

Practical Ways to Reduce the Carbon Footprint of Rural Clinical Practice

UBC CPD Rural Rounds

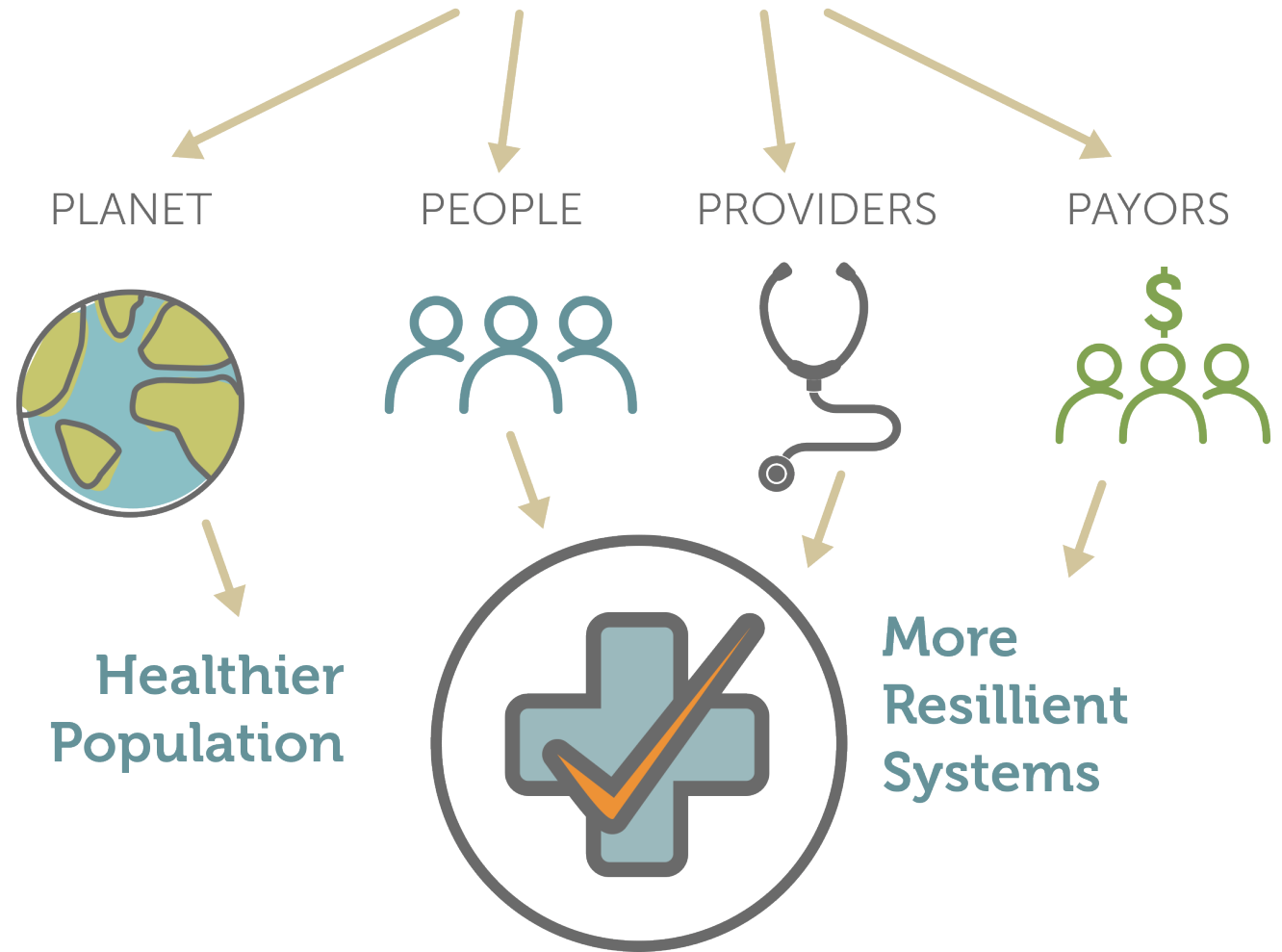
February 13, 2025

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Sustainable, High Quality Care

Better for...



Disclosures

No commercial conflicts of interest

Support: Interior Health Authority, Health Quality BC, CASCADES (Environment and Climate Change Canada), East Kootenay Division of Family Practice,, SSC Physician Quality Improvement Program

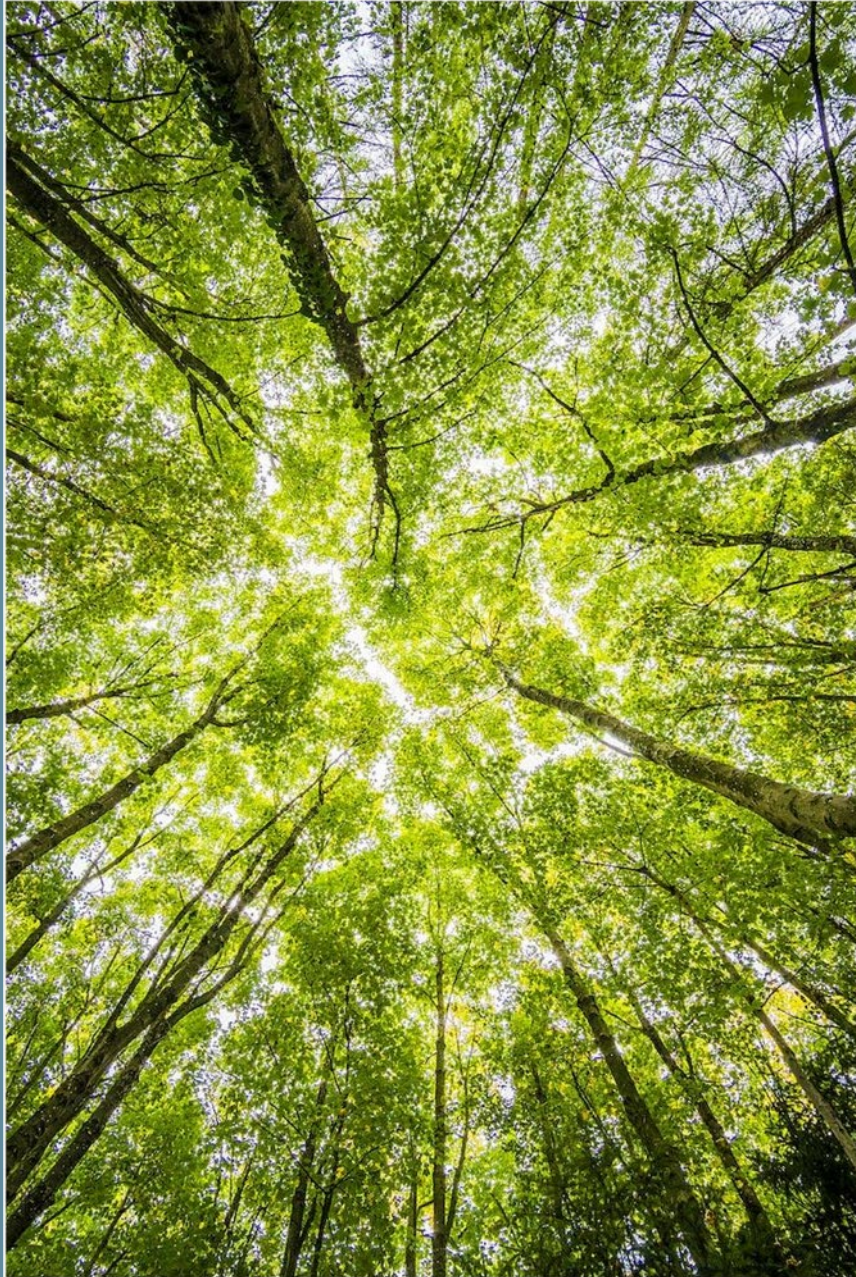
Speakers' Honoraria: many academic, non-profit, governmental organizations

Learning Objectives

- Identify the connections between planetary health and human health
- Recognize the important opportunities for providers to address many of today's health challenges by using the principles of sustainable healthcare
- Describe practical examples of sustainable health care practices in day-to-day clinical work

