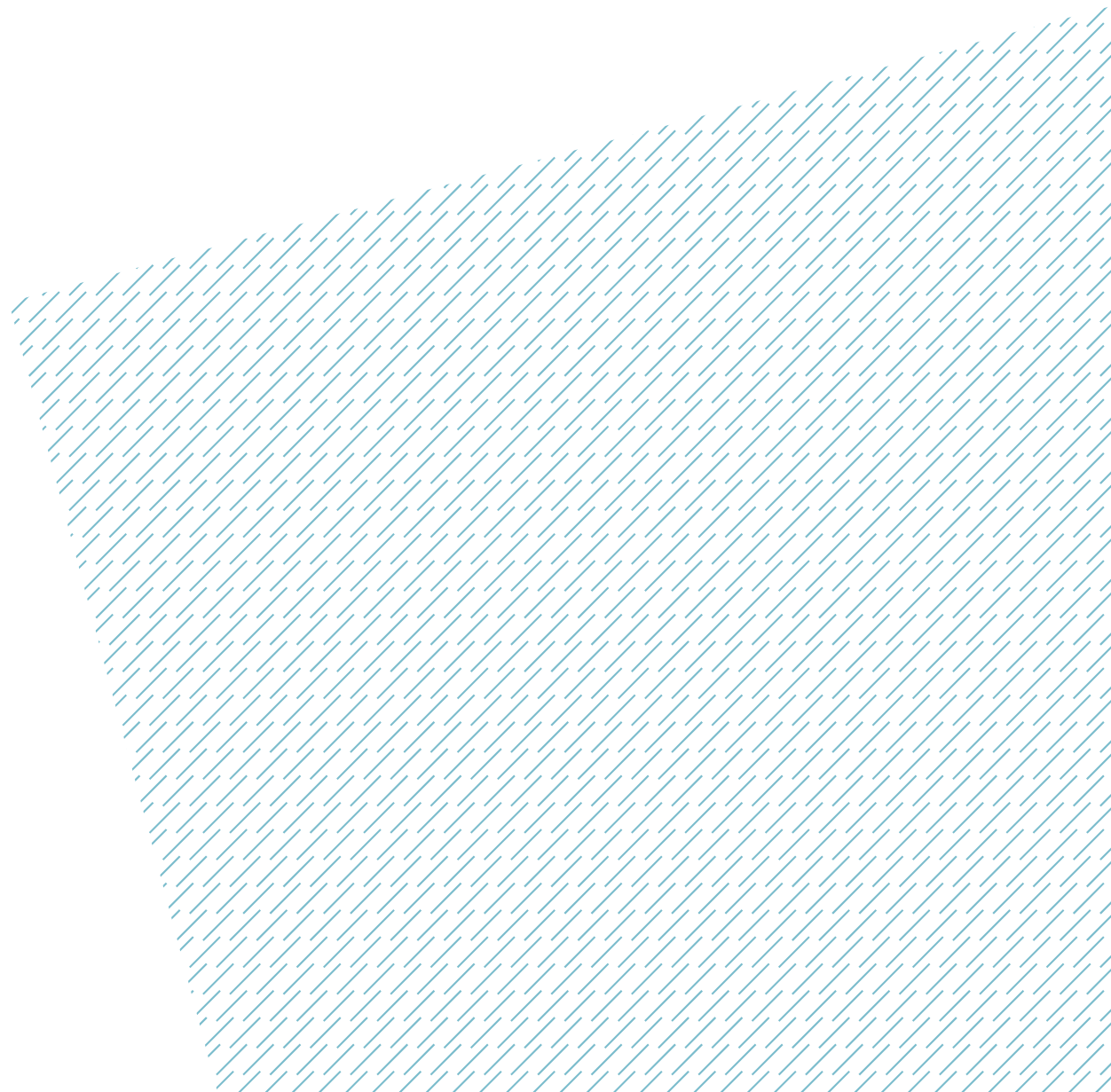




Health Service Environmental Sustainability Competition Guide

2024/25





Overview

This document introduces the 2024/25 Health Service Environmental Sustainability Competition. It serves as a guide to lead a successful **sustainable healthcare quality improvement project** in your organisation.

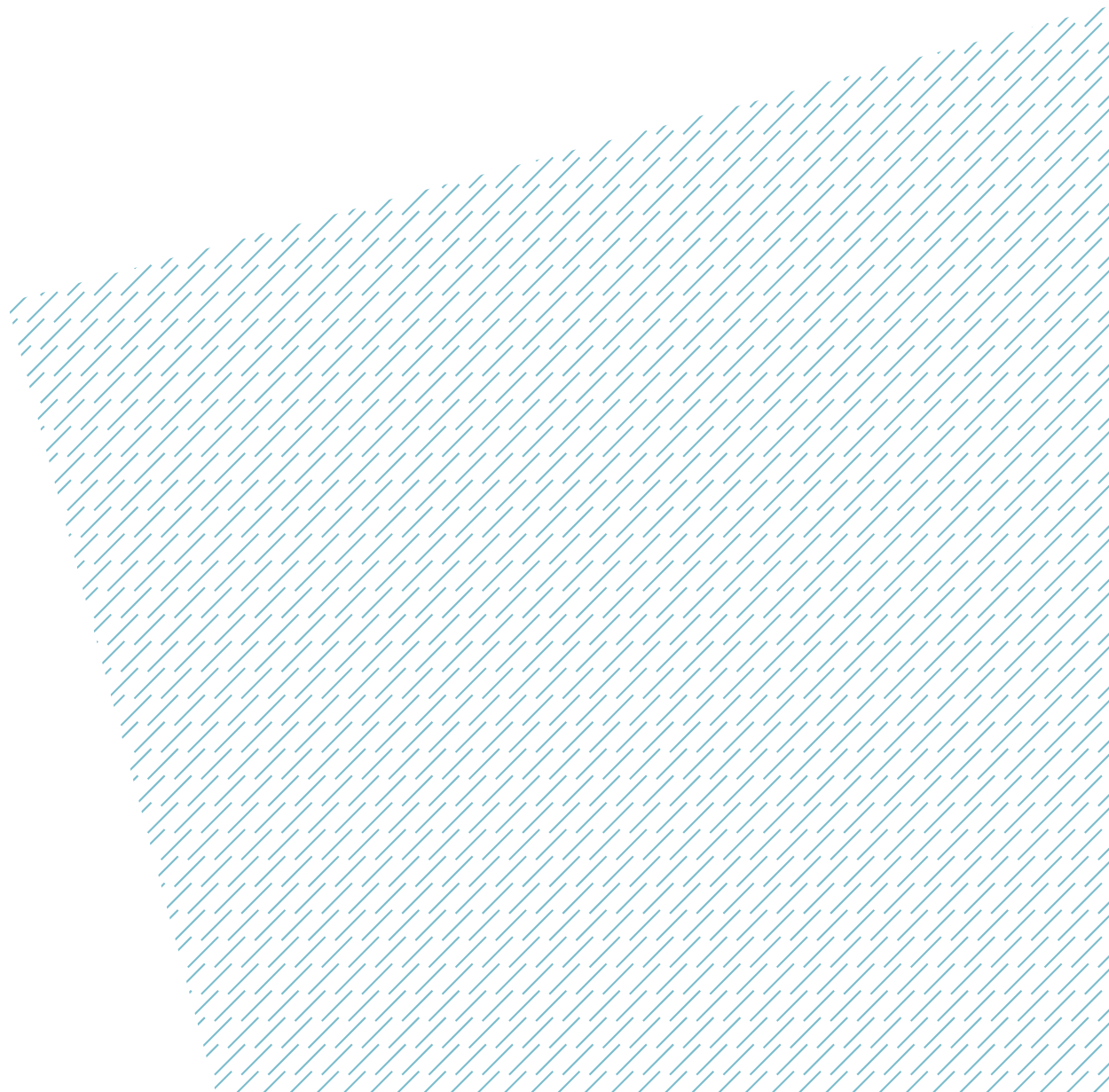
If you have further questions after reading this guide, please contact ben.dunne@unimelb.edu.au

