

ENVIRONMENTAL SUSTAINABILITY COMPETITIONS: ENGAGING HEALTHCARE STAFF IN SUSTAINABLE AND FINANCIALLY BENEFICIAL INITIATIVES

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ABSTRACT

Clinical care is a major source of healthcare's greenhouse gases. Health service professionals have a role in reducing this impact through adopting low-carbon models of care and addressing low-value care. This study demonstrated the effectiveness of an environmental sustainability competition in engaging staff to lead sustainable and financially beneficial quality improvement projects.

In 2022, the Royal Melbourne Hospital launched an environmental sustainability competition open to all staff. In 2023, it expanded to include Melbourne's Peter MacCallum Cancer Centre and the Royal Women's Hospital, with resources and support from the University of Melbourne. Participant surveys provided feedback and assessed the value of provided resources.

In 2022, 13 projects prevented 2.5 million kg CO₂ equivalent emissions (CO₂e) and diverted 250,000 items from landfill, with an added financial benefit of approximately \$500,000. In 2023, 17 projects resulted in preventing 140,000 kg CO₂e, emissions and 3,000 kg of waste, while saving \$160,000. Sustained 2022 projects resulted in a cumulative savings of \$800,000. Participants valued the resources and were motivated to continue initiatives but suggested formal sustainability education to enhance future projects.

Competitions effectively engaged staff in sustainable healthcare, yielding significant environmental and financial savings. Enhanced resources and education may further improve engagement and outcomes.

KEYWORDS

sustainability, environmental sustainability, healthcare, management, engagement, SusQI, sustainable practice, quality improvement, green initiatives, Australian

INTRODUCTION

In Australia, the healthcare sector has been estimated to contribute to 7% of national greenhouse gas (GHG) emissions (exceeding the global average of 5.3%) with hospitals responsible for greater than 44% [1, 2]. Up to 40% of the GHG emissions from clinical care are estimated to be from low-value care, which includes unnecessary testing and procedures that offer minimal benefits to patients and contribute to waste and emissions [3]. However, healthcare workers face barriers to engaging with sustainability efforts, such as competing priorities, lack of training, and absence of incentives to incorporate environmental sustainability into their work [4]. Thus, innovative approaches are necessary to overcome these barriers and foster a culture of sustainability within healthcare institutions.

AIM AND PURPOSE

The Royal Melbourne Hospital (RMH) Sustainability Team aimed to increase staff engagement in sustainable healthcare projects by piloting an environmental sustainability competition in 2022. This initiative sought to incentivise staff to develop and implement projects that reduced unnecessary testing, GHG emissions, waste and financial costs, whilst aligning with RMH's strategic goal of 'Strive for Sustainability' [5].

The decision to adopt a competition-based approach was based on similar projects that have demonstrated effectiveness in other healthcare settings. For example, the Centre for Sustainable Healthcare (UK), successfully used 'Green Team' Sustainability competitions to overcome barriers to staff engagement, foster interdisciplinary collaboration and measurable outcomes [6]. Recognising this success and contextual similarities in staff enthusiasm – RMH adapted this model to harness staff interests, centralise guidance and amplify engagement and scale organically occurring sustainability efforts.

This competition provided a platform for staff to submit their project proposal, ensuring early involvement of the Sustainability Team to offer resources, mentorship and integration with broader organisational goals. Building on the pilot's success, the 2023 competition expanded to include Melbourne's Peter MacCallum Cancer Centre and the Royal Women's Hospital. The University of Melbourne's Sustainable Healthcare team provided additional support and resources to competition entrants, including locally adapted Sustainability in Quality Improvement (SusQI) project management resources [7] to help staff design initiatives that improve patient care, reduce low-value practice, and advance environmental and financial sustainability.

METHODS

The sustainability competition involved two iterations from 2022 to 2023 with a third iteration launched on 5 June 2024. Each iteration is built upon the previous, to enhance effectiveness and impact. Stakeholders including green champions, executives, sustainability officers, quality improvement leads, communications representatives, and education teams were engaged in the competition's development and implementation. Participants, including clinical and non-clinical staff, were informed of the guidelines through multiple communication channels, including the website, emails, posters and newsletters within each organisation.