Indigenous Acknowledgement



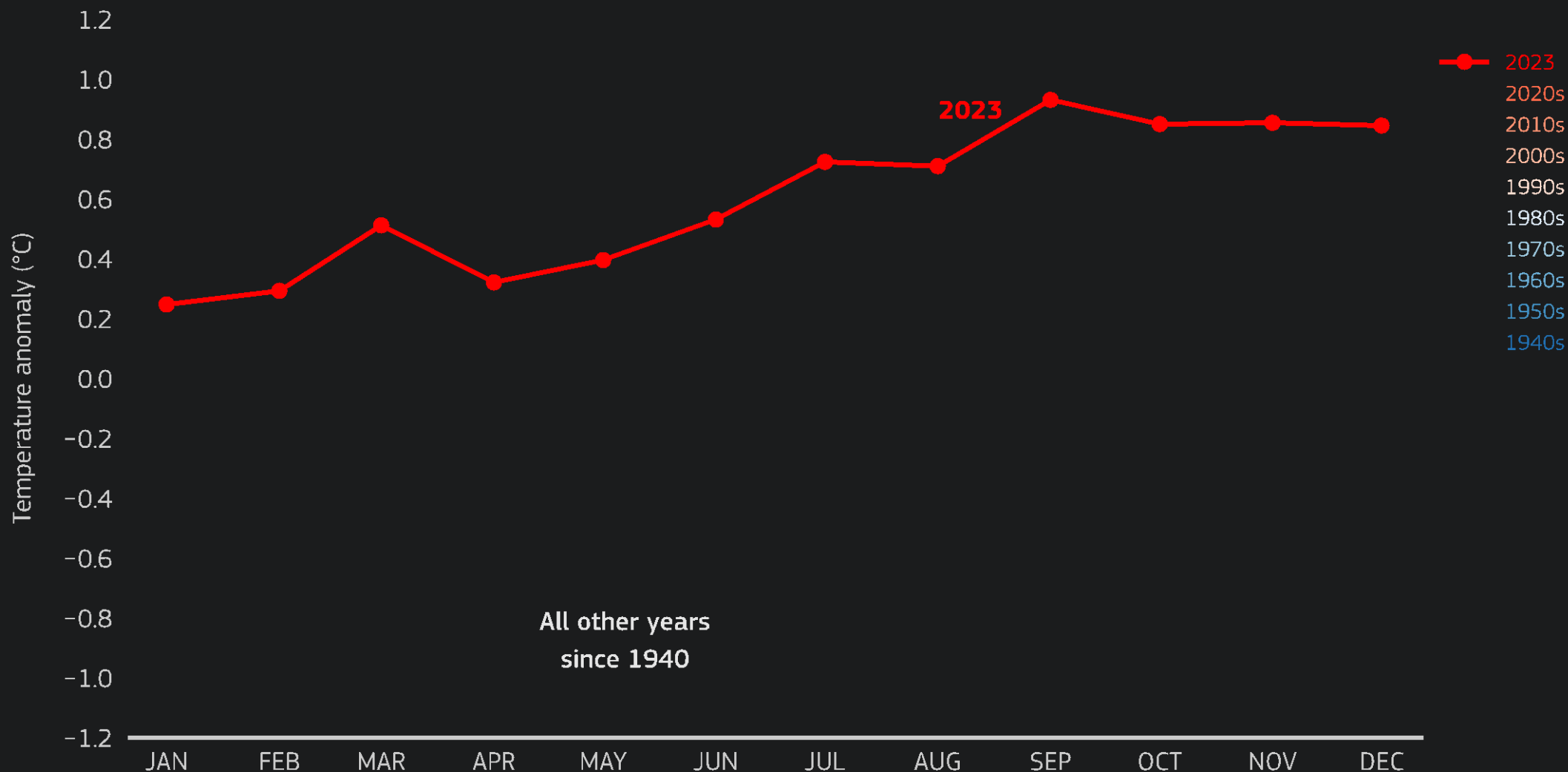


Planetary Health

“...human health and human civilization depend on flourishing natural systems and the wise stewardship of those natural systems.”

GLOBAL SURFACE AIR TEMPERATURE ANOMALIES

Data: ERA5 1940–2023 • Reference period: 1991–2020 • Credit: C3S/ECMWF



PROGRAMME OF THE
EUROPEAN UNION



IMPLEMENTED BY

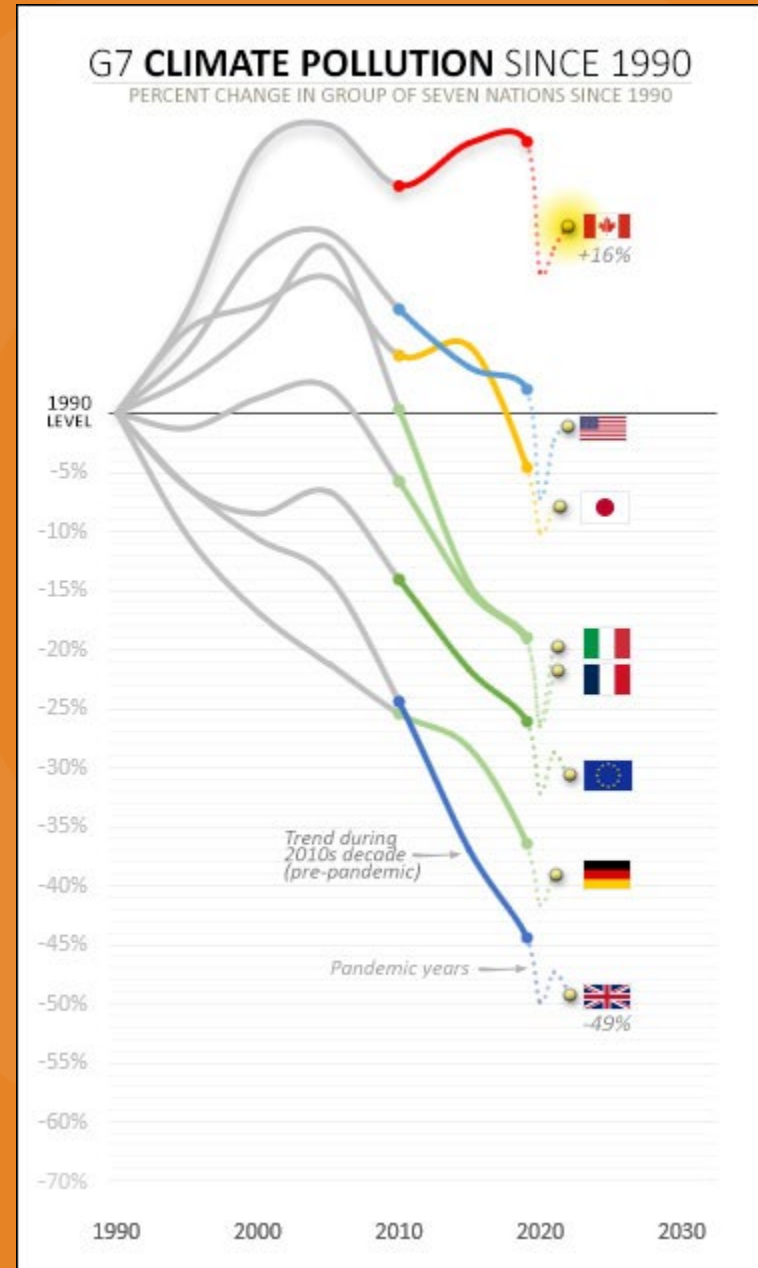


Climate
Change Service
climate.copernicus.eu



“Relax. Pot temperatures have been going up and down for centuries.”

G7 CLIMATE POLLUTION CHANGES SINCE 1990. Historical emissions data from UNFCCC National Inventory Reports for 2023. Chart shows every fifth year from 1990-2015 and then each year since. Solid parts of line shows trends from 2010-2019. Dotted ends of line shows pandemic years of 2020, 2021 (plus 2022 for some). Estimates for 2022 for USA, EU and UK from those nations. For Canada, 2022 estimate from Canadian Climate Institute. CHART by Barry Saxifrage at VisualCarbon.org and NationalObserver.com. Nov 2023.