Contents

1. Why healthcare sustainability is important
2. Competition overview, marking criteria, key dates
3. Measuring and using greenhouse gas emission data



Why healthcare sustainability is important



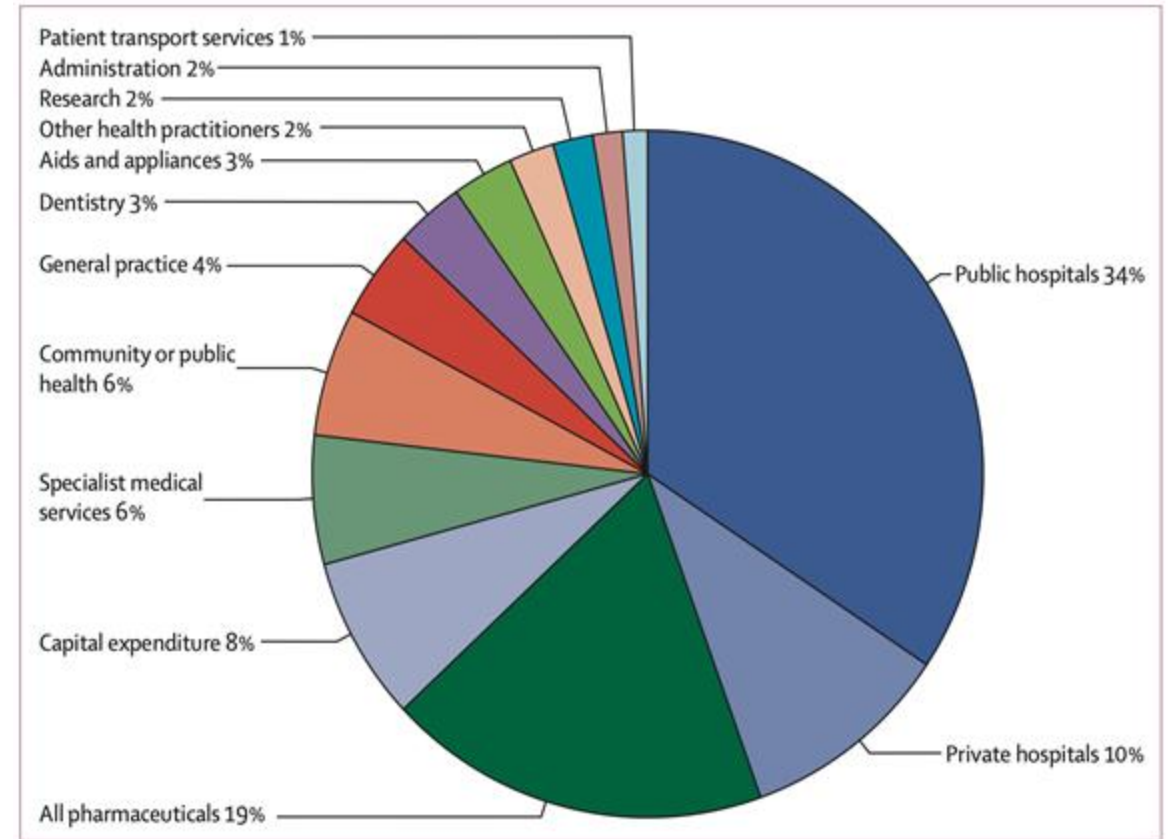
Healthcare's Climate Impact

The carbon footprint of Australian healthcare is 7% of Australia's entire emissions¹

This is more than the carbon emissions produced by all South Australians²

All vehicles on the road in Australia produce 10% of our emissions³

Worldwide 4% of global emissions come from healthcare... compared to only 2% from all aviation⁴



[1] Malik A., Lenzen M., McAlister S., McGain F. The carbon footprint of Australian health care *Lancet Planetary Health* 2;1;27-35

[2] South Australia Dept of Environment and Water 'Climate Change' 12 Feb 2023 <https://www.environment.sa.gov.au/topics/climate-change/south-australias-greenhouse-gas-emissions>

[3] Federal Dept of Climate Change, Energy, Environment and Water 'Transport' 12 Feb 2023 <https://www.energy.gov.au/households/transport>

