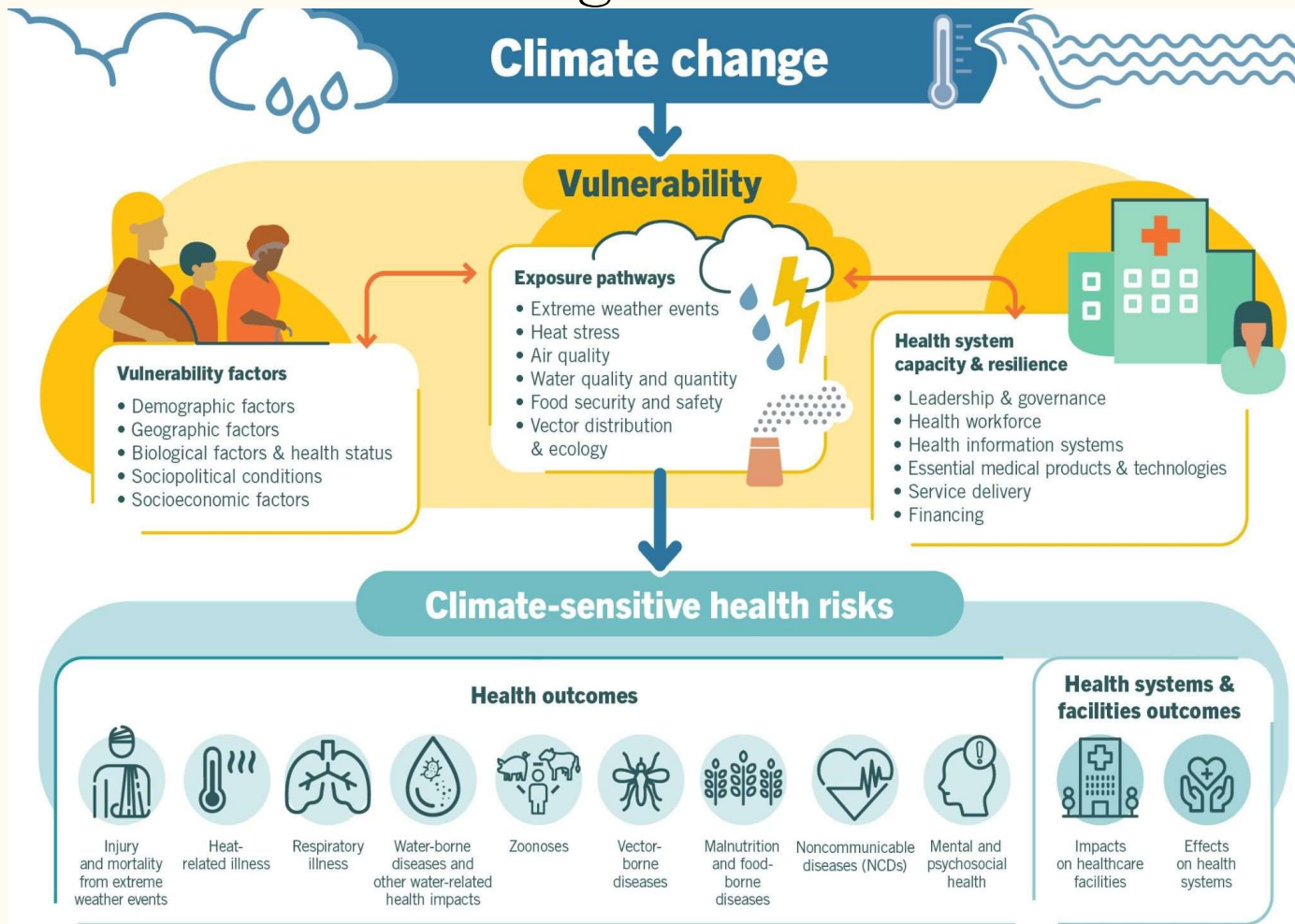
Dubai and Las Vegas are both built in deserts...