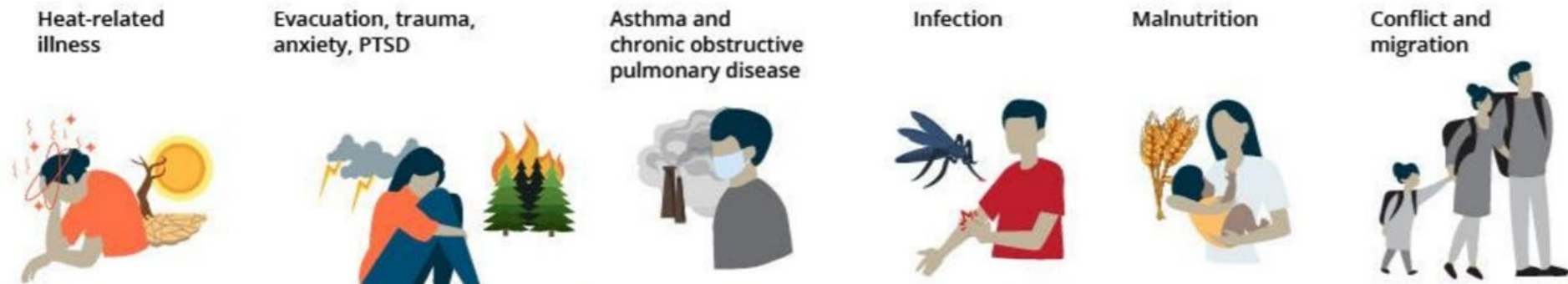


Climate- related Health Impacts



Climate change-related impacts to health and health systems

Health



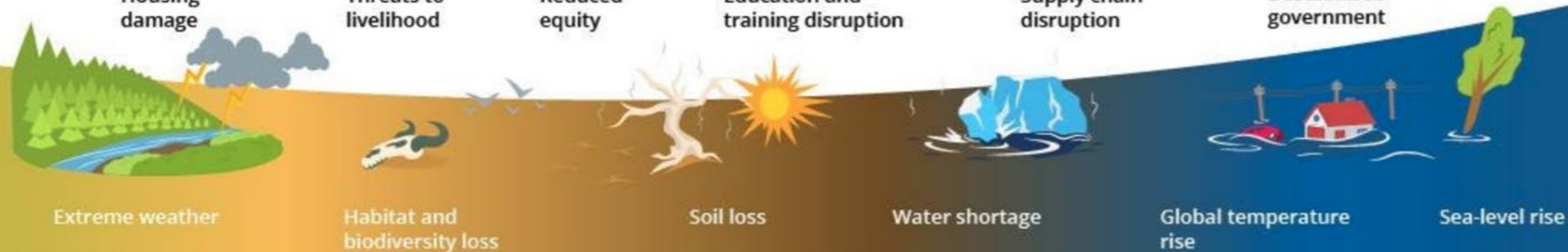
Health systems



Social & structural determinants of health



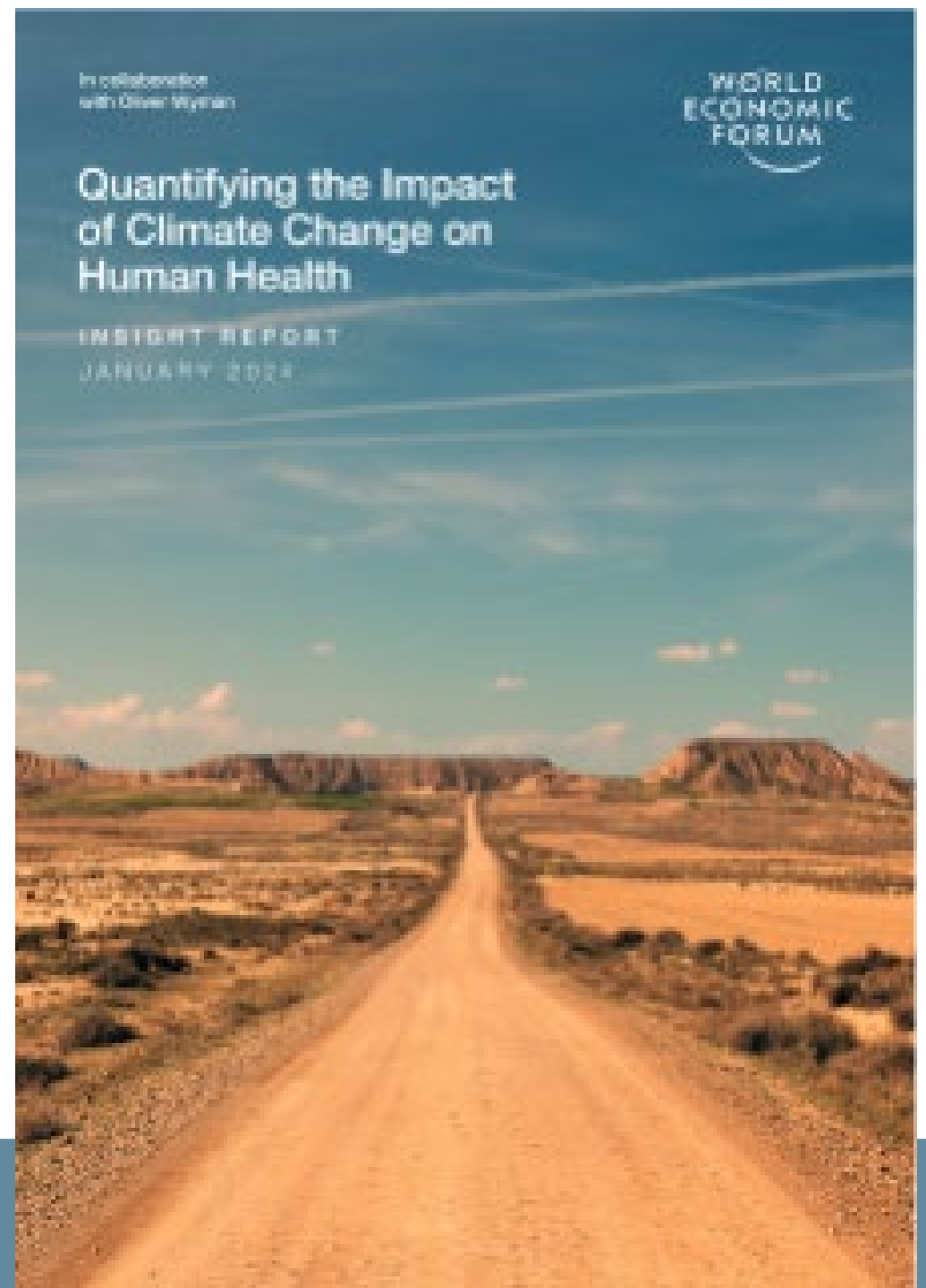
Ecological determinants of health



Health Impacts

By 2050:

- 14.5 million additional deaths
- \$12.5 trillion economic losses
- \$1.1 trillion in extra costs to the healthcare system



Health Care Environmental Effects



Health systems contribute upwards of **5%** of greenhouse gas emissions, almost on par with the aviation industry's environmental impact.*



1 aerosol inhaler, depending on the type, can have the same carbon footprint as driving up to **170km** in a gas car.*



An operating surgical suite has an estimated impact of over **3,200,000kg CO₂e**. Equivalent to powering over 718 Canadian homes annually.*

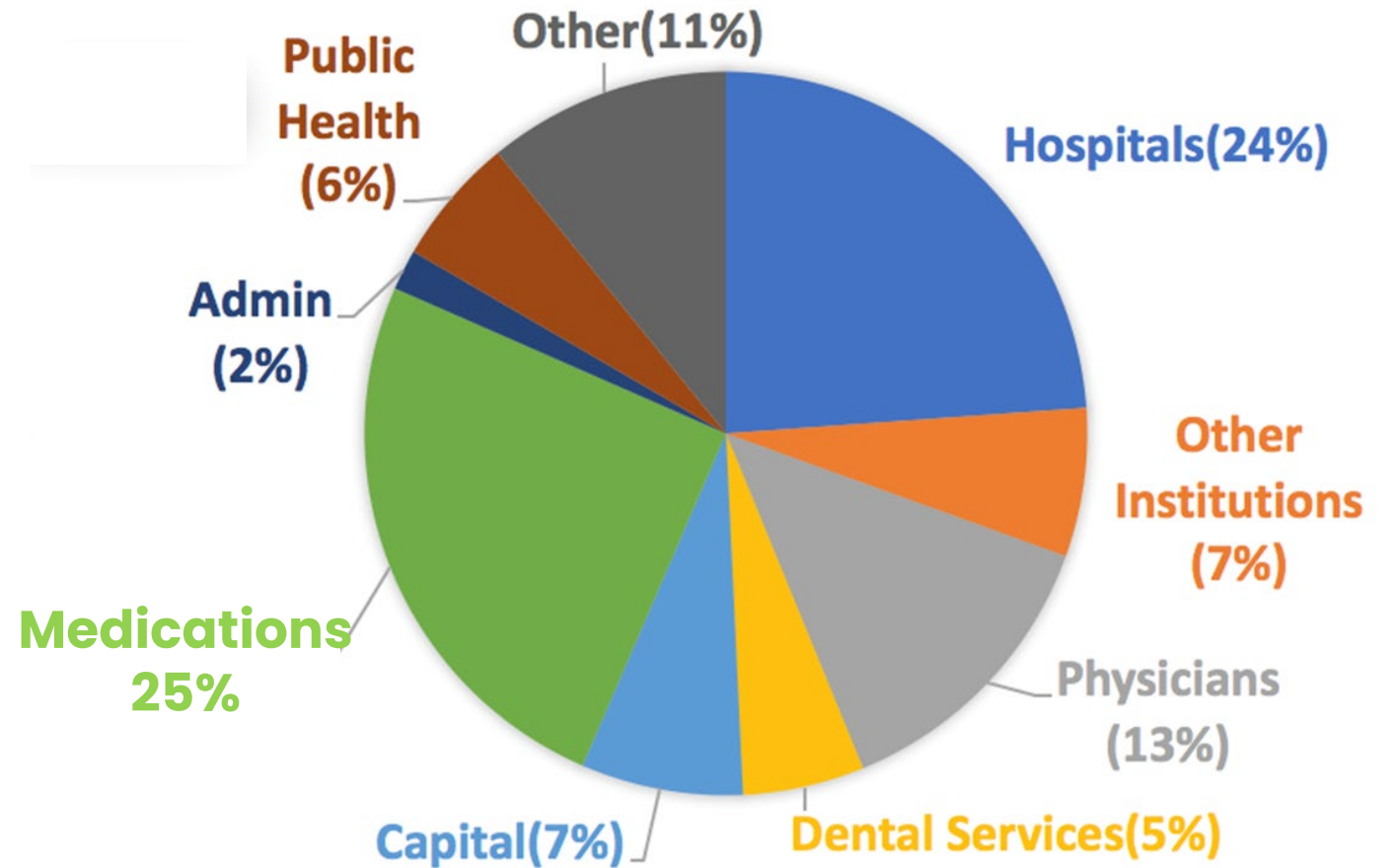
Where do we need to go?