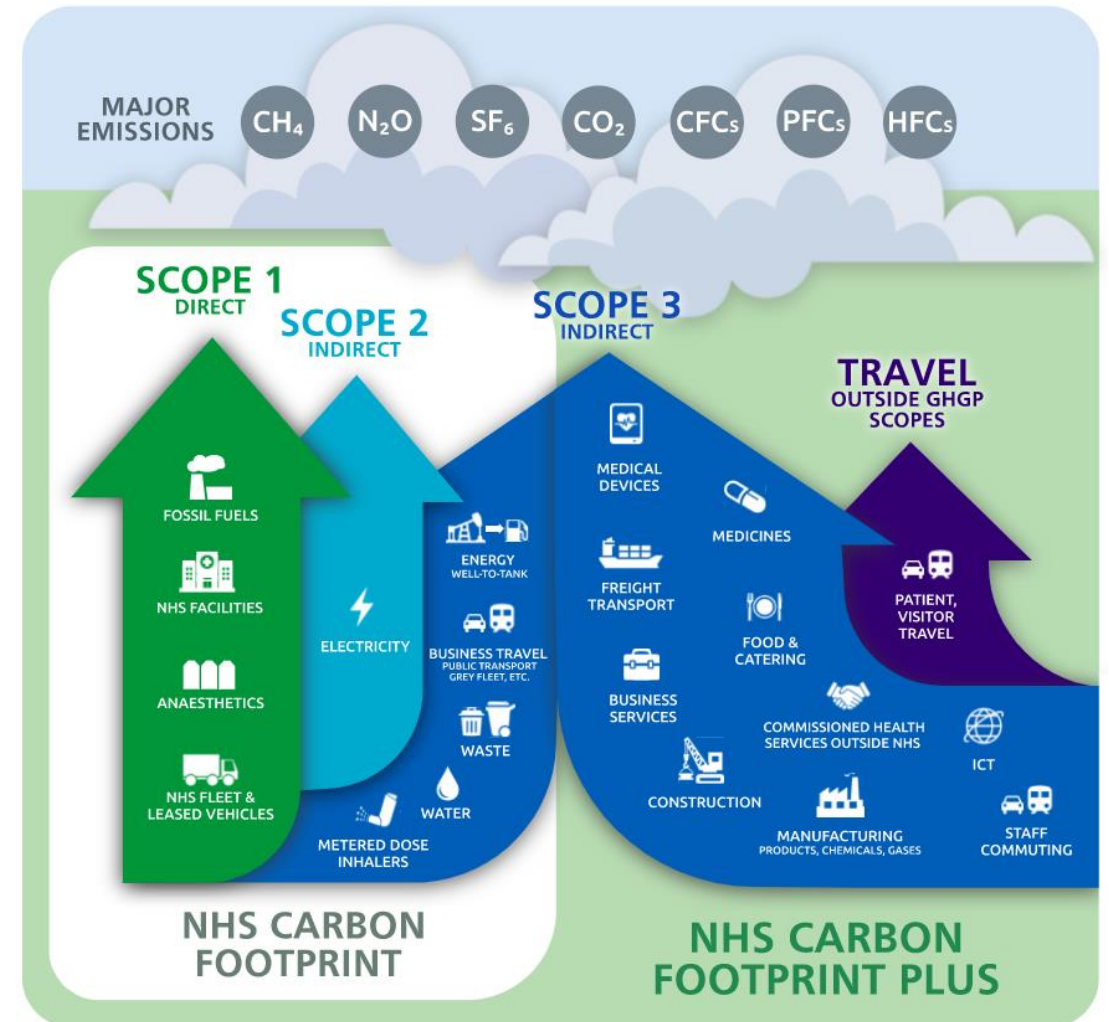
[4] International Energy Agency 'Aviation' 12 Feb 2023 <https://www.iea.org/reports/aviation>

Healthcare Greenhouse Gas Emissions

Emissions are generated from many sources and are described according to scope of emission.

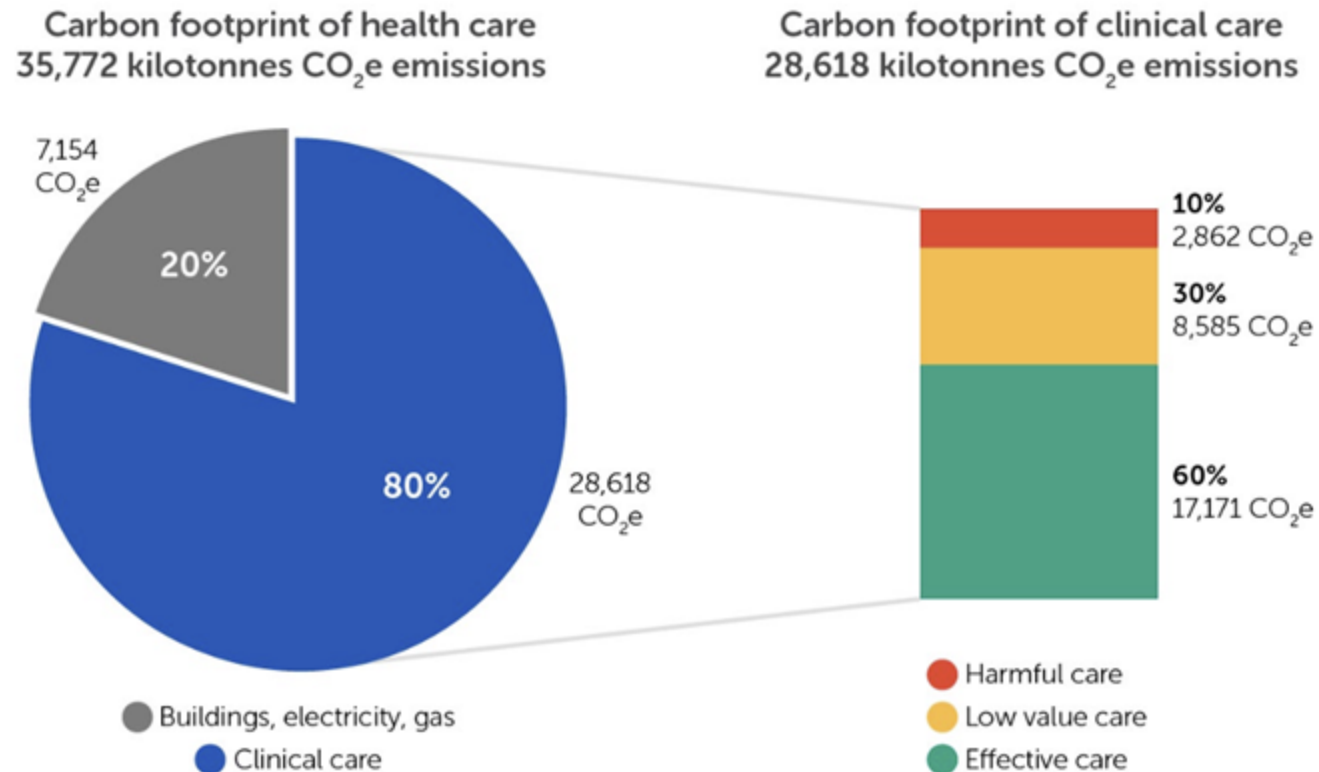
Scope 3 emissions are around 2/3 of all healthcare emissions. This is because every product we use has a carbon footprint.