Percentage of CO₂ emissions by world population

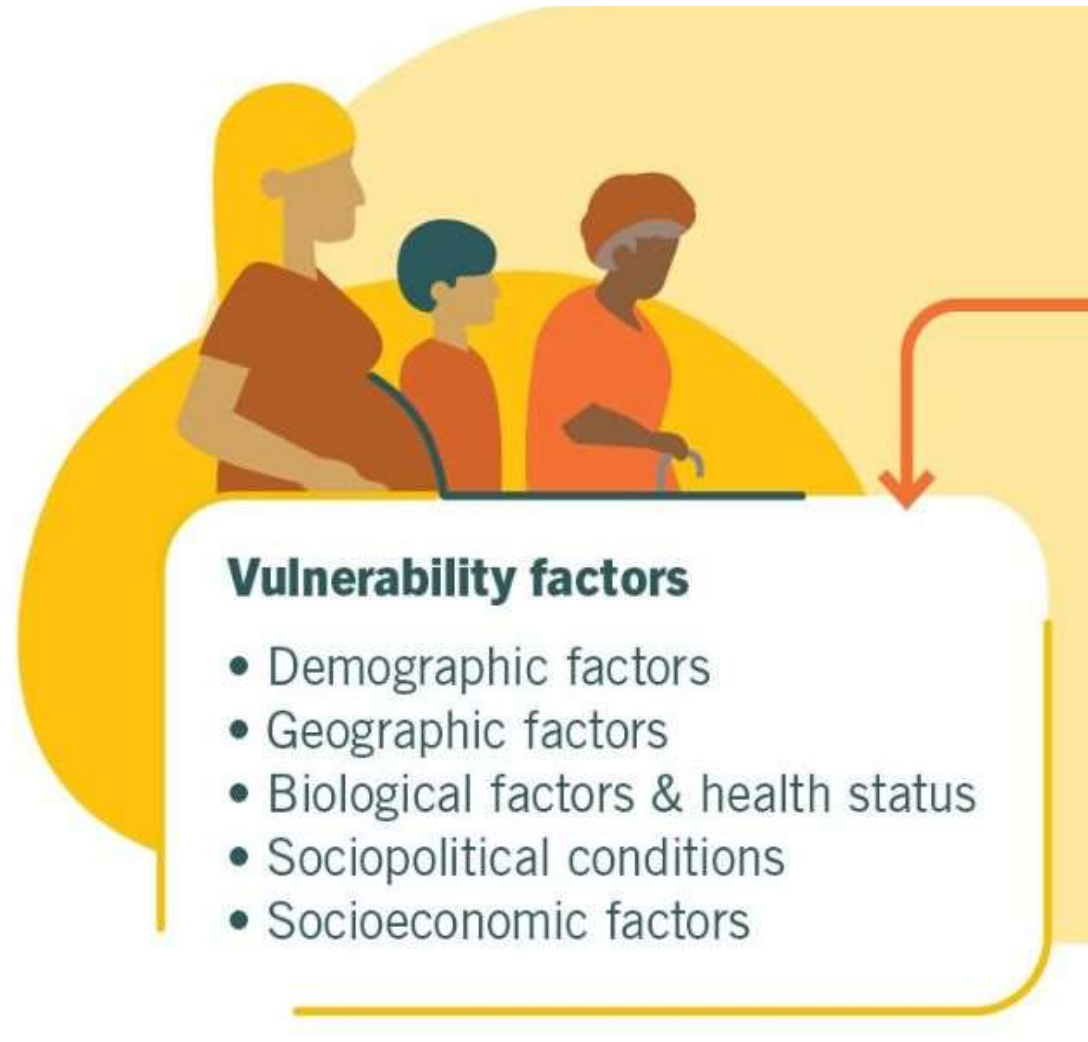


[23] <https://www.theguardian.com/environment/2015/dec/02/worlds-richest-10-produce-half-of-global-carbon-emissions-says-oxfam> but made by Oxfam

So how does climate change affect human health?