Sustainable, High Quality
Healthcare



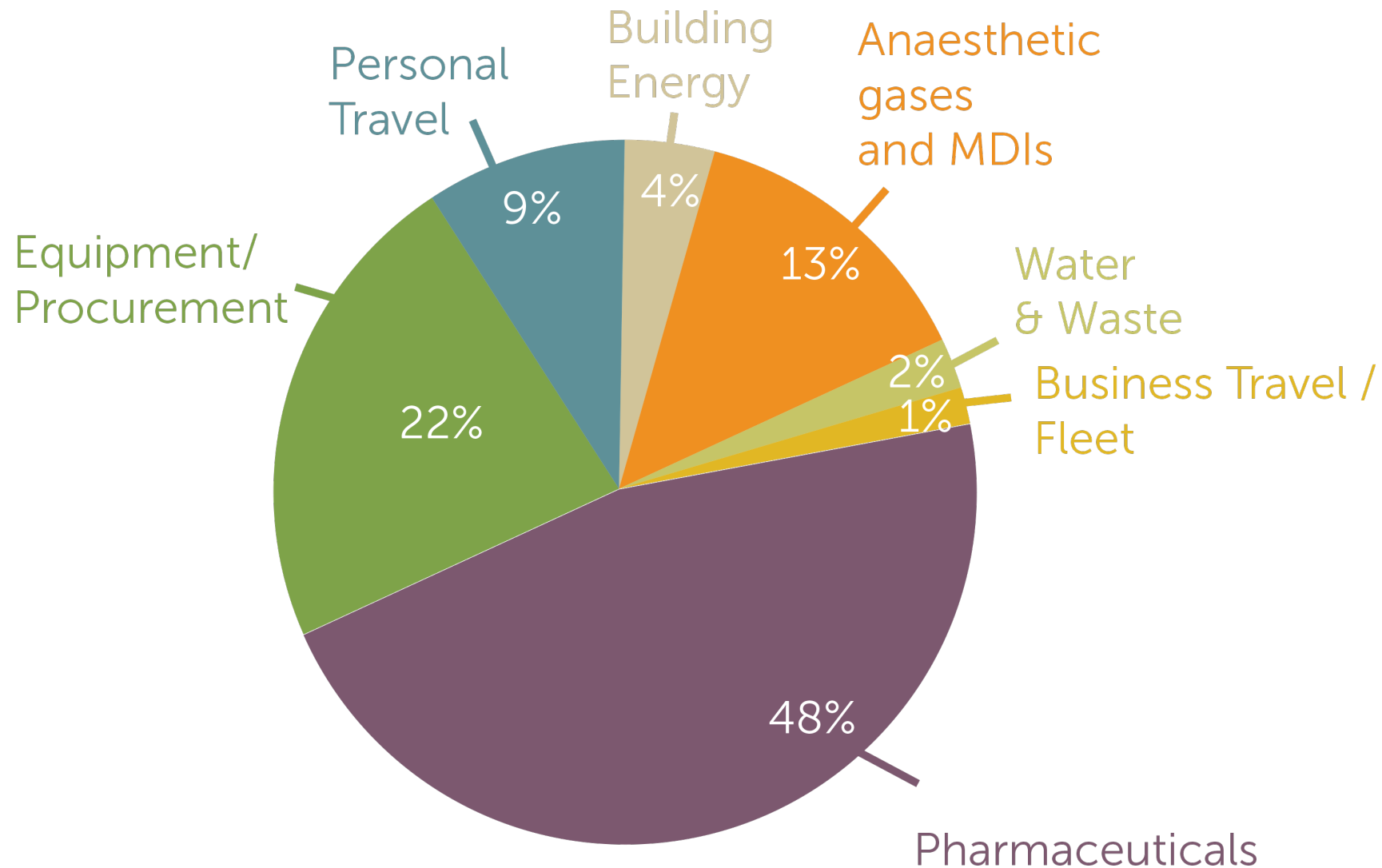
HEALTH QUALITY BC

Greenhouse Gas Pollution from Canadian Health Care



Eckelman MJ, Sherman JD, MacNeill AJ. Life cycle environmental emissions and health damages from the Canadian healthcare system: an economic-environmental-epidemiological analysis. *PLoS medicine*. 2018;15(7):e1002623.

Greenhouse Gas Pollution from Primary Care





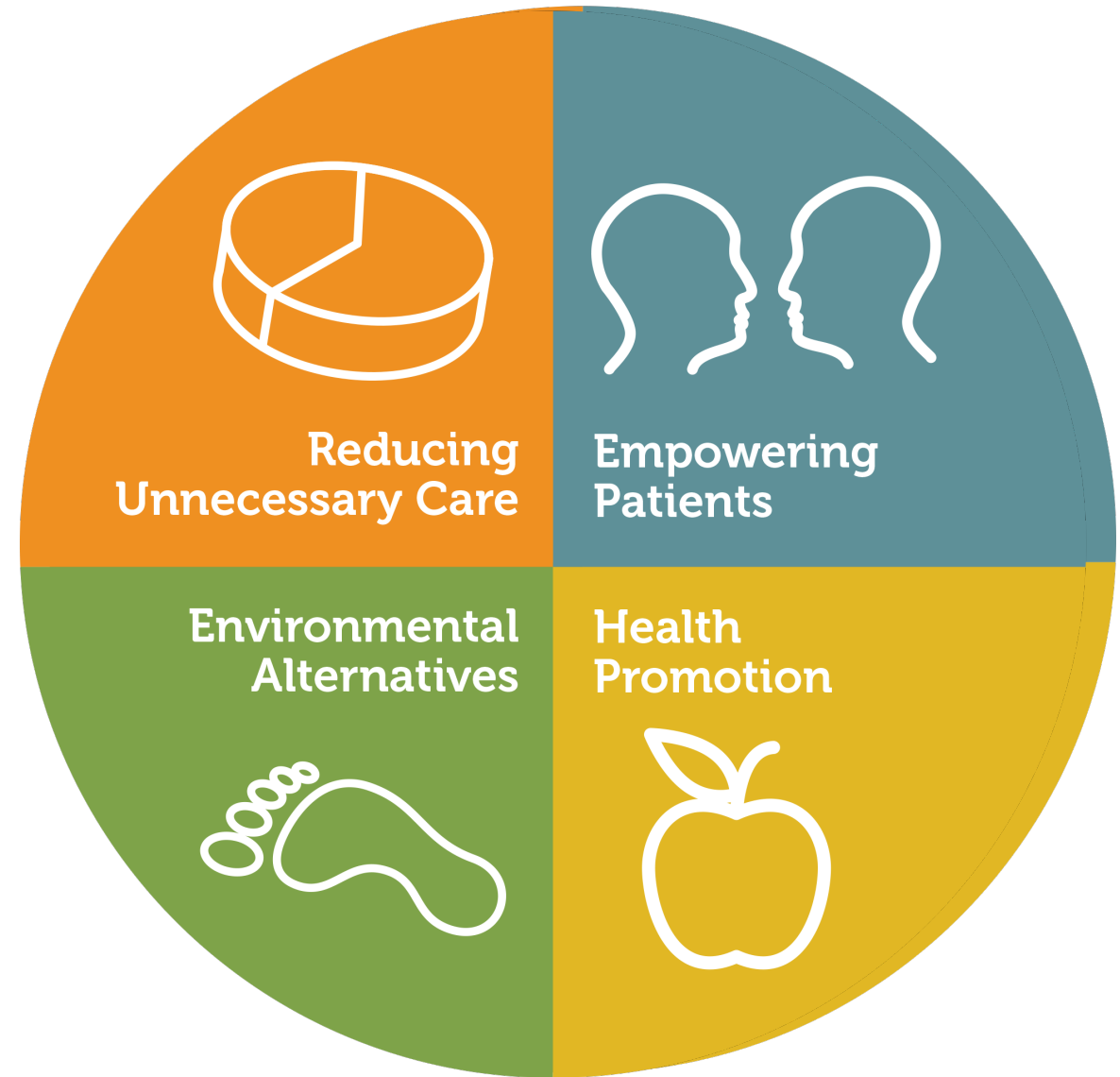
Life Cycle Environmental Impacts of Medical Supplies



The Recycler

“We are not going to recycle our way out of this”

Principles of Environmentally Sustainable Health Care

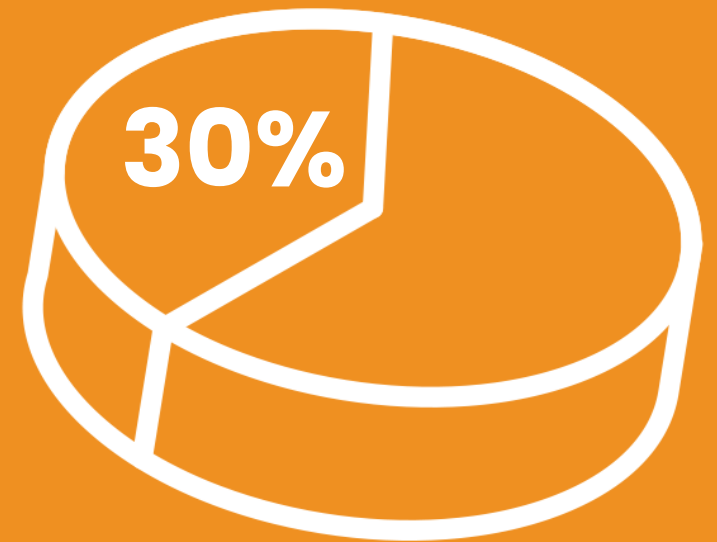


Mortimer F. The sustainable physician. *Clinical medicine* (London, England). 2010;10(2):110-1.

30% of care is unnecessary 10% is harmful

- Over-investigation
- Overdiagnosis
- Over-treatment

Barratt AL, Bell KJ, Charlesworth K, McGain F. High value health care is low carbon health care. *The Medical journal of Australia*. 2022;216(2):67-8.



Reducing Unnecessary Care

Melanie, 42 yo small business owner in 100 Mile House

- C/o feeling tired and achy x 1-2 months
- Headaches, sore back & joints, low energy, poor sleep
- Busy with work, kids, aging father, worried about “menopausal symptoms”
- No red flags for headache or back pain
- What do you do?

Melanie, 42 yo small business owner in 100 Mile House

- CBC, creat, lytes, urine, LFTs, CK, ferritin, B12, TSH, HbA1c, lipids, ANA, RF, Vit D, CRP, HLA B27, LH, FSH, prolactin, Hep B&C, HIV
- xray L-spine
- MRI brain

Melanie, 42 yo small business owner in 100 Mile House

- K+ : 5.1
- TSH: 6.5
- ANA: pos 1:80
- T. chol: 6.0, LDL: 3.87 HDL: 1.6 Ratio: 3.73
- MRI brain: Rathke's cleft cyst
- L-spine: multi-level mild "degenerative disc disease"

Unnecessary Lab Testing

Vitamin D testing in Australia – 2020

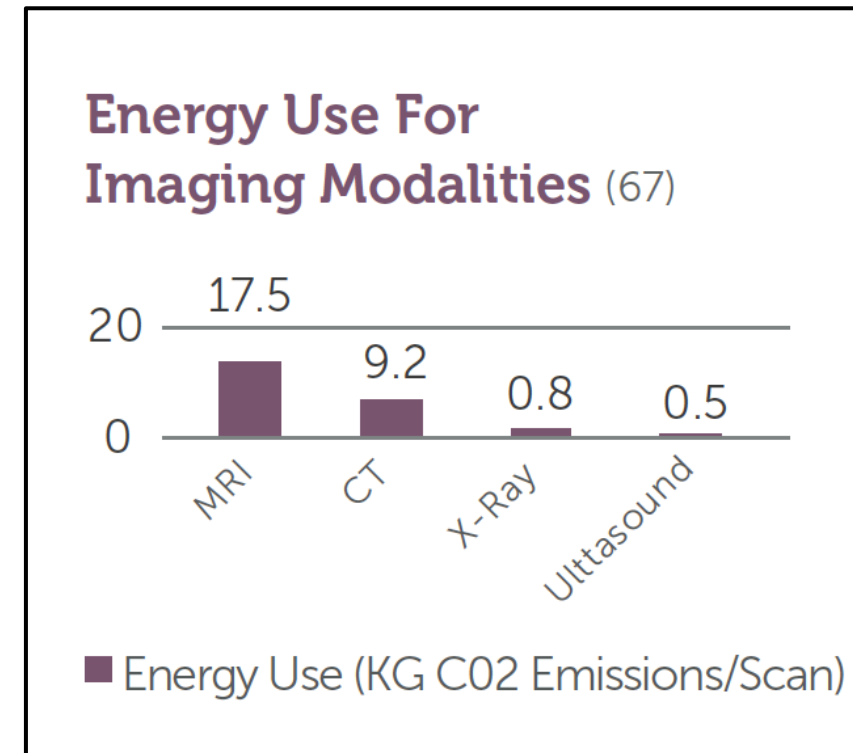
- 4,457,657 tests
- \$87 million AUD
- >76.5% unnecessary
- **Greenhouse Gas reduction = 160,000 – 230,000 km driving**