A carbon footprint is an estimate of greenhouse gas emissions associated with all steps of manufacture, use and disposal of that product. For example, a plastic kidney dish has a carbon footprint comprised of extraction of raw materials (fossil fuels used to produce plastics), emissions from energy used for manufacture, transport, and disposal.



Healthcare Greenhouse Gas Emissions

The carbon footprint of Australian health care and the share of its carbon emissions attributable to harmful, low value and effective care

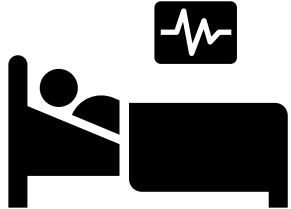


~60% of care is in line with evidence-based/consensus guidelines
 ~30% is wasteful or of low value to the patient
 ~10% is harmful

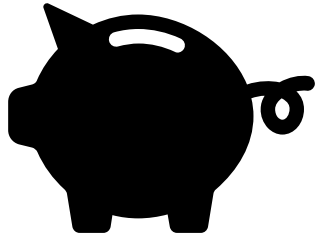
Better care for our patients is better care for our planet

CO₂e = carbon dioxide equivalent. Data sources: Malik et al,³ Tennison et al 2021,⁴ and Braithwaite et al.⁶ ◆

High quality care is sustainable care



PATIENT



PROFIT



PLANET

Environmentally sustainable care is good patient care that is **safe, effective and has low environmental and financial costs.**

Models of care that optimise efficiency, reduce unnecessary (or harmful) care, prevent admissions, avoid environmentally harmful medications or reduce waste **are all environmentally sustainable quality improvement projects.**

Principles of environmentally sustainable healthcare

1. PREVENTION

promoting health and preventing disease by tackling the causes of illnesses and inequalities

3. LEAN SERVICE DELIVERY

streamlining care systems to minimise wasteful activities

Four principles of **SUSTAINABLE HEALTHCARE**

Mortimer, F. *The Sustainable Physician*. Clin Med 10(2). April 1, 2010. p 110-111.

<http://www.clinmed.rcpjournals.org/content/10/2/110.full>

2. PATIENT SELF-CARE

empowering patients to take a greater role in managing their own health and healthcare

4. LOW CARBON ALTERNATIVES

prioritising treatments and technologies with a lower environmental impact.



CENTRE for
**SUSTAINABLE
HEALTHCARE**

inspire • empower • transform

Frameworks for considering environmental action



Environmental hierarchy



The "triple bottom line"

Potential project ideas

Avoid

- Use of unnecessary products, devices etc.
- Higher carbon footprint products where a lower carbon footprint alternative exists. Such as, oral versus IV medications (eg. paracetamol).
- Single use plastic items where avoiding them has a low risk of influencing patient care. For example, bluey absorbent pads.

Reduce

- Audit and instigate routine testing in accordance with evidence/consensus guidelines – all tests come with a carbon footprint. Examples include CXRs, coagulation tests if not indicated, pre-operative blood grouping tests likely to expire.
- Staff travel and promote public/active transport.
- Clinical waste stream volumes through improved waste segregation.

Reuse

- Measure staff personal use of plastic products and explore reusable alternatives for use in break areas.
- Explore reusable alternatives for single use devices (SUDs).

Recycle

- Improve recycling stream amounts.
- Introducing a new recycling stream into a new area.



The “triple bottom line”

Improving QUALITY of care

Improving the QUALITY of care provided also has environmental benefits that are not just directly related to resource use and waste

Preventing ill health prevents the carbon footprint of the care required to manage that illness

Any intervention that prevents illness, reduces complications, shortens length of stay or prevents readmissions has environmental benefits



The “triple bottom line”



