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Environmental sustainability practices in emergency departments

Report
June 2024

Sustainable emergency care in a changing climate – assessing impact and implementing adaptation strategies

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Environmental sustainability practices in emergency departments

Key findings

ACEM has taken the initiative to assess the existing environmental sustainability practices through the 2023 Annual Site Census. Of all the 148 ACEM-accredited emergency departments at the time of census:

49% reported having a designated Environmental Sustainability Lead.

96% reported their ED has clearly labelled bins for different categories of medical waste.

47% reported having taken measures to reduce carbon footprint.

76% reported having waste management guidelines or policies in their ED/hospital.

76% reported making efforts to reduce unnecessary or low-value medical tests and procedures.

35% reported having guidelines or policies to promote sustainable procurement practices.

Key recommendations

A sustainable healthcare system requires alignment between emergency department staff buy-in and ongoing support from the hospital leadership and government.

Emergency department staff

- Develop an emergency department-specific environmental sustainability plan, driven by dedicated sustainability lead(s)
- Promote energy-saving practices within the emergency department – start with simple actions
- Support the Choosing Wisely initiatives to reduce low-value care
- Reduce waste generation and comply with best practices of waste management
- Active campaign and staff education to promote environmental sustainability practices

Health services

- Establish a comprehensive environmental sustainability strategy with measurable and realistic targets
- Invest in renewable energy and prioritise green building design principles
- Adopt a green procurement strategy
- Active stakeholder engagement to ensure buy-in and ongoing collaboration across organisations
- Advocate for funding and sustained government support

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Healthcare's carbon footprint is anticipated to triple by 2050 if current practices are continued. While there are vast opportunities to reduce carbon emissions and improve environmental sustainability, the uptake of environmental sustainability measures in healthcare services, specifically in the emergency department (ED) setting, remains to be explored. This report provides an overview of the status of sustainability practices in all ACEM-accredited EDs on various aspects, ranging from sustainability leadership, carbon footprint, waste reduction, to sustainable clinical practice and procurement. Successful sustainability measures, areas for improvement, and key recommendations for ED staff and the broader health services are also highlighted in the report.

1. Executive Summary

- Australia released its first National Health and Climate Strategy in December 2023, followed by the development of the Net Zero Roadmap by NSW Health in 2024. There was also an announcement of a collaboration with the United States and the United Kingdom to decarbonise the healthcare supply chain in April 2024.
- Just under half (49%, n=73) of 148 ACEM-accredited emergency departments (EDs) reported having a designated Environmental Sustainability Lead role, and 62 (42%) EDs indicated they had a formal Environmental Sustainability Plan for their ED or hospital.
- ACEM-accredited EDs in Aotearoa New Zealand were more likely than those in Australia to report undertaking efforts to quantify their carbon footprint (47% vs. 26%) or having measurable greenhouse gas emission reduction targets (32% vs. 16%).
- Seventy (47%) of 148 ACEM-accredited EDs reported having taken measures to reduce carbon footprint in their ED or hospital.
- Only 39 (26%) reported having taken measures to substitute nitrous oxide or volatile anaesthetic gases with more environmentally sustainable alternatives.
- Three-quarters (n=112) of ACEM-accredited EDs reported having made efforts to reduce unnecessary or low-value medical tests and procedures.
- Almost all (96%) ACEM-accredited EDs reported their ED has clearly labelled bins for different categories of medical waste; however, less than half reported having a system to separate PVC-containing medical products for recycling (45%) or a system to separate other recyclable medical waste appropriately (48%).
- Three-quarters (n=113) of ACEM-accredited EDs reported having waste management guidelines or policies in their ED or hospital, but only 26 (18%) EDs reported that their ED staff received formal training or education on sustainability practices.
- Around one-third of ACEM-accredited EDs reported having guidelines or policies to promote sustainable procurement practices in their ED or hospital (35%) or were considering sustainable alternatives during procurement (32%).
- The implementation of sustainability initiatives not only reduces greenhouse gas emissions and improves population health but also yields substantial cost savings.
- The attainment of a sustainable healthcare system necessitates alignment between ED/ hospital staff buy-in and ongoing support from the hospital leadership and government.

2. Key Recommendations

ED Staff

- Develop an ED-specific environmental sustainability plan tailored to the busy ED setting and nominate dedicated sustainability lead(s) to foster a culture of environmental responsibilities within the department.
- Promote energy-saving practices within the ED, including simple actions such as turning off lights or unused equipment, reducing paper and printer use, and using energy-efficient equipment.