Breth-Petersen M, et al. Health, financial and environmental impacts of unnecessary vitamin D testing: a triple bottom line assessment adapted for healthcare. *BMJ Open* 2022;12:e056997. doi:10



Carbon footprint of radiology

- 4% of hospital energy
- CT = 5 households
- MRI = 26 households



Heye T, Knoerl R, Wehrle T, Mangold D, Cerminara A, Loser M, et al. The Energy Consumption of Radiology: Energy- and Cost-saving Opportunities for CT and MRI Operation. Radiology. 2020;295(3):593-605.; McAlister S, McGain F, Petersen M, Story D, Charlesworth K, Ison G, et al. The carbon footprint of hospital diagnostic imaging in Australia. Lancet Reg Health West Pac. 2022;24:100459.

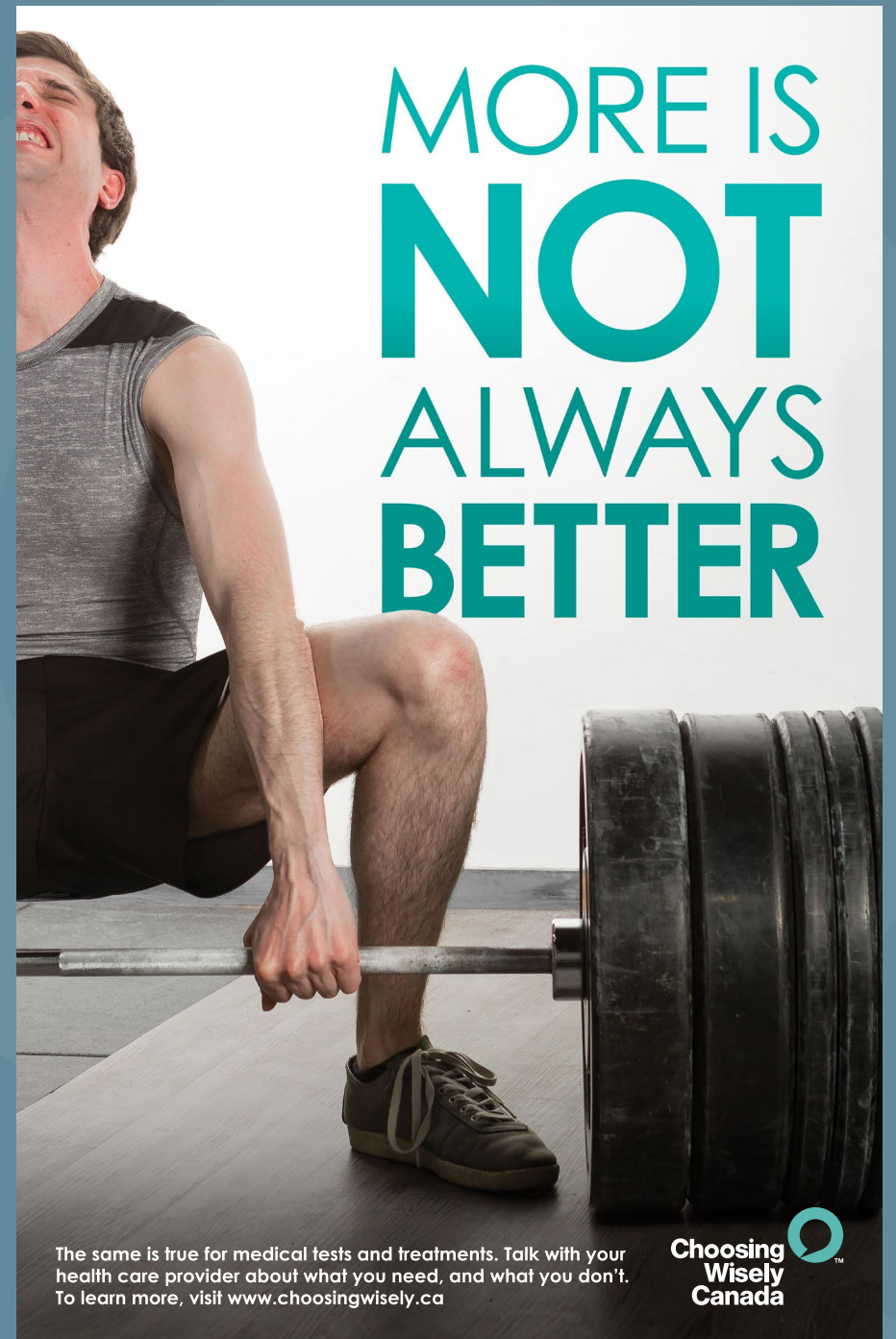
Harms of Unnecessary Care

- Adverse events / risks
- Incidentalomas
- Anxiety/ fear
- Pressures on providers
- Increased wait times
- Costs (system/patient)



PlanetaryHealth
for Primary Care

Hensher M, Canny B, Zimitat C, Campbell J, Palmer A. Health care, overconsumption and uneconomic growth: A conceptual framework. *Social science & medicine* (1982). 2020;266:113420.

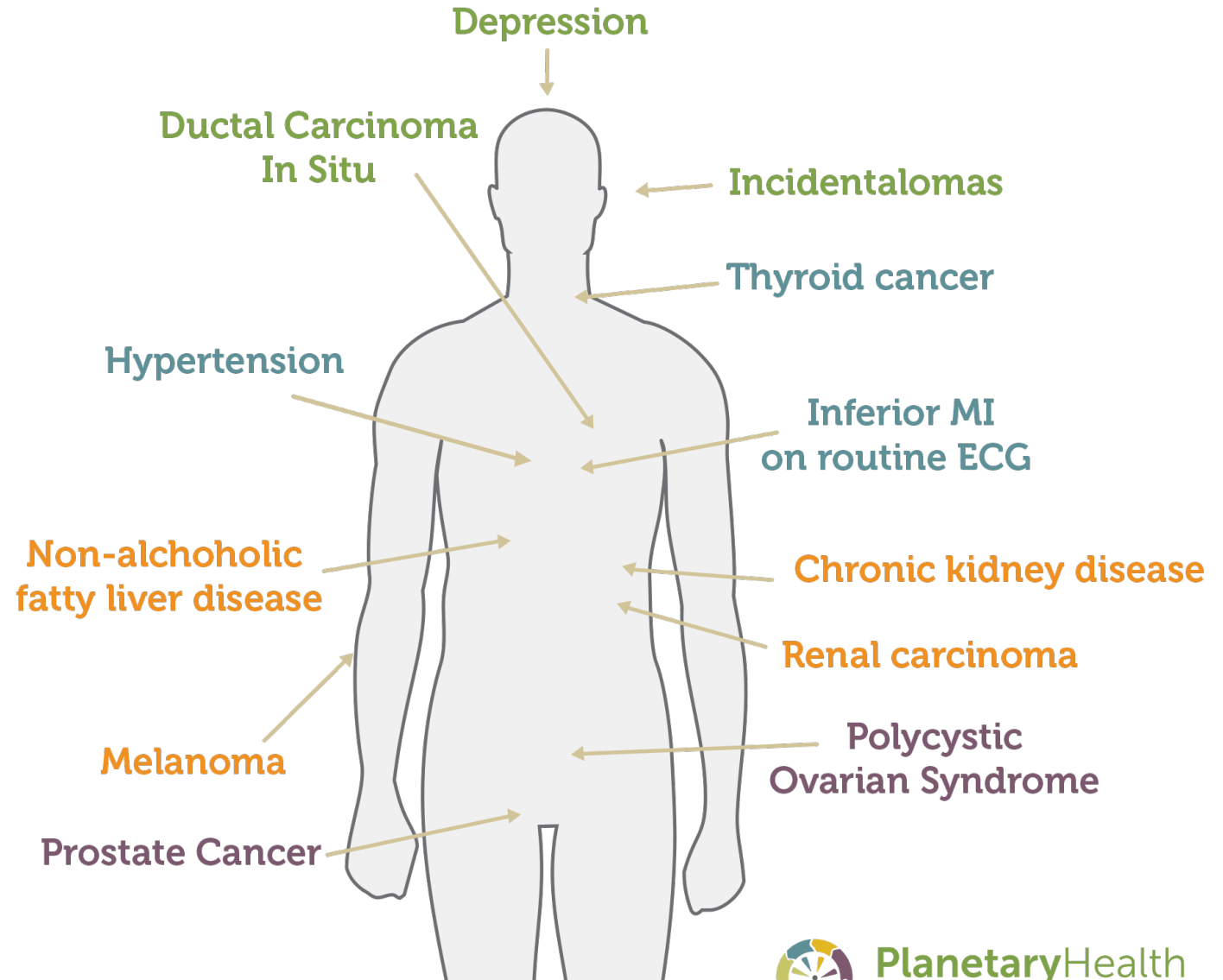


The same is true for medical tests and treatments. Talk with your health care provider about what you need, and what you don't. To learn more, visit www.choosingwisely.ca

Choosing
Wisely
Canada

Overdiagnosis

- Over-screening
- Over-investigating
- Diagnostic “creep”
- Medicalizing normal



Over-treatment

Antidepressants:

- #1 prescribed drug in BC
- Legacy drugs
- Prescribing cascades



Walker, A. J., Curtis, H. J., Bacon, S., Croker, R., & Goldacre, B. (2018). Trends and variation in prescribing of low-priority treatments identified by NHS England: A cross-sectional study and interactive data tool in English primary care. *Journal of the Royal Society of Medicine*, 111(6), 203–213.