2022 and 2023 Competition Outcomes

2022 Royal Melbourne Hospital

13 Quality Improvement Projects led by clinical and non-clinical staff

Financial Savings
\$500,000

CO2 savings
2.5 million kg eCO2

Waste savings
250,000 items kept from landfill

2023 Parkville Precinct

17 Quality Improvement Projects led by clinical and non-clinical staff

Financial Savings
\$160,000

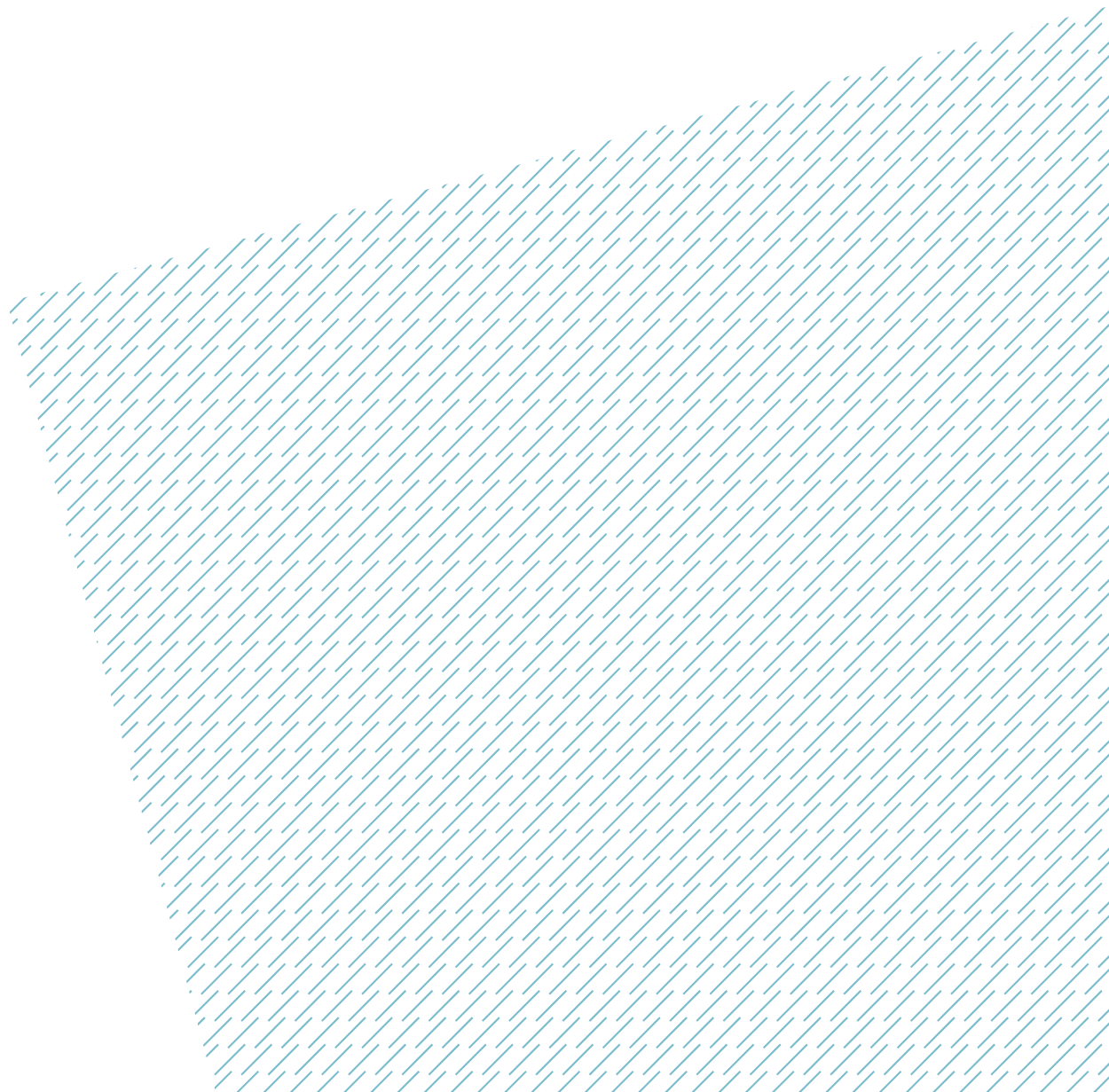
CO2 savings
140,000 kg CO2e

Waste savings
3 tonnes of waste out of landfill

The 2022 clinical change projects were maintained culminating in \$800,000 savings



Overview the 2024/25 Health Service Environmental Sustainability Competition





2024/25 Health Service Environmental Sustainability Competition

Purpose

Building on the success of the 2022 RMH and 2023 Parkville Precinct competitions, this competition aims to continue to foster engagement in sustainable healthcare quality improvement initiatives by providing support resources to catalyse impactful initiatives that improve quality of care, reduce emissions and waste, are financially viable, and continue to engage health organisations and staff.

Objectives

- Promote environmental sustainability across University of Melbourne affiliated sites
- Reduce low value care
- Reduce our carbon and waste footprint
- Financial sustainability
- Foster a learning and improvement culture
- Support healthcare staff to instigate impactful workplace changes



2024/25 Health Service Environmental Sustainability Competition

Information for Participants

- Projects can focus on any area of the hospital including clinical care, energy use, waste management, supply chain, food service, facilities management, transportation, etc.
- Consider whether your project might require a Quality Assurance/HREC application for publication and check with your hospital Ethics Committee
- Teams or individuals can participate
- The projects will be judged by an expert panel
- Prizes will be awarded in the following categories:
 - Best Emissions Reduction Project
 - Best Waste Reduction Project
 - Best Clinical Change Project
 - Best Facilities Project
 - Best Ward Project

Marking guidelines

Projects will be evaluated on:

- Emissions reduction: How effectively the project reduces carbon emissions
- Waste reduction: How effectively the project reduces waste
- Clinical outcomes: How your project improved patient care
- Social sustainability: How your project socially benefited patients, staff, or wider community
- Economic sustainability: The financial savings
- Generalisability: The potential of the project to be applied across different areas within the hospital



Getting Started - Overview

Step 1: Register your project idea by [filling out this form](#)

- Participants do not need to register their idea in advance but are strongly encouraged to do so to access the resources and support. There is no closing date for registration.

Step 2: Download the Sustainable QI Project Planner [from this link](#) and populate with as much information as you can

- Follow [this link](#) to additional resources on the susqi.org site
- Familiarise yourself with the Competition Marking Guidelines on the previous slides

Step 3: Get guidance for your project

Once you have registered, the University of Melbourne Sustainable Healthcare Team will contact you with information on drop-in sessions for guidance on your project.

Step 4: Get going with your project!

Step 5: Populate the Project Submission Form [available from this link](#) and submit by **Feb 7th 2025**



Resource websites



Home About Do a Project Teach Others Green Team Competition SusQI Acad

RESOURCES

Here you will find all the resources you need to carry out a SusQI project.

Please see our [licensing page](#) to find out how to credit CSH when using our resources.

Click [here](#) if you would like to receive further training on the SusQI approach, or contact us [here](#).

What is SusQI?