[24] <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>



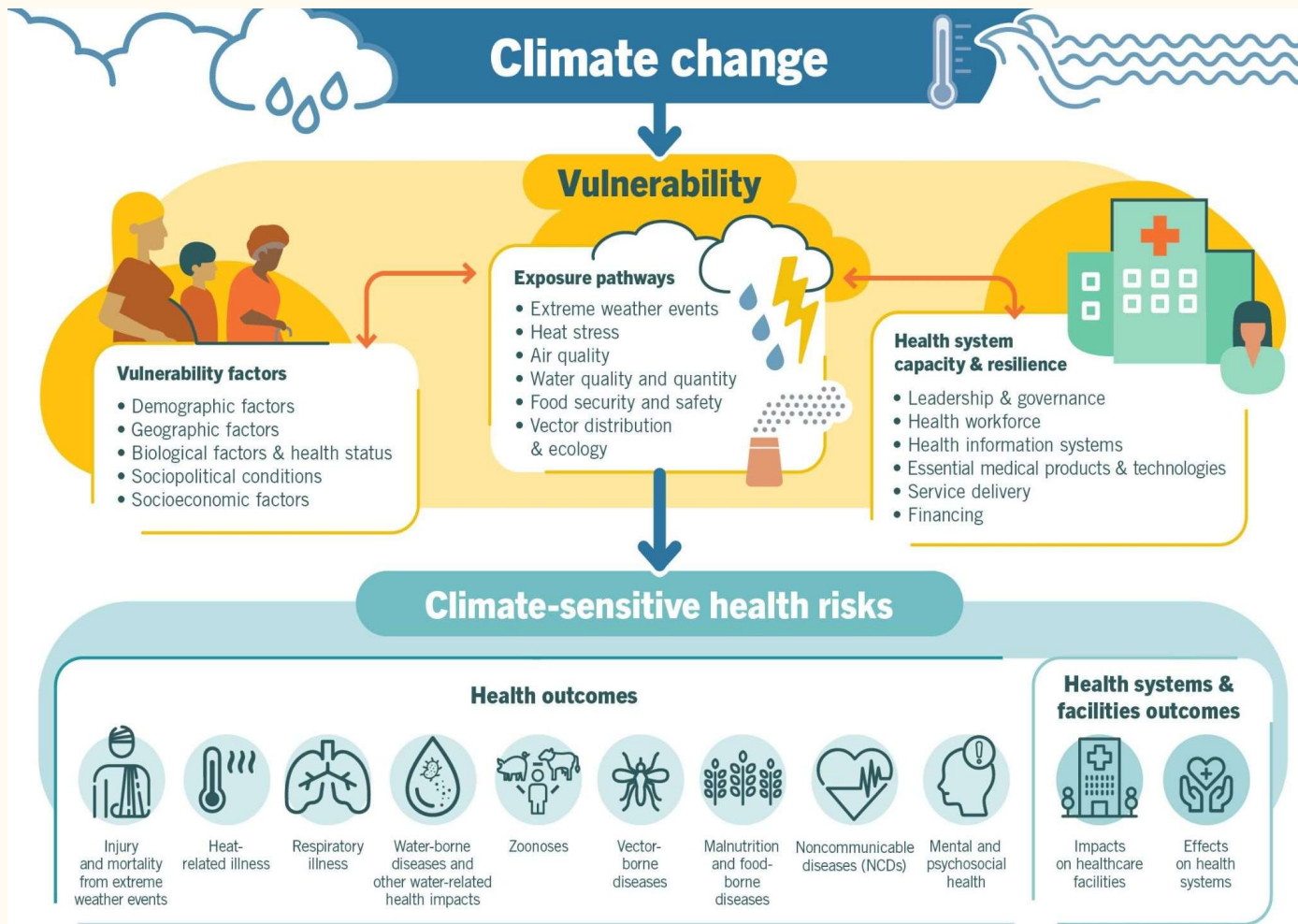
[24]<https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>





Health system capacity & resilience

- Leadership & governance
- Health workforce
- Health information systems
- Essential medical products & technologies
- Service delivery
- Financing



[24] <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>



Injury
and mortality
from extreme
weather events

- Derecho May 2022 - Boater died on Ottawa River when wind overturned boat, people hit by falling trees, 1M without power, hydro lines and trees down everywhere. [25]
- Wildfires 2023 - In Canada, 4 firefighters died [26]. Maui 97 died or were swept out to sea [27]. Wildlife impacts as well
- Hurricanes Fiona (2022) and — (2023) - People in Atlantic Canada swept out to sea [28,29]
- Libya (Sept 2023) - Massive rains broke two unmaintained dams washing people out to sea - 11,000 dead, 10,000 missing [30]
Why unmaintained - civil unrest and anarchy following the Arab spring of 2011 (more to come)

[24] <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>

[25] <https://www.theweathernetwork.com/en/news/weather/severe/derecho-leaves-behind-nearly-1000-km-of-damage-fatalities-in-wake-ontario-quebec>

[26] <https://www.cbc.ca/news/canada/british-columbia/zak-muise-firefighter-identified-1.6925128>

[27]

<https://www.cbc.ca/news/world/maui-wildfires-death-toll-dna-test-1.6968915#:~:text=Authorities%20in%20Hawaii%20have%20adjusted%20the%20number%20of,DNA%20samples%20from%20some%20of%20those%20who%20died.>