Drivers of Overuse

- Habit/Training
- Fear of missing something
- Idea that “More is Better”
- Patient requests
- Guidelines / policies
- Influence of special interests
- “Fast Medicine”





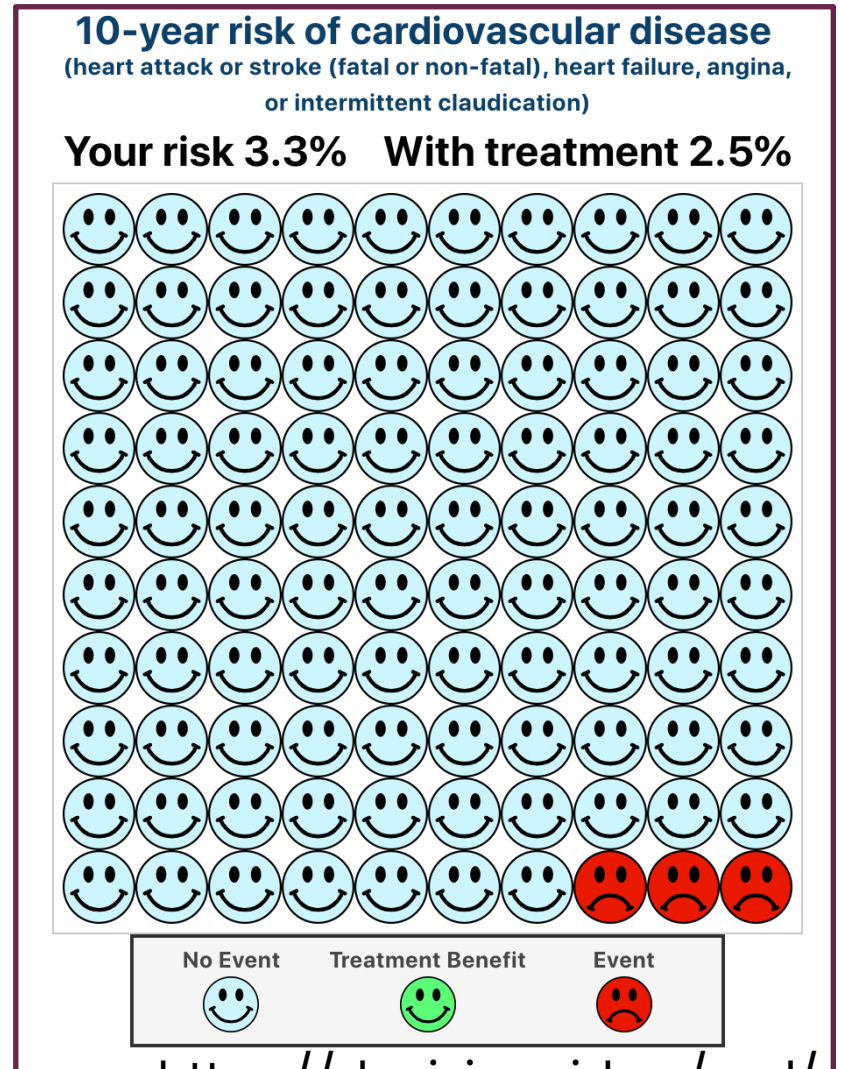
Empowering Patients

“Well-informed patients consume less medicine ...the delivery of unwanted services is eliminated...and patients are far more likely to keep their conditions under control, leading to fewer hospitalisations and emergency department visits”

Mulley A. Patient Preferences Matter: Stop the Silent Misdiagnosis. London: The King's Fund, Dartmouth Centre for Health Care Delivery Science; 2012 2012.; WHO. Patient engagement. Geneva: World Health Organization; 2016 2016.; Paterick TE, Improving health outcomes through patient education and partnerships with patients. Proceedings (Baylor University Medical Center). 2017;30(1):112-3

Shared Decision Making

- “What matters to YOU?”
- ↓ overuse *and* underuse
- Reminds *us* about the evidence
- ↑ adherence, trust, understanding
- Adds 2.6 minutes to visit



<https://decisionaid.ca/cvd/>

Patient Preferences Matter: Stop the Silent Misdiagnosis. London: The King's Fund, Dartmouth Centre for Health Care Delivery Science; 2012; Paterick TE, Patel N, Tajik AJ, Chandrasekaran K. Improving health outcomes through patient education and partnerships with patients. Proceedings (Baylor University Medical Center). 2017;30(1):112-3; Street RL, Jr., Makoul G, Arora NK, Epstein RM. How does communication heal? Pathways linking clinician-patient communication to health outcomes. Patient education and counseling. 2009;74(3):295-301; BC Patient Safety and Quality Council. What Matters to You? (2021). <https://bcpsqc.ca/advance-the-patient-voice/what-matters-to-you/>.

Serious Illness Conversations

- Bill, 86 year-old retired mechanic from Invermere
- COPD, CAD, CHF, CRF, advanced dementia
- Develops pneumonia, increasing respiratory difficulty
- MOST level C2
- Hospital admission, prolonged stay, complications, delirium, investigations and monitoring
- Dies in hospital

**BC
CAN
CER**

Provincial Health Services Authority

**SERIOUS ILLNESS
CONVERSATION
GUIDE**

Engage patients

- 73% want to be involved in medication decisions
- 50% felt they were not

New Zealand Study:

- 50% “Too many meds!”
- 84% willing to stop

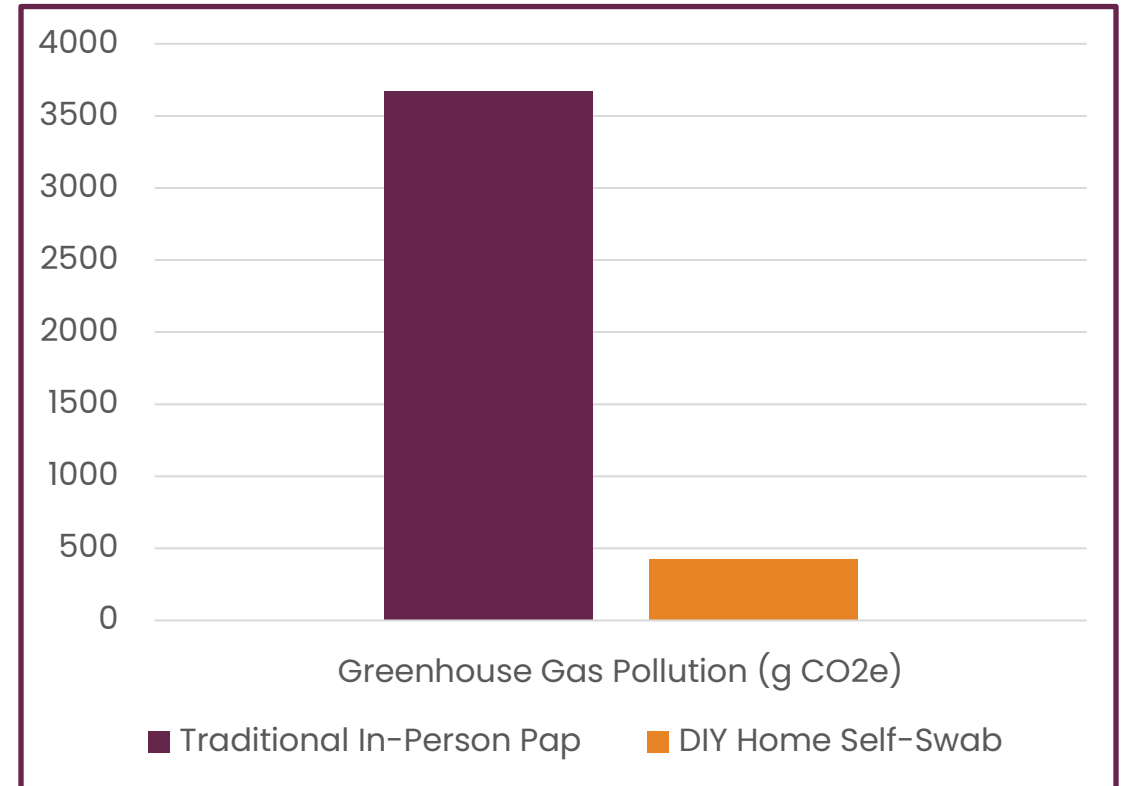


Mohammed MA., Attitude towards deprescribing and its association with frailty and complexity of medication regimen: A survey of older inpatients in a district health board in New Zealand. BMC Geriatr. 2023 Mar 23;23(1):166.; Tannenbaum C., Reduction of Inappropriate Benzodiazepine Prescriptions Among Older Adults Through Direct Patient Education: The EMPOWER Cluster Randomized Trial. JAMA internal medicine. 2014;174(6):890-8. Weir KR, Consumer Attitudes Towards Deprescribing: A Systematic Review and Meta-Analysis. Gerontol A Biol Sci Med Sci, 2022, Vol. 77, No. 5, 1020-1034

Cervix Cancer Screening

Traditional pap smears:
8.7 x larger
carbon footprint
than self-swab options

Whittaker M, Davies JC, Sargent A, Sawyer M, Crosbie EJ. A comparison of the carbon footprint of alternative sampling approaches for cervical screening in the UK: A descriptive study. BJOG. 2024;131(5):699–708. <https://doi.org/10.1111/1471-0528.17722>