[The SusQI Framework](#)

This paper by Mortimer et al sets out the SusQI Framework in detail

[The Triple Bottom Line](#)

Here, CSH explains the concept of triple bottom line analysis

[Principles of Sustainable Healthcare](#)

This paper by Frances Mortimer sets out the CSH principles of sustainable healthcare

[Sustainability in quality improvement: measuring impact](#)

This paper by Mortimer et al using cases studies to discuss how different variables of sustainable practice

[Concrete ways we can make a difference](#)

This paper by Spooner et al presents an evaluation of trainee experience of SusQI and demonstrate engagement and motivate learners to contribute to the development of a sustainable healthcare system

[Teaching skills for sustainable healthcare](#)

This paper by Stanford et al reviews the SusQI framework and outlines its value for engaging health transformation

[LINK HERE](#)

Melbourne Medical School > Our Departments > Critical Care > About Us > Sustainable healthcare

Hospital Sustainability Competition

Building on the success of the [2022 RMH and 2023 Parkville Precinct sustainability competitions](#), this competition aims to continue to foster engagement in sustainable healthcare quality improvement initiatives by providing support resources to catalyse impactful initiatives that improve quality of care, reduce emissions and waste, are financially viable, and continue to engage health organisations and staff.

This year, participating hospitals include:

- Royal Melbourne Hospital
- Peter MacCallum Hospital
- Royal Women's Hospital



[LINK HERE](#)

Project Registration Form Competition Guide

- Participant information
- Marking criteria
- Key dates

Sustainable QI Project Planner Project Submission Form



2024/25 Health Service Environmental Sustainability Competition

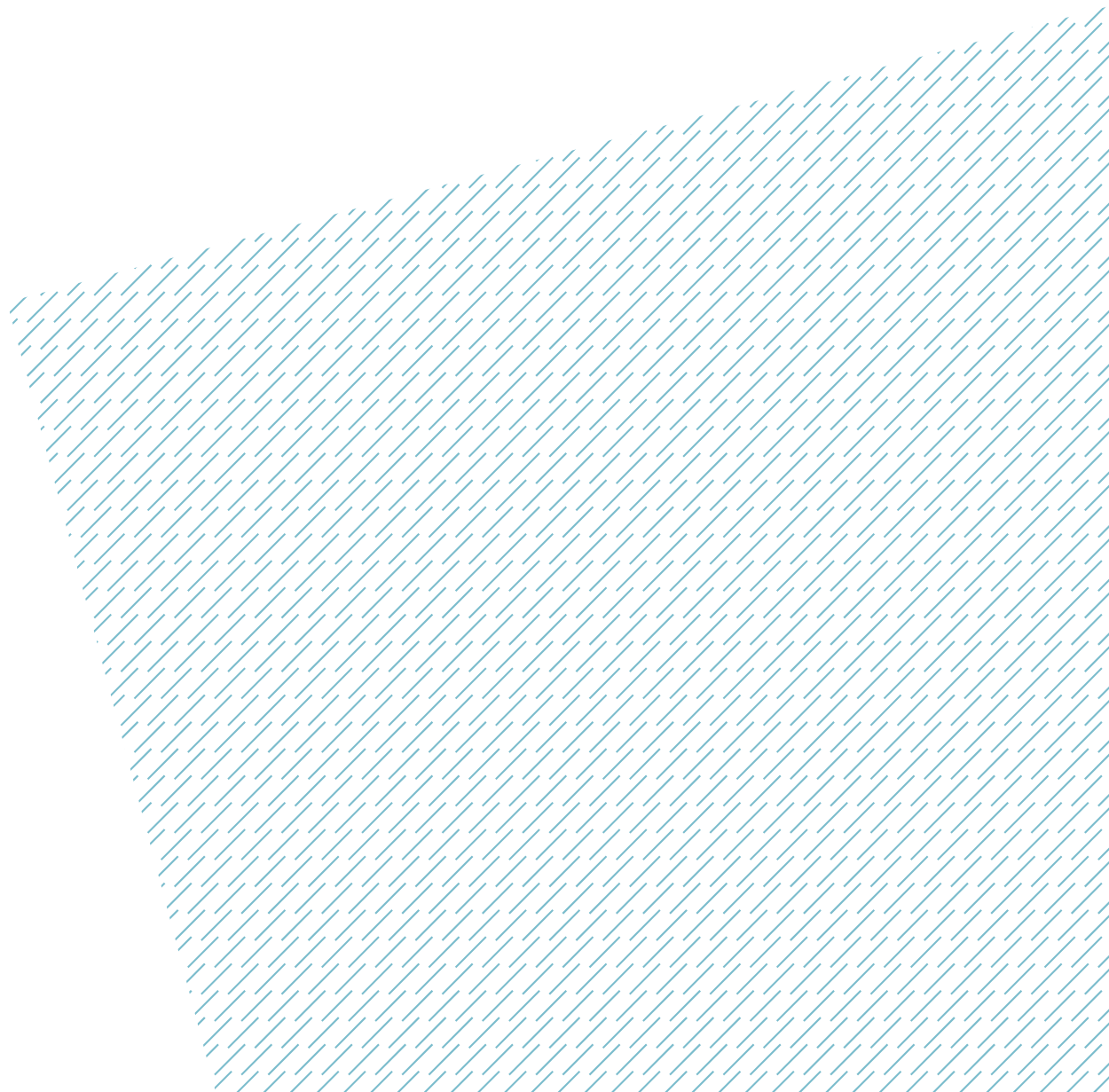
Key dates

June 5th 2024	<p>Project registration opens:</p> <ul style="list-style-type: none">• Participants register their project ideas, receive access to environmental sustainability quality improvement project resources, and access ongoing project support from the University of Melbourne Sustainable Healthcare Team• Participants do not need to register their project in advance but are strongly encouraged to do so for access to resources and support. There is no closing date for registration.
July 2024	Education opportunity: SusQI workshop setting you up for success
Date TBA	Drop in sessions for project support
Feb 7th 2025	Closing date for completed competition entries
Mid Feb 2025	Panel review
End of Feb 2025	Winners announced



Measuring and using carbon footprint data

—





Environmental impacts can be measured in many ways

Common ways include:

- Carbon footprint/Greenhouse Gas (GHG) emissions reductions – usually expressed in terms of carbon dioxide equivalent emissions, or CO₂e.
- See the next slide for an explanation on how to calculate.
- **It may not be possible or appropriate to calculate the carbon savings for every project**
- Other forms of environmental impact measures include:
 - Waste reductions – usually expressed in mass/weight or number of items saved from landfill/diverted to other waste streams
 - Hospital admission avoidance / reduction in length of stay – this would inherently reduce emissions and waste, due to a reduction in resource use
 - Water reductions – expressed in litres of water reduced

What is a carbon footprint?