- Support the Choosing Wisely initiatives and seek opportunities within ED to minimise unnecessary or low-value medical tests/ procedures.
- Improve waste management by reducing waste generation (e.g., minimising single-use items, advocating for green procurement) and complying with the best practices of waste management (e.g., appropriate waste segregation, increasing recycling initiatives).
- Raise awareness about the importance of environmental sustainability among ED staff, patients, and visitors through active campaigns and ongoing staff education programs.

For Health Services

- Establish a comprehensive environmental sustainability strategy outlining health services goals, measurable and realistic targets, and short-term action plans to reduce the carbon footprint.
- Engage stakeholders from across the organisation to ensure buy-in and collaboration in implementing sustainability initiatives, as well as allocate dedicated resources to support the implementation of practical strategies.
- Invest in renewable energy to power healthcare facilities and prioritise green building design principles, including incorporating energy efficiency lighting, ventilation, and air conditioning systems, introducing hybrid or fully electric fleet vehicles, and sustainable building features.
- Adopt a green procurement strategy that prioritises environmentally friendly products and actively engage with suppliers to optimise packaging and identify sustainable alternatives.
- Advocate for funding and sustained government involvement to drive targeted campaigns and the implementation of environmental sustainability policies and strategies.

3. Introduction

> *"Climate change is the biggest global health threat of the 21st century."*
>
> *– The Lancet (Costello, Abbas et al. 2009)*

Healthcare services are estimated to account for 4.5% of global greenhouse gas emissions (Health Care Without Harm 2019, Watts, Amann et al. 2021). This figure has been predicted to be 9.8% of emissions in the United States of America (USA) (Eckelman and Sherman 2016) and between 5.3% and 7.2% of emissions in Australia (Malik, Lenzen et al. 2018, Commonwealth of Australia 2023). If healthcare were a country, it would be the fifth-largest emitter on the planet (Health Care Without Harm 2019).

Recognising the importance of reducing emissions from healthcare systems, over 80 countries, including Australia and Aotearoa New Zealand, have committed to developing a climate-resilient health system, with many indicating net zero commitment (Alliance for Transformative Action on Climate and Health (ATACH)).

In December 2023, Australia released its first National Health and Climate Strategy (Commonwealth of Australia 2023). It outlines a "whole-of-government plan for addressing the health and wellbeing impacts of climate change, while also addressing the contribution of the health system – encompassing public and preventative health, primary and secondary health care and aged-care – to climate change" (Commonwealth of Australia 2023). Subsequently, NSW Health has developed a Net Zero Roadmap in 2024 to help guide a 50% reduction in greenhouse gas emissions by 2030 (NSW Ministry of Health 2024). Many other jurisdictional governments and health services throughout Australia have also released health and environmental sustainability reports and strategies (Victorian Health Building Authority 2021, Wyns, Bragge et al. 2022, Commonwealth of Australia 2023, Western NSW Local Health District 2023).

In July 2023, ACEM partnered with the NSW Environment Protection Authority to assess the impact of climate-related events on NSW emergency departments (EDs), as well as to understand what EDs and hospitals are doing with respect to sustainability practices, with a focus on ACEM-accredited EDs across Australia and Aotearoa New Zealand. This report presents the findings from ACEM's Annual Site Census, which captured information on sustainability practices in place at the 148 ACEM-accredited EDs. These findings are supported by an analysis of the published literature to understand the outcomes of sustainability initiatives and projects occurring in the ED setting and across the broader health service in Australia.

4. Environmental Sustainability Planning and Leadership

Without a significant reduction in global carbon emissions, there is likely to be a continued increase in natural disasters and extreme weather events (CSIRO and The Bureau of Meteorology 2022). Many of these climate events are expected to impact human health and intensify the strain on the healthcare system, particularly EDs, which are increasingly becoming the point of entry into the health system for many individuals (Ghazali, Guericolas et al. 2018, Xu, Yu et al. 2023).

A report published in 2021 by the Royal Australasian College of Physicians (RACP) and endorsed by the Australasian College for Emergency Medicine (ACEM) highlights the critical role that the healthcare system plays in managing climate change-related health issues (Bragge, Armstrong et al. 2021). As the front-line responders to the health implications of climate change, ED staff are uniquely positioned to not only treat the immediate effects but also to take proactive actions in reducing greenhouse gas emissions and promoting sustainability.

ACEM has taken the initiative to assess the existing environmental sustainability practices in all 148 ACEM-accredited EDs through the 2023 Annual Site Census. Of 148 EDs across Australia and Aotearoa, 73 (49%) reported having a designated Environmental Sustainability Lead role, with the role more commonly available hospital-wide than based in the ED (45% vs. 29%), and 62 (42%) EDs indicated they had a formal Environmental Sustainability Plan for their ED or hospital (Figure 1). Other sustainability leadership bodies or initiatives reported having been established, including hospital-wide sustainable healthcare committees, environmental advisory groups, net-zero governance groups, and the implementation of the GreenED program and targets established by the Royal College of Emergency Medicine.