Health Promotion

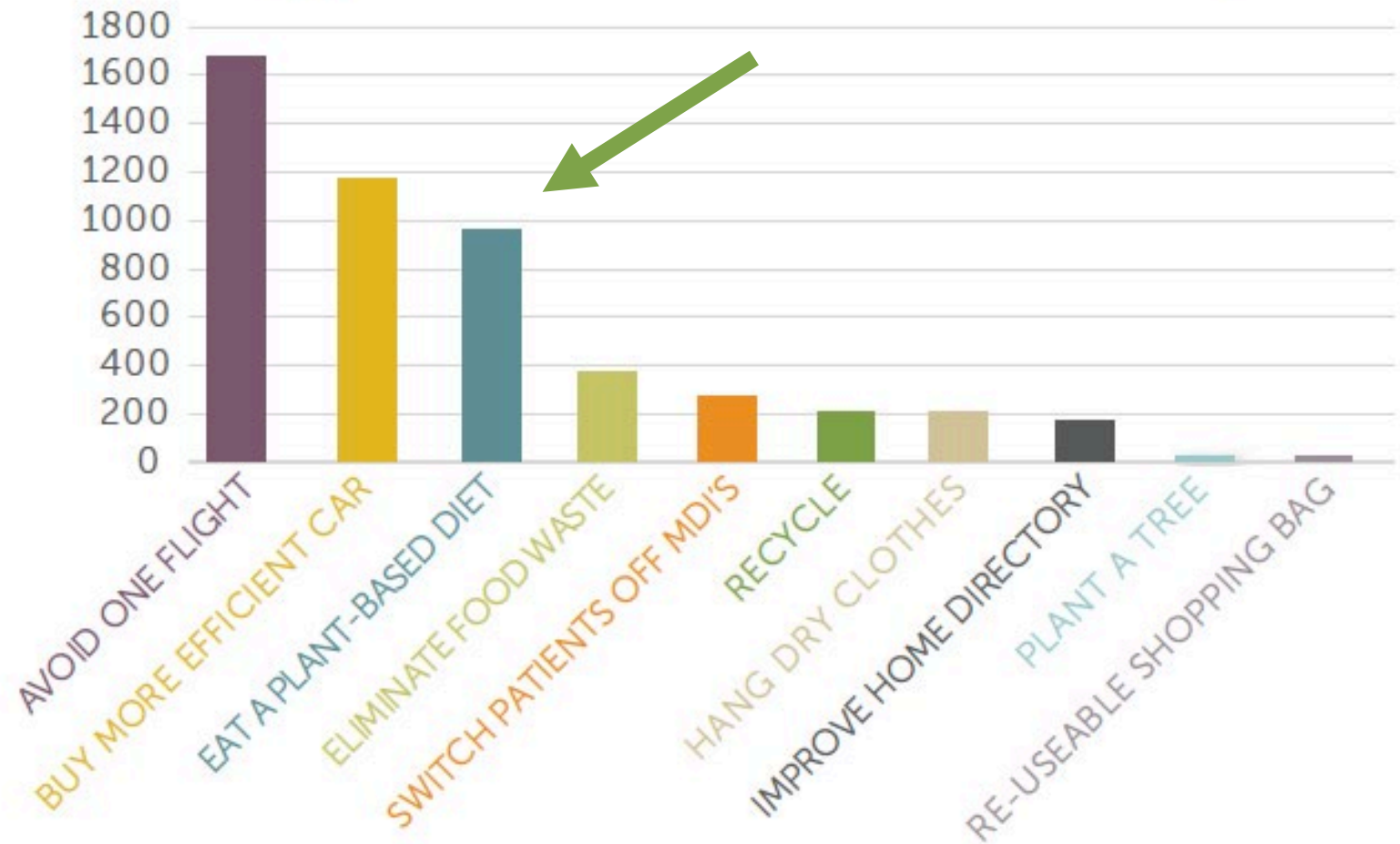


Shift to prevention (avoid *under-use*)

- More effective
- Less expensive
- More sustainable

Plant Based Diets

Approximate CO₂e reduced/year



Environmental Alternatives

- Long-acting
- Oral vs IV/IM
- Pill splitting
- 1 week trial new Rx's
- Non-pharmacologic
- Social / green Rx's



Metered Dose Inhalers



can have the same carbon footprint
as driving up to **170** km
in a gas car*

*Stoynova V, Culley C. Detailed Inhaler Carbon Footprint Chart. Available from <https://cascadescanada.ca/resources/inhalers/>

Inhaler Guide: British Columbia

Inhaler Carbon Emissions:



Instructions

1. Select indication:*

Asthma

2. Add criteria:

- Green inhalers only
- Regular PhamaCare coverage (Special Authority NOT required)
- Available in hospital

Patient's Age:









7

Click on an inhaler for more info








SABA

 Bricanyl Turbuhaler terbutaline	 Vannia Diskus salbutamol	 Vannia Softmist MDI salbutamol	 Vannia MDI salbutamol
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ICS

 Pulmicort Turbuhaler budesonide	 Aerolide Ellipta fluticasone furoate	 Flovent Diskus fluticasone propionate	 Aerolide Respigard fluticasone propionate
 Asmanex Twisthaler mometasone furoate	 Flovent MDI fluticasone propionate	 Advair MDI fluticasone/salmeterol	 Qvar MDI beclomethasone dipropionate

ICS/LABA

 Symbicort budesonide + formoterol	 Breez Ellipta fluticasone furoate + salmeterol	 Wixela Inhub fluticasone propionate + salmeterol	 Advair Diskus fluticasone propionate + salmeterol
 Breezhaler formoterol + budesonide	 Advair MDI fluticasone propionate + salmeterol	 Zenbuhe MDI mometasone + formoterol fumarate	

ICS/LAMA/LABA

bcinhalers.ca

There is now a guide for every province
Check out inhalerguide.ca for more info

Infection Prevention

- Gloves / sterile gloves
- Sterile water / saline
- Alcohol swabs
- Prophylactic antibiotics
- Topical “triple cream”
- Clean vs sterile

GLOVES AREN'T MAGIC

CLEAN YOUR HANDS.
GLOVES DO NOT REPLACE
HAND HYGIENE.



Protect patients and yourself by following proper hand hygiene procedures.

Clean your hands:

- Before and after patient / environment contact
- Before donning and after doffing gloves
- Before aseptic procedure
- When there is a risk of exposure to blood / bodily fluids
- Before handling medication or food
- After taking personal breaks



Scan the QR code for more hand hygiene and glove use tips.



Eliminating Exam Table Paper

No Staff or patient concerns

Annual Canada-wide savings

20,000 trees,

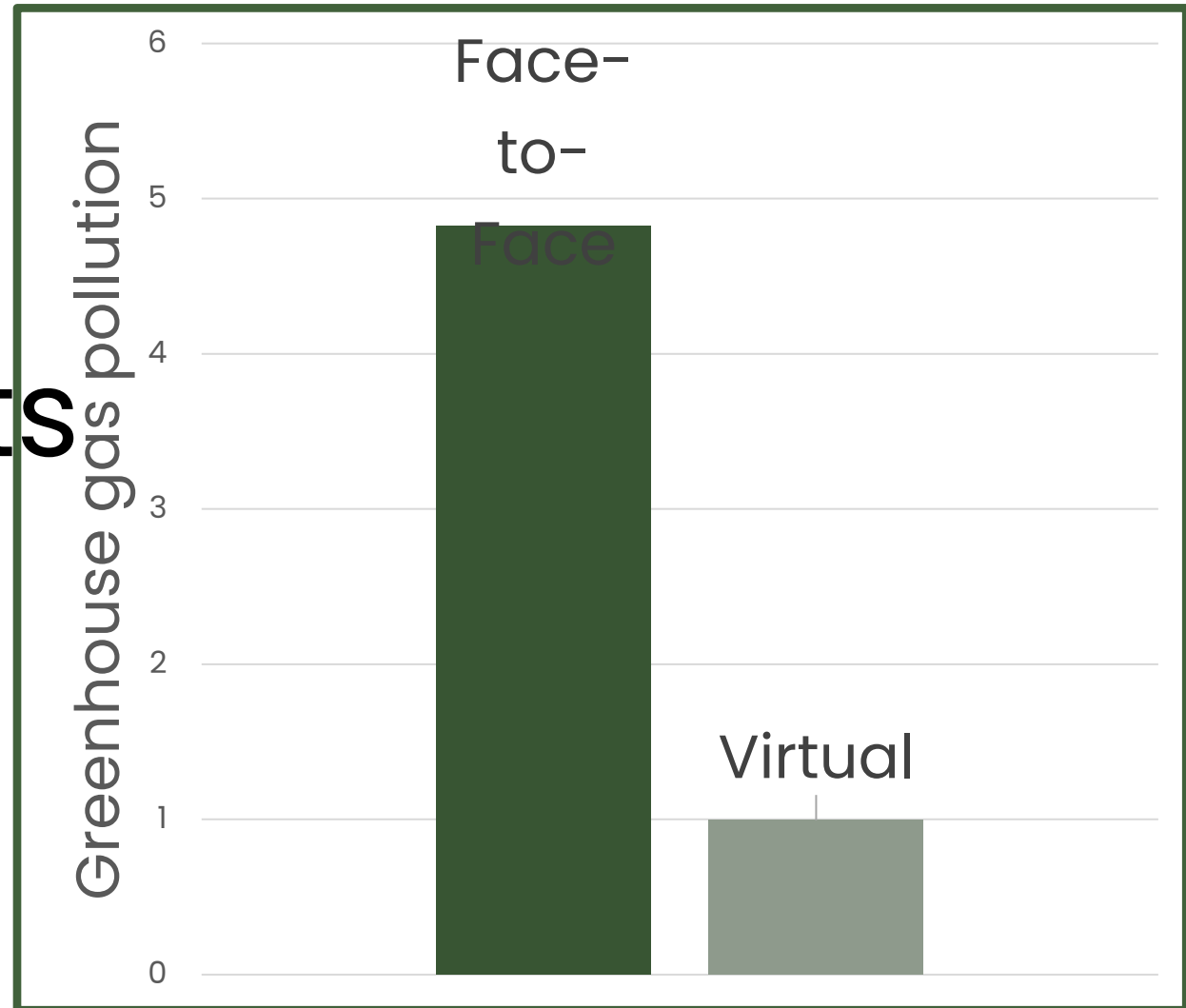
95,000 km of paper

\$8.5 million



Virtual Care

In person visits
= **4727 km**
driving /year



Bartlett S, Keir S. Calculating the carbon footprint of a Geriatric Medicine clinic before and after COVID-19. Age and ageing. 2022;51(2).