[28] <https://www.cbc.ca/news/canada/nova-scotia/fiona-has-arrived-in-atlantic-canada-time-to-stay-inside-1.6594245>

[29] <https://www.aljazeera.com/news/2023/7/24/two-killed-two-missing-after-violent-flooding-in-eastern-canada>

[30] <https://www.cnn.com/2023/09/13/middleeast/what-we-know-about-libya-floods-intl/index.html>



Heat-
related illness

- Ideal external temperature - room temperature 21-25 C
- Core body temperature above 40 C, proteins are starting to denature and organ failure starts
- Wet bulb temperature above 35 C, unable to sweat to cool down, incompatible with life.
- 2021 BC Heat Dome killed 595, 99% at home, 70% over 70 years old [31].
- 2023 was the hottest year on record globally[32].

[24]<https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>

[31]<https://www.cbc.ca/news/canada/british-columbia/bc-heat-dome-sudden-deaths-revised-2021-1.6232758>

[32]<https://www.nasa.gov/news-release/nasa-analysis-confirms-2023-as-warmest-year-on-record/>



- PM2.5 - particulate matter less than 2.5 microns - can enter the blood stream - causes asthma and COPD exacerbations and abnormal clotting - heart attacks and strokes.
- 2023 Canada's worst wildfire season on record. Mass evacuations - 2/3 of NWT including all major towns and cities, parts of BC, James Bay Region of Quebec, Northwestern Ontario, Northern Alberta and Saskatchewan. Forced internal displacements - infrastructure, financing & coordinating evacuations, mental health, access to shelter, food, essential medication (diabetes), or medical treatment (dialysis) - impacts receiving community's resources as well.
- 1 in 5 deaths globally [32a]
- Approximately 10 million fatalities per year due to fossil fuel air pollution [33]. Total COVID global fatalities reported as of 1 November 2023 - 6,933,583 [34] .
- Air pollution or wildfire smoke rarely on death certificate - 9yo soccer player Carter Vigh in BC [35] and 9yo Ella Adoo-Kissi-Debrah in the UK [36].

[24] <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>

[32a] <https://www.hsph.harvard.edu/c-change/news/fossil-fuel-air-pollution-responsible-for-1-in-5-deaths-worldwide/>

[33] <https://www.nytimes.com/2022/07/08/opinion/environment/air-pollution-deaths-climate-change.html>

[34] <https://www.worldometers.info/coronavirus/>

[35] <https://www.cbc.ca/news/canada/british-columbia/nine-year-old-asthma-death-bc-wildfires-1.6909013>

[36] <https://www.bbc.co.uk/news/uk-england-london-56801794>



Water-borne
diseases and
other water-related
health impacts

- Flood waters are dirty and carry disease. When flooding occurs sewage usually backs up. High risk of fecal matter in flood waters or contaminating well water.
- Climate change causes wars and conflicts creating refugees. Refugee camps often have significant sanitation problems. Diarrhea is the leading killer of children under the age of 5 despite being treatable [37]
- Drought causes low water levels - more important than oil or money - current negotiations on the Columbia River Treaty - BC/Montana/Washington [38]. Colorado River (Las Vegas, Los Angeles, agricultural irrigation) - record low levels - Mexico barely gets a trickle [39].
- Tensions between Egypt, Ethiopia and Sudan over the Nile [40].
- Can lead to conflict, war, forced migrations and refugee crises.

[24]<https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>

[37]<https://data.unicef.org/topic/child-health/diarrhoeal-disease/>

[38]<https://www.cbc.ca/news/politics/columbia-river-treaty-negotiation-1.6975849>

[39]<https://www.hcn.org/articles/colorado-river-what-the-feds-new-proposal-for-management-of-colorado-river-reservoirs-means>

[40]<https://today.usc.edu/nile-river-water-dispute-filling-dam-egypt-ethiopia-usc-study/>



Zoonoses

- Deforestation forces humans closer to animals increasing zoonotic transmission of disease
- COVID-19 - Wuhan wet market most probable source [41].
- Ebola - bats and primates [42].
- Avian flu - high risk [43].

[24] <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>

[41] <https://www.cnn.com/2022/07/26/health/wuhan-market-covid-19/index.html>

[42] <https://www.cdc.gov/vhf/ebola/about.html>

[43] <https://www.fao.org/animal-health/situation-updates/global-aiv-with-zoonotic-potential/en>



Vector-
borne
diseases

- Lyme Disease, Dengue, Malaria, Chagas, etc. All can cause disability and death.
- Change in wildlife habitats and patterns caused by warming climate, deforestation and habitat loss
- I grew up in Ottawa in the 1990's - no ticks or Lyme Disease.
- ~2010 Public Health was testing ticks as it was becoming a problem.
- Present day - so endemic, ticks are not tested, warning signs everywhere and pharmacist can prescribe prophylactic antibiotics.