The 2022 pilot at RMH served as a proof-of-concept. Although minimal formal guidance was provided to participants, the RMH Sustainability Team took a hands-on approach to support all entrants in planning, conducting, and analysing their projects. Projects were evaluated with a score of 1-5 based on their potential scalability as well as quantifiable metrics including reductions in GHG emissions, waste, or cost while maintaining quality patient outcomes. Informal qualitative evaluation included discussions with entrants on improving support and internal reflections within the RMH Sustainability team on refining processes. Five projects were named winners in distinct categories including Best Clinical Change Project, Best Facilities Project, Best Waste Reduction Project, Best Ward Project, and Best Emissions Reduction Project.

The competition expanded to include Royal Women's Hospital and the Peter MacCallum Cancer Centre in 2023. Competition resources were also updated with expert input from the University of Melbourne Sustainable Healthcare team. These resources included a registration form, a competition guide with participant information, marking criteria, key dates, project management tools and resources including a QI project planning template and carbon footprinting references. Additional support was provided by the organisational sustainability teams in the form of drop-in sessions, QI workshops, and email check ins.

Quantitative metrics such as reductions in GHG emissions, waste, or cost, were used to evaluate the 2023 competition entries. All participants were surveyed to assess their satisfaction with the support and resources provided, suggest areas for improvement, and determine whether their experience would encourage them to engage in future sustainable healthcare projects and competitions. An audit of the clinical projects from 2022 was conducted to determine if outcomes were maintained. This information was used to expand and refine the support in place for the 2024 competition which was launched on World Environment Day - Wednesday 5 June. The competition participants continue to be supported by sustainability officers at each of the 3 participating sites, a clinical sustainability lead based at RMH and a senior fellow in sustainability, climate and health based at the University of Melbourne. Operational details are outlined in table 1. Figure 1 illustrates the 2023 competition timeline.

TABLE 1: SUMMARY OF SUSTAINABILITY COMPETITION PROGRAM EVOLUTION AND OPERATIONAL IMPLICATIONS

Category	2022 Pilot (RMH Only)	2023 Expansion (Multi-Site)
Participating Sites	Royal Melbourne Hospital (RMH)	RMH, Peter MacCallum Cancer Centre, Royal Women's Hospital
Number of Projects	13 projects	17 projects
Staff Involved	1 Sustainability officer, 1 clinical lead	3 sustainability officers, 1 clinical lead, 1 senior fellow
Duration	9 months	9 months
Key Focus Areas	Engagement, Waste reduction, GHG emissions,	Added focus on financial sustainability, low-value care, patient outcomes
Support Resources	RMH Sustainability Team	University of Melbourne's SusQI resources
Barriers Identified	Limited project visibility, limited project management skills among healthcare staff	Varied institutional cultures, communication channels and resource disparities, limited project management skills among healthcare staff
Outcomes Measured	GHG reduction, Cost savings, waste diversion	Added staff engagement surveys
Cost to Implement	Very Low (existing staff time)	Low (increased coordination, token prizes)

FIGURE 1: TIMELINE FOR 2023 PARKVILLE HEALTH SERVICE ENVIRONMENTAL SUSTAINABILITY COMPETITION



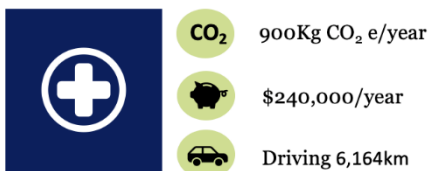
OUTCOMES

In 2022, 13 clinical and non-clinical projects resulted in savings of 2.5 million kg CO₂e and kept 250,000 single-use items out of landfill. Financial savings of \$500,000 were realised. One project from the Emergency Department reduced unnecessary blood gas (BG) and coagulation tests by 37% and 22% respectively, saving 900kg of CO₂e/yr and \$240,000. Another project from the Cardiothoracic Surgery team reduced unnecessary imaging and blood tests by 2000 tests/yr, resulting in 90kg CO₂e and \$40,000 saved. The Telehealth team estimated that patients using telehealth appointments rather than coming into the RMH outpatient services saved 103,434 N95 masks, the equivalent of 1.1 tonnes of clinical waste. Meanwhile, a shift to an all-electric vehicle fleet reduced the RMH's CO₂e emissions by 305 tonnes a year.