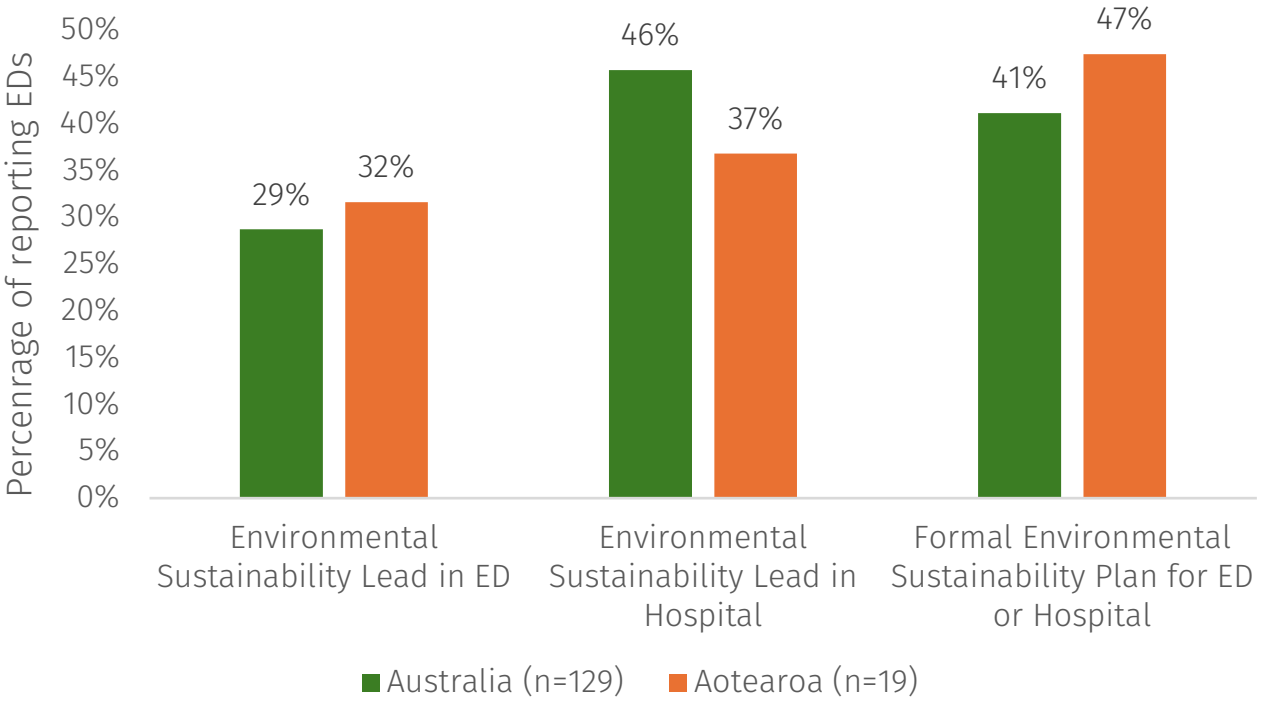

Figure 1: Percentage of EDs that reported having a designated Environmental Sustainability Lead and formal Environmental Sustainability Plan in the 2023 Site Census, comparing Australian and Aotearoa EDs

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5. Quantifying Carbon Footprint

The carbon footprint of Australian healthcare services was estimated to be between 24,484 and 35,772 kilotons of carbon dioxide equivalent (CO2e) in 2014-15 (Malik, Lenzen et al. 2018, Commonwealth of Australia 2023). Despite a scarcity of studies quantifying the direct carbon emissions of EDs, they are likely responsible for considerable carbon emissions, given that EDs operate 24/7 and are energy intensive. It is crucial that EDs, as well as the broader healthcare industry, reduce their carbon footprint to ensure that they do not exacerbate the very problem they will inevitably treat.

Carbon emissions can be classified into three categories:

- **Scope 1 –** come directly from healthcare facilities and healthcare vehicles as a result of healthcare delivery (6-17% of emissions)
- **Scope 2 –** emissions produced when generating the energy used in healthcare facilities (12-19%)
- **Scope 3 –** occur outside the healthcare organisation, including the supply chain and waste disposal (71-75%)

Patient and visitor travel is not accounted for within any of these categories but should be taken into consideration when assessing the carbon footprint of the healthcare system (Health Care Without Harm 2019, Commonwealth of Australia 2023).