Malnutrition
and food-
borne
diseases

- Drought, fire or extreme rains cause crop failures which cause increase food prices and food insecurity.
- Crop failures Horn of Africa, California, Alberta and British Columbia
- Increased food prices → inflation → increased cost of living → increased poverty → lose of shelter / homelessness → increased negative health outcomes



Noncommunicable
diseases (NCDs)

- Climate crisis is degrading many ecological and social determinants of health which causes increase in metabolic disease and diabetes, cardiovascular disease, lung disease, kidney disease and cancer. It is a risk multiplier
- Extreme events and/or increased poverty reduce access to medical treatment



Mental and
psychosocial
health

- Eco-anxiety and climate grief on the rise as people worry about the future.
- Extreme events and forced migration or displacements can cause Post-traumatic stress syndrome.



Impacts
on healthcare
facilities

- Summer 2023 - NWT forced the evacuation of the 100 bed Stanton Territorial Hospital including ICU patients, frail elderly, pregnant people, dialysis patients. Patients went south to major cities in Alberta and British Columbia impacting the hospitals in those communities.
- Similar evacuations have taken place around the world.



[24] <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>

[44] <https://www.nationalnursesunited.org/press/kaiser-sutter-santa-rosa-rns-help-evacuate-wildfire-patients-while-also-facing-personal>



Effects
on health
systems

- The climate crisis is already putting stress on our healthcare system.
- Our healthcare system was vulnerable before COVID, but it is broken in many ways now - extreme nursing shortages, family doctors quitting or changing specialties, lack of infrastructure and resources.
- We need a robust healthcare system and strong, healthy workforce to cope with the coming challenges. We need to be working under capacity so that we can surge when the crises arrive.

Fort Chipewyan

- Downstream from Alberta tar sands
- High Cancer Rates
- Country food no longer edible
 - + high food prices
 - + \$\$\$ transport
 - = Food Insecurity



[25] <https://thenarwhal.ca/oilsands-cancer-story-2-deformed-fish-cause-doctor-sound-alarm/>

[26] <https://theinspirednester.com/2013/06/25/favourite-recipe-beef-stew-bannock/alberta-fort-chipewyan-map/>

Well that was terrible.

Options:

- Denial
- Paralysis
- ACTION!!!!!!!

Joan Baez's words: "Action is the antidote to despair."

“Nurses are the most trusted profession.”[27]

Our vested interest is human health

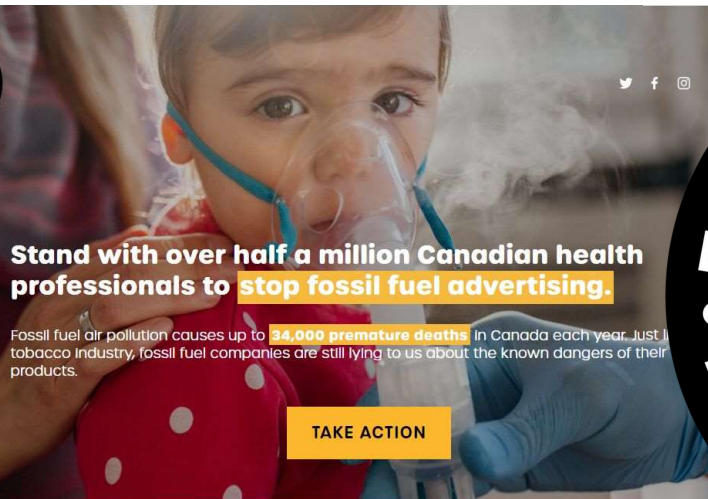
Let's use our voice!