FIGURE 2: EXAMPLES OF PROJECTS SUBMITTED TO THE 2022 COMPETITION WITH ASSOCIATED FINANCIAL, CARBON, AND CARBON SAVINGS EXPRESSED IN TERMS OF KM DRIVEN

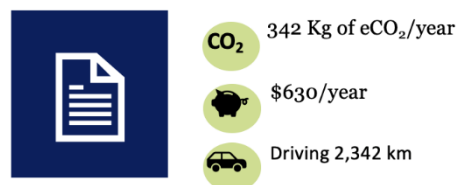
Clinical Practice Change: Choosing Wisely

Reducing unnecessary blood test in the ED



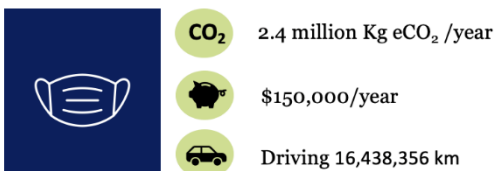
Paperless Revenue Services Project

Going paperless in the Revenue Services Office



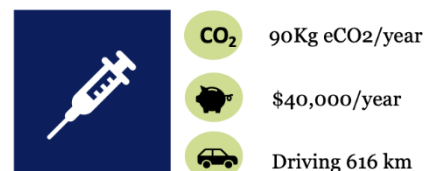
RMH Telehealth Program

Reduction in patient travel and N95 masks for clinic visits



Choosing Wisely in CTS PAC

Reducing pathology and CXR orders in preadmissions clinic



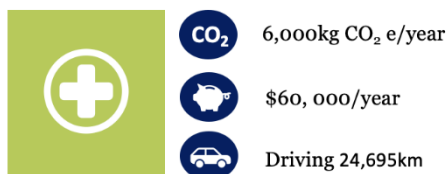
In 2023, 17 projects, conducted in less than 12 months, resulted in savings of 140,000 kg CO₂e, 3000 kg of waste and \$160,000. The RMH Emergency Dept saved a total of 6000kg CO₂e/yr and \$60,000 by reducing unnecessary intravenous (IV) cannulation and CT Kidney-Ureter-Bladder (CT-KUB) imaging through education and posters outlining clear order indications. Food services used patient feedback to tailor their supplements, reducing food waste and saving 658kg CO₂e/yr. The Orthopaedic Surgery Dept instituted a Virtual Spine Fracture Clinic saving 13,000kg CO₂e/yr and \$37,000.

The Peter MacCallum Operating Theatres eliminated nitrous oxide from their practice and saved 116,000 kg CO₂e/yr. A pilot project to introduce reusable gowns and drapes in theatres demonstrated the ongoing viability of this practice, which if annualised could reduce clinical waste by 10,000kg and reduce GHG emissions by 11,780kg CO₂e. A project to eliminate single-use drug trays in theatre and anaesthesia prevented 27,400 of these items from going to landfill, reducing waste by 2000kgs.

FIGURE 3: EXAMPLES OF PROJECTS SUBMITTED TO THE 2023 COMPETITION WITH ASSOCIATED FINANCIAL, CARBON, AND CARBON SAVINGS EXPRESSED IN TERMS OF KM DRIVEN

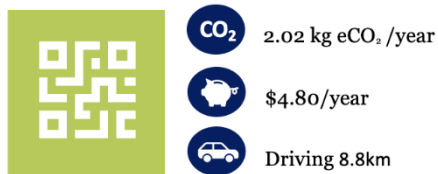
Choosing Wisely in ED: IVC & CT KUBs

Reducing unnecessary IVC and CT KUBs in ED



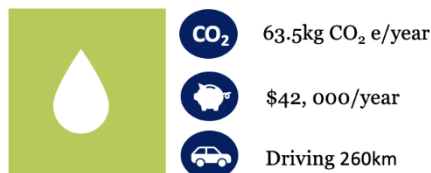
Going Digital with QR codes

Patient brochures on QR codes instead of paper



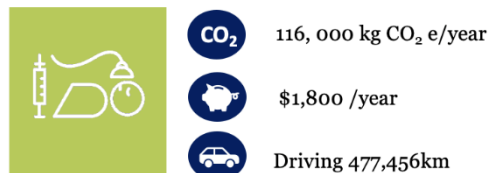
Choosing Wisely in PAC: Coag Orders

Reducing unnecessary coagulation tests



Eliminating Nitrous Oxide

Eliminated the use of NO in theaters



The 2022 clinical change projects were audited, and the outcomes were maintained resulting in cumulative savings of \$800,000 from entries in the 2022 and 2023 competitions. There was no reported adverse patient outcomes associated with any of these projects.