A **carbon footprint**, is the total **Greenhouse Gas (GHG) emissions** from an **activity or process**. It is a measure of our impact on climate change.

An **activity / process** can be anything that results in GHG emissions. For example, services, consultations, hospital admissions, travel, etc.

To calculate the carbon footprint of your activity/process, follow the below steps:

Obtain your activity data:

- A measure of a level of activity – *e.g. reduction in usage of: litres of fuel, number of supplies, cubic metres of waste, kilometres travelled.*

1. Find an appropriate emissions factor:

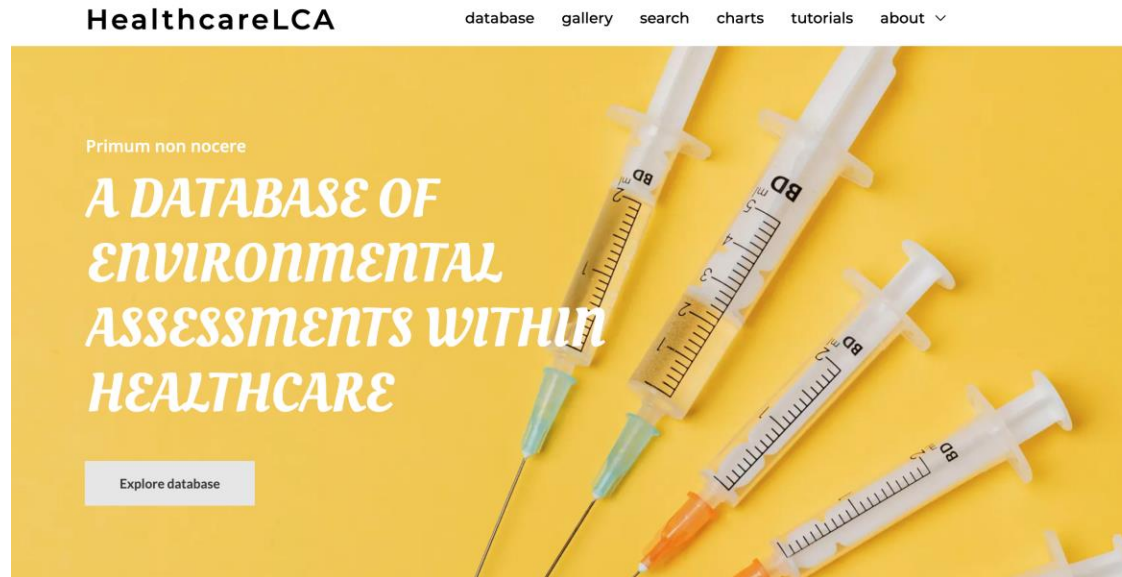
- This number is a set quantity that represents the amount of GHG emissions that are typically released for that type of activity. An emissions factor is represented as: *GHG emissions per unit of activity for a given emissions source.*
- For example, a tonne of municipal waste emits 1.6 tonnes of GHG emissions. This is represented as: *1.6 t CO₂-e/t waste*
- See slides for a list of potential locations for emissions factors. There is no one-stop-shop for emission factors, they can be very tricky to find!

2. Use the below equation to calculate total GHG emissions/carbon footprint:

- Carbon footprint (*unit-CO₂e*) = Activity data X emissions factor

The Healthcare LCA Database

Includes the carbon footprint of individual items and procedures used in healthcare as well as the carbon footprint of entire healthcare pathways



<https://healthcarelca.com/>

HOWEVER... the quality of the studies included in the database has not been rigorously assessed so they may not all be reliable sources



Reliable data to help measure pharmaceutical GHG emissions in Australia

Anaesthetic gases

Desflurane: 3,721.1 kgCO₂e / litre

Isoflurane: 762.96 kgCO₂e / litre

Sevoflurane: 197.86 kgCO₂e / litre

Nitrous oxide: 0.559 kgCO₂e / litre

Nitrous oxide with oxygen 50/50 split:
0.278 kgCO₂e / litre

Metered dose inhalers

GHG emissions factors per inhaler:

Large volume inhaler, e.g. Salbutamol: 24 kgCO₂e / inhaler

Small volume inhaler, e.g. Salbutamol: 10 kgCO₂e / inhaler

Wilkinson AJK et al. Costs of switching to low global warming potential inhalers. An economic and carbon footprint analysis of NHS prescription data in England. BMJ Open Access. Sep 2019. <https://bmjopen.bmj.com/content/bmjopen/9/10/e028763.full.pdf>

If you're looking for a specific inhaler carbon emissions factor please use the PrescQIPP database: [Bulletin 295: Inhaler carbon footprint | PrescQIPP C.I.C](https://www.prescqipp.info/our-resources/bulletins/bulletin-295-inhaler-carbon-footprint/)



Suggested data to help measure PPE and waste GHG emissions

PPE

Single glove: 0.026 kgCO₂e / item

Cup fit FFP respirator: 0.125 kgCO₂e/item; duckbill FFP respirator 0.076 kgCO₂e / item

Type IIR surgical mask: 0.02 kgCO₂e, type II surgical mask: 0.013 kgCO₂e / item

Face shield: 0.231 kgCO₂e / item

Apron: 0.065 kgCO₂e / item

Single-use gown: 0.905 kgCO₂e / item

Rizan C, Reed M, Bhutta M. Environmental impact of Personal Protective Equipment supplied to health and social care services in England in the first six months of the COVID-19 pandemic. *Journal of the Royal Society of Medicine*; 0(0) 1–14, DOI: 10.1177/01410768211001583, <https://journals.sagepub.com/doi/full/10.1177/01410768211001583>

Waste disposal

Recycling: 21 kgCO₂e / tonnes

Recycling reusable instruments: 21 kgCO₂e / tonne

Recycling reusable surgical linens: 21 kgCO₂e / tonne

Recycling batteries: 65 kgCO₂e / tonne

Low temperature incineration with energy for waste - dry mixed recycling, domestic waste : 172 kgCO₂e / tonne

Low temperature incineration with energy for waste – non-infectious offensive waste: 249 kgCO₂e