[27]<https://nurse.org/articles/nursing-ranked-most-honest-profession/>

Ontario Nurses for the Environment - RNAO

- Interest Group of the Registered Nurses Association of Ontario
- Sustainable/ net zero procurement campaign with CCGHC, CAPE, CANE
- Went to COP28
- Numerous events on environment and nursing
- Write submissions to proposed government legislation
- Collaborating with many partners on their campaigns



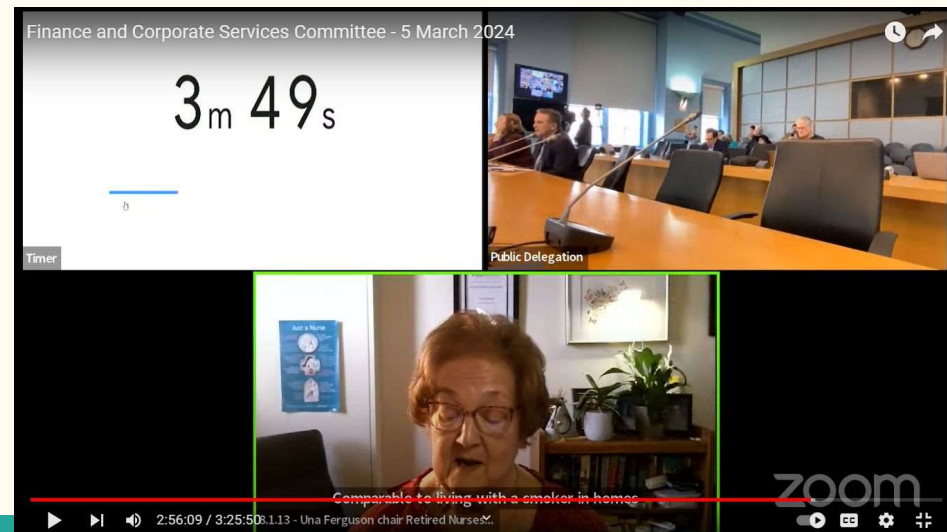


Feb 6th -NDP MP Charlie Angus introducing Bill C-372

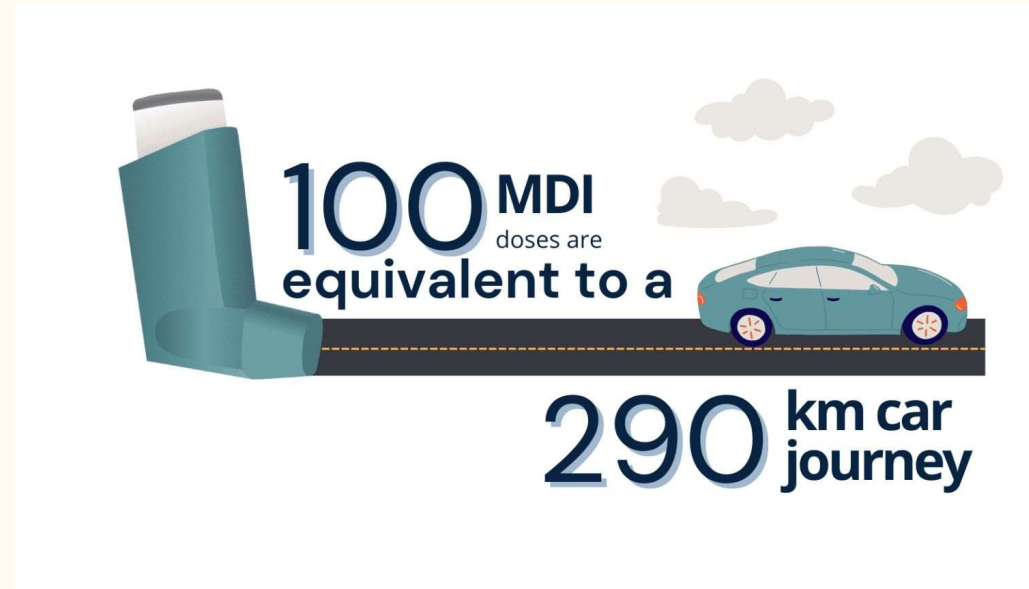
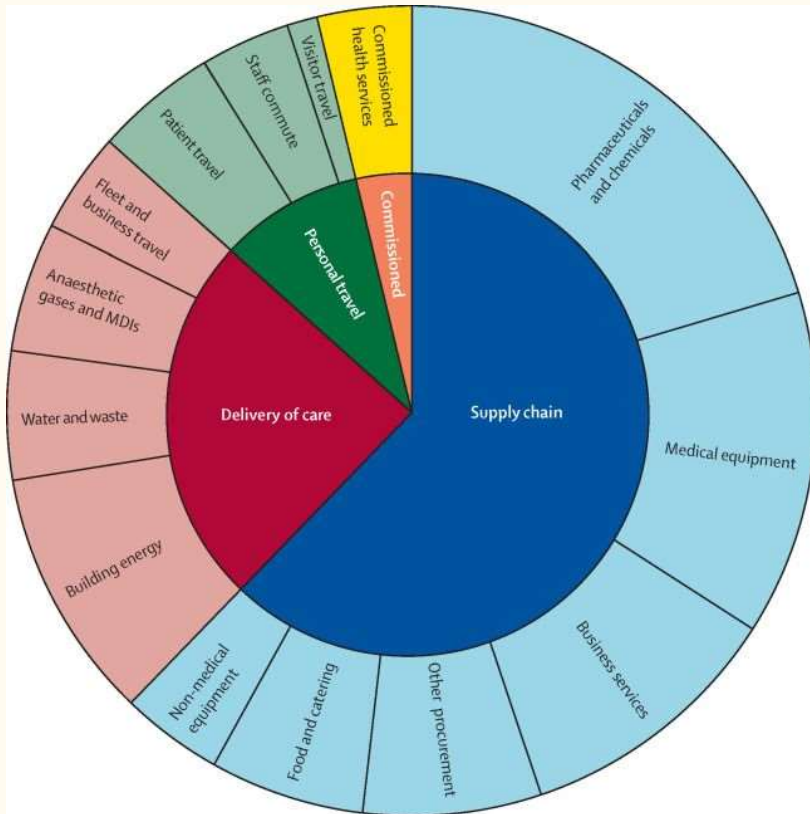
Mar 5th - RNAO RN Una Fergusson presents to City of Ottawa