Re-useable

vs

Disposable



**750% less
solid waste**

**200-300 %
less energy**

**Fewer
volatile
organics**

**250-350 %
less water**

**Better
instrument
recovery**



Slow Medicine: Take time to...

- Listen to the patient's story
- Do a good physical exam
- Communicate clearly
- Allow bodies to heal
- Review old records
- Do some homework
- Talk to a colleague



Melanie, 42 yo small business owner in 100 Mile House

- L-thyroxine 50 ug od,
- Atorvastatin 20 mg od
- Citalopram 10 mg od
- Pantoprazole 40 mg od
- COCP od
- Salbutamol MDI prn

Melanie, 42 yo small business owner in 100 Mile House

- Shared decision making, prescribing cascades, Choosing Wisely, legacy medications
- Able to stop all meds, switch to LNG-IUS
- Reduce 1825 pills per year for a single patient!
- Reduced need for follow-up visits, investigations
- Save money, time for patient and providers, reduced risks

The Rural Advantage

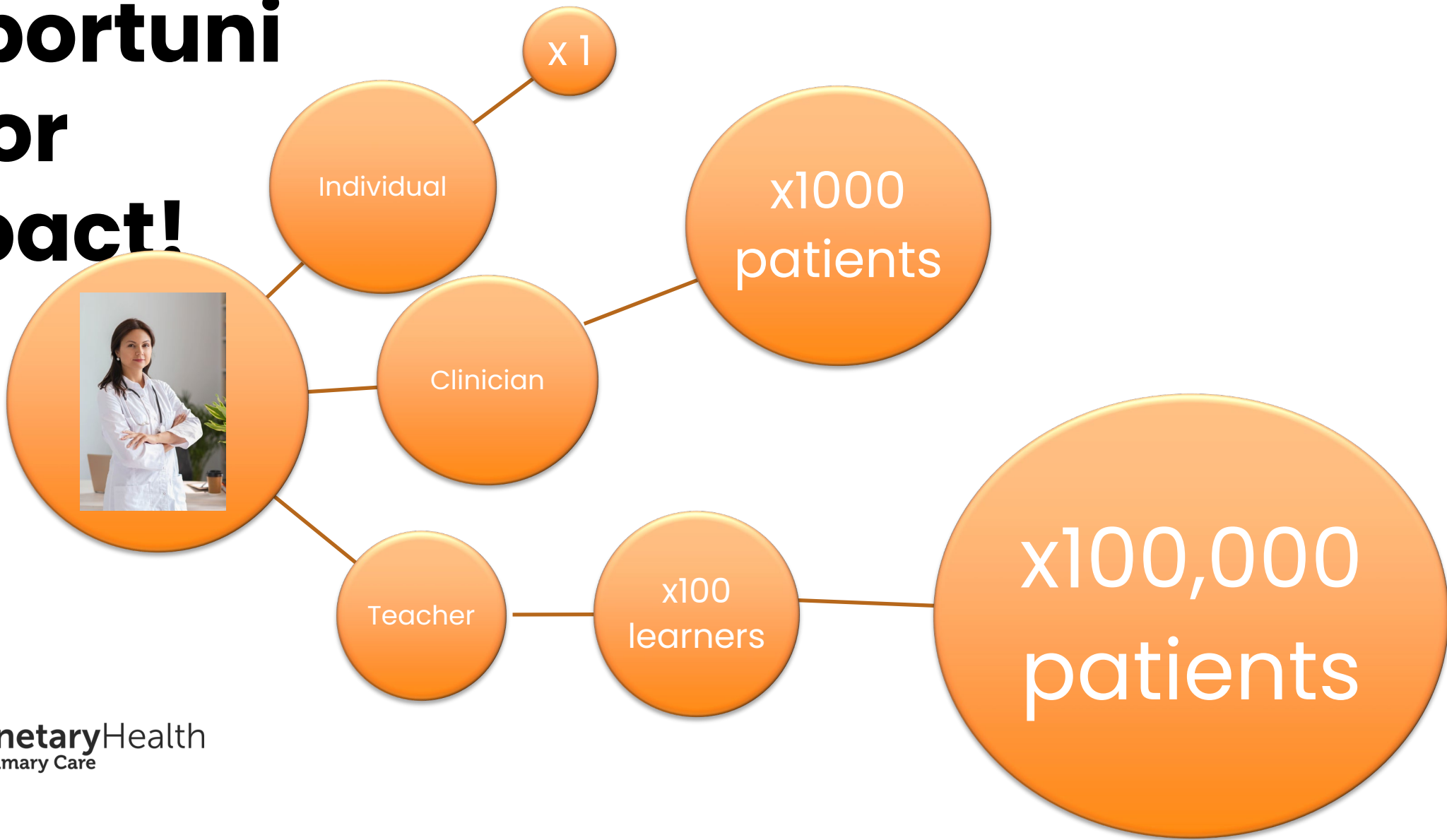
- Low Resource / High Value Care
- Longitudinal Relationships
- Independent
- Gatekeepers
- Low-cost solutions



Why are all of these people smiling?



Opportunity for Impact!



Sustainable, High Quality Care

Better for...



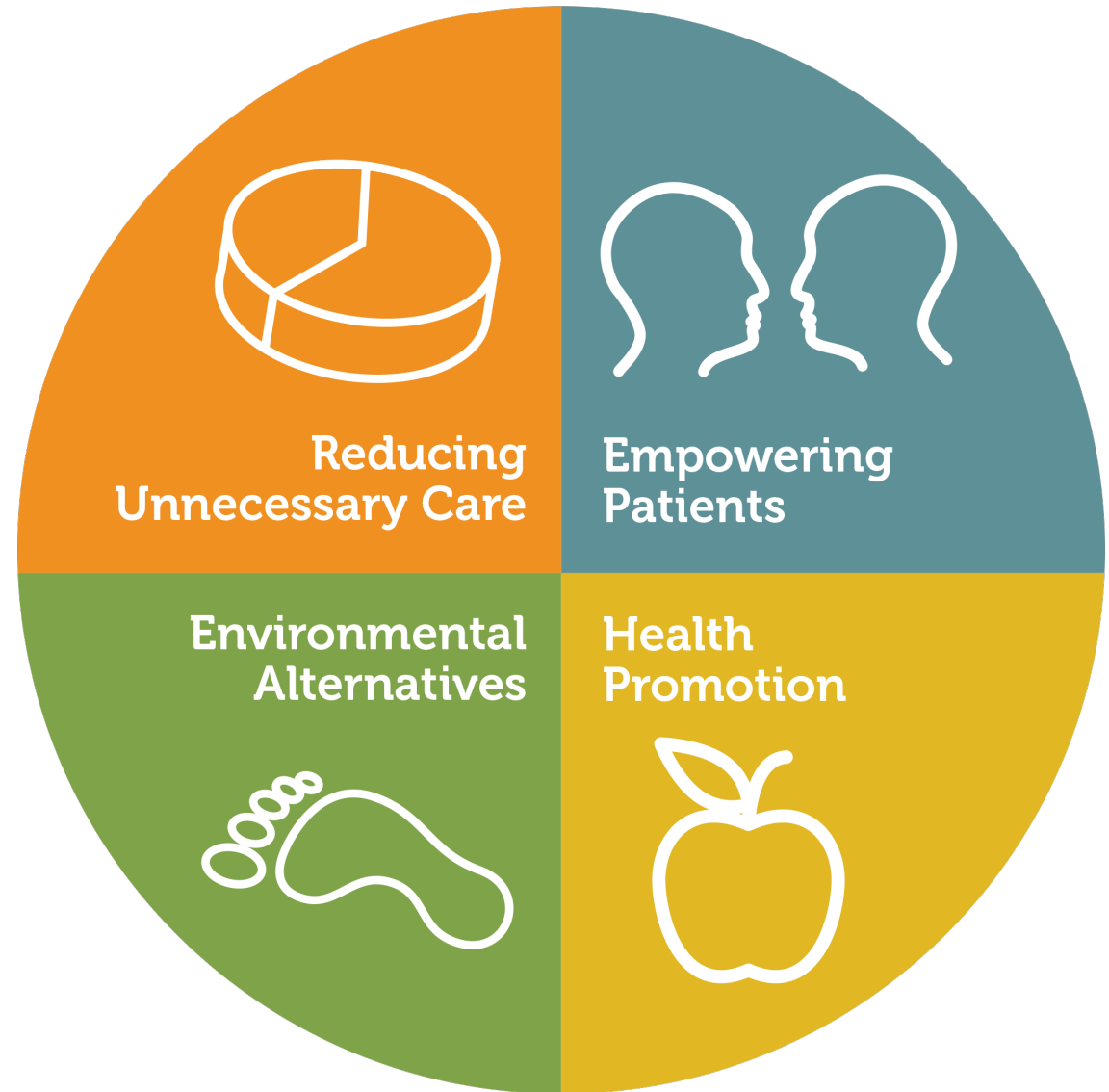
Do No Harm



Planetary Health for Primary Care



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PlanetaryHealth
for Primary Care