Feedback through qualitative surveys noted that participants believed the competition support resources were helpful, they were motivated to continue working on sustainable healthcare projects and would enter future competitions. However, participants requested didactic sustainability focused QI education sessions. This feedback was incorporated into the 2024 competition.

An Australian first, the Health Service Environmental Sustainability Competition, has successfully harnessed the motivation of healthcare staff to reduce the environmental impact of healthcare delivery, engaging and encouraging them to innovate and drive change. We empowered healthcare staff to improve models of care by reducing unnecessary tests and interventions, reducing waste, lowering GHG emissions and reducing costs. The competitions increased engagement with local sustainable healthcare initiatives, delivered sustained success, and increased high-value, low-carbon care with no adverse patient outcomes. It provided the clinical and non-clinical workforce with an opportunity to develop leadership skills to drive change, which has been shown to have a positive impact on staff wellbeing and productivity (8).

Effectively communicating the opportunity to all staff across multiple organisations was a significant barrier to uptake and participation and early engagement with the organisation's communication teams as key stakeholders has been an essential mitigation tactic. Additionally, supporting participants to deliver high quality projects was a challenge that was mitigated by providing sustainability focused quality improvement resources and upskilling opportunities. The initiative continues to develop with increasing support from the University of Melbourne Sustainable Healthcare team. Education and training are now delivered through the University of Melbourne as a recognised Sustainability in Quality Improvement (SusQI) Beacon site [9]. There are plans to expand the competition in 2025 to include 6 additional health services.

DISCUSSION

Implementing a sustainability competition has several potential benefits for any health service. The environmental benefits are clear from our demonstrated results. In addition, the competition can drive significant cost savings by reducing waste, energy consumption, and unnecessary tests or interventions. Clinicians' involvement in systems improvement initiatives has been linked to improved workforce retention, organisational culture, and sustainable, cost-effective clinical outcomes [10]. Patient safety and quality of care are often improved by eliminating unnecessary tests and procedures resulting in direct benefits for patients and the larger community [3].

Successfully delivering these competitions requires appropriately adapted organisational governance structures as well as targeted resource allocation. Effective governance structures are critical to maintain visibility and align projects with organisational goals [11]. Engaging key stakeholders including executives, sustainability teams, as well as the education, communications and safety and quality improvement teams fosters a collaborative approach for success [12]. Adequate sustainability focused quality improvement training and resources are crucial to help staff lead high-quality projects that deliver measurable outcomes [13, 14]. Robust project evaluation is necessary to assess the impact of sustainability initiatives, enabling continuous improvement and scalability of successful projects [15]. Effective communication of the competition's benefits, opportunities, and successes maximises ongoing participation and impact. Transparent judging criteria and celebrating achievements publicly can motivate broader participation and sustain momentum [16].

The Health Service Environmental Sustainability Competition has engaged staff across Royal Melbourne Hospital, Peter MacCallum Cancer Centre, and the Royal Women's Hospital to design and implement innovative solutions to reduce unnecessary testing, low-value care, GHG emissions, and waste. SusQI resource support and training from the University of Melbourne Sustainable Healthcare Team has enabled these projects to deliver sustained GHG savings of 2.6 million kg, 3,000 kg of waste, and keep 250,000 single-use items out of landfill, while saving a cumulative total of \$800,000 over 2022 and 2023.

CONCLUSION

This collaborative effort across Royal Melbourne Hospital, Peter MacCallum Cancer Centre, the Royal Women's Hospital, and the University of Melbourne recognised that strategic alignment, governance structures, and investment were critical for success and strived to ensure they were embedded as part of the competition process. The outcomes demonstrate robust engagement and a commitment to environmental sustainability. The application of this approach elsewhere would require similar attention to project detail to ensure successful outcomes for the benefit of the workforce, the organisation, and patients.

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