[28] <https://www.youtube.com/watch?v=ltxPxZrcO3w>

[29] <https://www.youtube.com/watch?v=h9lqOo22Nd4>



Healthcare GHG emissions

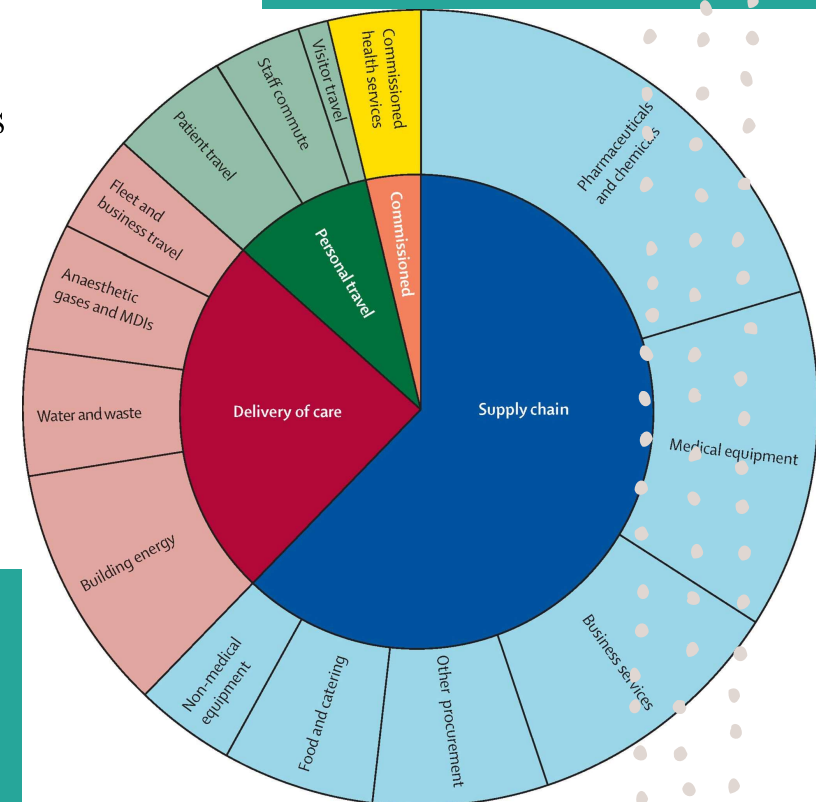


[30] [https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196\(20\)30271-0/fulltext](https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(20)30271-0/fulltext)

[31] <https://cascadescanada.ca/training/climate-conscious-inhaler-prescribing-collaborative/>

Sustainable Procurement in Healthcare

- Globally, healthcare accounts for 5.2% of total greenhouse gas emissions (GHGE) [32] and 4.6% in Canada [33]. In the UK, the Nation Health Service reports the supply chain, medications and equipment are responsible for two-thirds of their emissions [31].
- In Canada institutions source their supplies through Group Purchasing Organizations (GPO).