Autoclave decontamination plus Low temperature incineration with energy for waste – infectious waste: 569 kgCO₂e / tonne

High temperature incineration – clinical waste, medicinal contaminated sharps, anatomical waste, medicinal waste 1074 kgCO₂e /tonnes

Rizan C, Bhutta M, Reed M, Lillywhite R. The carbon footprint of waste streams in a UK hospital. *Journal of Cleaner Production* 286 (2021) 125446. <https://www.sciencedirect.com/science/article/abs/pii/S0959652620354925>



Reliable data to help measure carbon emissions for pathology testing and imaging in Australia

3 Carbon dioxide equivalent (CO₂e) emissions for five common hospital pathology tests, with distance driven in a standard car producing equivalent emissions

	Mean CO ₂ e (g) (95% CI)	Equivalent distance in car (km/1000 tests)
Full blood examination	116 (101–135)	770
Coagulation profile	82 (73–91)	540
Urea and electrolytes	99 (84–113)	650
C-reactive protein*	0.5 (0.4–0.6)	3
Arterial blood gases	49 (45–53)	320

CI = confidence interval. * Ordered in conjunction with urea and electrolyte assessment. ◆

	Attributional LCA per scan (mean)			
	Total CO ₂ e/No. of tests ordered (i.e. average)			
	MRI	CT	CXR	US
Average scan time	27 min	8 min	2 min	20 min
Consumables	1.0	1.1	0.74	0.07
Electricity	16.5	8.1	0.02	0.46
Total	17.5	9.2	0.76	0.53

Table 2: Carbon emissions for each imaging modality, kg CO₂e/scan.

McAlister S, Barratt AL, Bell KJ, McGain F. The carbon footprint of pathology testing. *Medical Journal of Australia* 2020; **212**: 377–82

McAlister S, McGain F, Breth-Petersen M, Story D, Charlesworth K, Ison G, Barratt A. The carbon footprint of hospital diagnostic imaging in Australia. *The Lancet Regional Health–Western Pacific*. 2022 Jul 1;24.

How can we achieve social sustainability within QI?

1

Take into account the social impacts of your current system, and your improvement idea to minimise social harm and add social value at every opportunity.

2

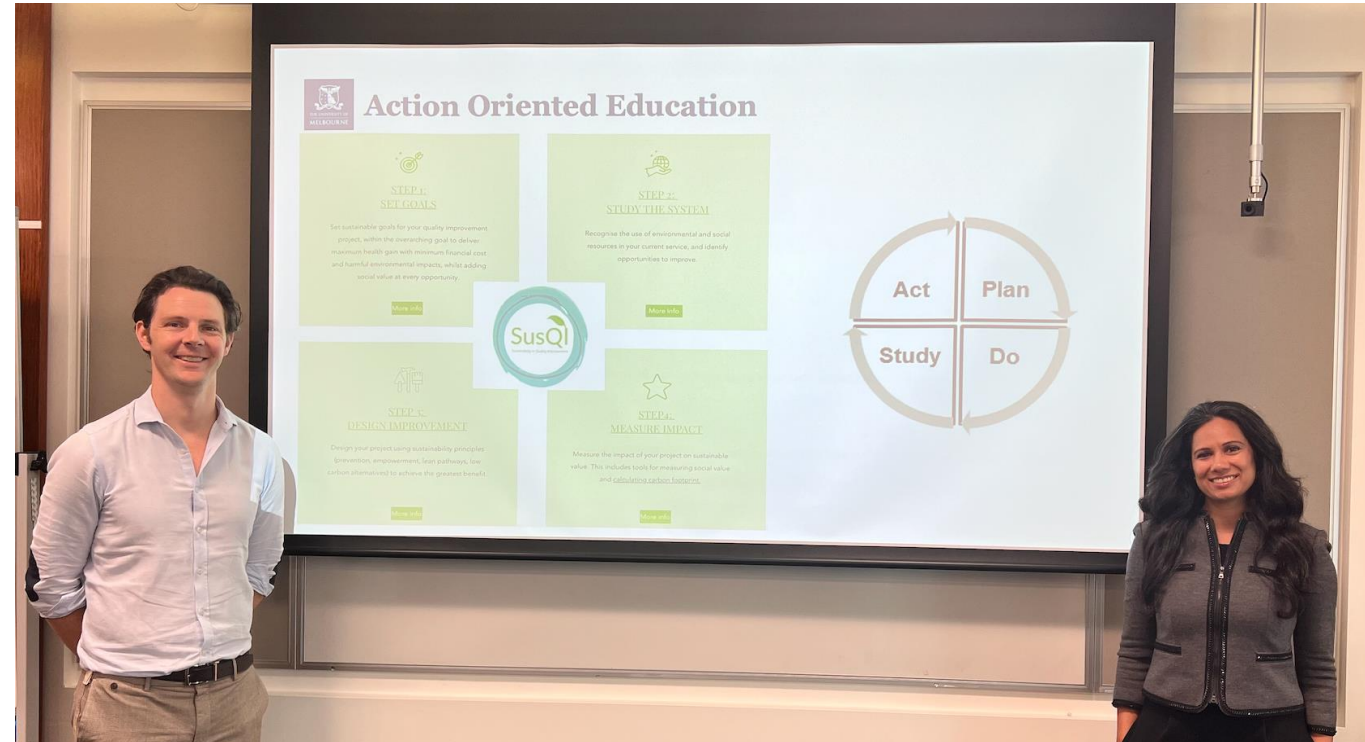
Target the social determinants of health to prevent ill health and reduce healthcare activity within your QI project, and make use of social assets.

Sustainable Quality Improvement Workshops

“It is easy to feel hopeless with news of climate change. SusQI is valuable as it gives concrete ways in which we can make a difference, rather than just learning about the problem.”



Spooner et al. “Concrete ways we can make a difference”: a multi-centre, multi-professional evaluation of sustainability in quality improvement education. *Medical Teacher* (2022).



Upcoming SusQI Workshop Dates: TBA

Register your project idea to receive information about upcoming workshops and project support sessions



Key contacts

Have a question, big or small?

Contact the University of Melbourne
Sustainable Healthcare team

Ben Dunne

Ben.dunne@unimelb.edu.au