[32] Bhopal, A., Norheim, O.F. Fair pathways to net-zero healthcare. *Nat Med* 29, 1078–1084 (2023). <https://doi.org/10.1038/s41591-023-02351-2>

[33] Vogel, Lauren. "Canada's health system is among the least green". *CMAJ* December 02, 2019 191 (48) E1342-E1343; DOI: <https://doi.org/10.1503/cmaj.1095834>

Towards Sustainable Procurement

- Sustainable / Net Zero procurement evaluation weighting: 80-90% cost + 10-20% sustainability criteria
- Exists already in other jurisdictions - NHS, Hamilton Health Sciences, GoC Treasury Board Directive, White House
- Challenge: Canada's decentralized system (13 different jurisdictions, numerous institutions).
- Solution: Accreditation Canada



ACCREDITATION
CANADA

[6]



Low-Hanging Fruit Banning Desflurane

CHOOSING GASES WITH LOWER GLOBAL ENVIRONMENTAL IMPACTS

Lower GWP20 values, such as sevoflurane, over those with high values, such as desflurane or nitrous oxide, is a key step in mitigating the environmental impacts of anesthetic gases.

CALL TO ACTION

University of Wisconsin-Madison Department of Anesthesiology provided staff education and affixed labels for AG products.

↓ 55% in desflurane usage ↑ 16% in sevoflurane usage ↓ \$25,000 costs/month



That's why, with the [support of the Royal College of Anaesthetists and the Association of Anaesthetists](#), NHS England has announced the decommissioning of desflurane by early 2024.

Mandate Carbon Labelling on Health Products

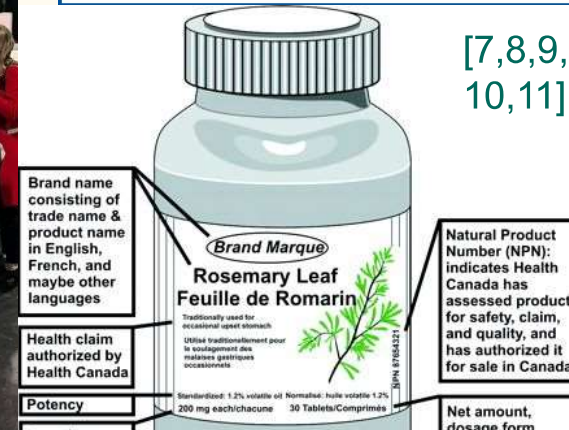
- Carbon footprint equivalent: 7 major GHG's (defined by Kyoto Protocol) converted to kg CO₂e
- Possibly ISO 14067:2018
- You can't manage what you don't measure
- Benefits:
 - Would aid sustainable procurement protocols
 - Know the true impact of the product being purchased
 - Force the supplier's suppliers to be more green
- Challenges:
 - Trained experts and contractors will take some to scale



Quaker® 100% Whole Grain Oats Packets
Gruau Quaker® à 100 % de grains entiers en sachets

	Nutrition Facts Per 1 packet (30 g) % DV*	Valueur nutritive pour 1 sachet (30 g) % VDV*
Calories 120		Calories 120
Total Fat 2 g	3%	Lipides 2 g
Saturated Fat 0.4 g	1%	Acides gras saturés 0.4 g
Trans Fat 0 g	0%	Acides gras trans 0 g
Cholesterol 0 mg	0%	Cholestérol 0 mg
Sodium 0 mg	0%	Sodium 0 mg
Carbohydrate 20 g	7%	Glucides 20 g
Fibre 3 g	11%	Fibres 3 g
Soluble Fibre 1g		Fibres solubles 1g
Total Sugar 2g		Fibres insolubles 2g
Sugars 0 g		Sucres 0 g
Protein 4 g		Protéines 4 g
Vitamin A 0%		Vitamine A 0%
Vitamin C 0%		Vitamine C 0%
Calcium 2%		Calcium 2%
Iron 8%		Fer 8%

*% Daily Value



Nursing Education

- Climate health competencies are currently lacking from entry to practice education globally.
- Josalyn Radcliffe and I precepted 4th year Algonquin College students
- ONE-IIOE has spoken to nursing students at Algonquin College and University of Toronto
- Started a community of practice Google Group (still in its infancy) with Algonquin, University of Toronto, Nipissing University, St. Lawrence College, Université de St-Boniface, MacEwan University and McGill all represented.

COP28 in Dubai



Discussion - The Climate Crisis is a Health Crisis

“Action is the antidote to despair” -Joan Baez

How can you take action to make the greatest impact?