Quantifying carbon footprint is a fundamental step in identifying areas of high carbon emissions to subsequently prioritise efforts and resources and set reasonable reduction targets. However, only a quarter of 129 Australian EDs (n=33), compared with nearly half of 19 Aotearoa EDs (n=9), reported undertaking efforts to quantify the carbon footprint generated by their ED or hospital in the 2023 Annual Site Census. Likewise, Australian EDs were also less likely than Aotearoa EDs to report having measurable greenhouse gas emission reduction targets in their ED or hospital (Figure 2).

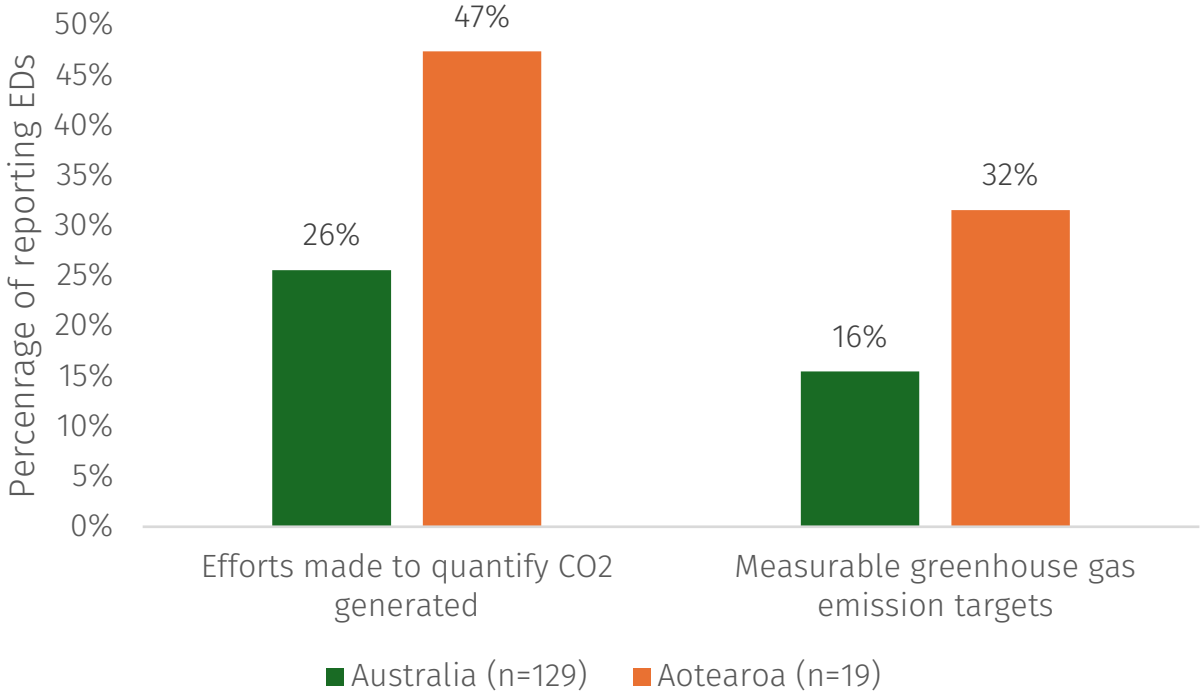

Figure 2: Percentage of EDs that reported undertaking efforts to quantify their carbon footprint and the percentage that reported having measurable greenhouse gas emission reduction targets in the 2023 Site Census, comparing Australian and Aotearoa EDs

6. Measures to Reduce Carbon Footprint

It is estimated that over 50% of healthcare's carbon footprint comes from energy usage, which includes all of scope 2 emissions plus the energy used within healthcare facilities and by the suppliers of goods and services for the healthcare industry (Health Care Without Harm 2019). Improving energy efficiency in EDs and hospitals by transitioning to renewable energy supplies and upgrading to more energy-efficient equipment and infrastructure is one of the most effective ways to reduce carbon emissions (Linstadt, Collins et al. 2020).

Anaesthetic gases such as nitric oxide and desflurane are commonly used in EDs and pre-hospital medicine, but they are incredibly harmful to the environment. For instance, it was estimated that the Australian healthcare system emitted 300 CO2e kilotons of nitrous oxide in the 2020-21 financial year, accounting for around 1% of the emissions from healthcare in Australia (Commonwealth of Australia 2023).

In October 2023, the Western Australia Department of Health was the first health department in Australia to remove desflurane (which has 2,500 more global warming potential than nitrous oxide) from public hospitals, which is estimated to have saved 1,800 tonnes of CO2e and $750,000 (Commonwealth of Australia 2023). Methoxyflurane is a more environmentally friendly anaesthetic gas that should be considered in EDs, as it has 117.7 times less global warming potential than nitrous oxide, however, it is three times more expensive (Spruell, Webb et al. 2021, Martindale, Morris et al. 2024).

Only 39 (26%) of 148 ACEM-accredited EDs reported that they implemented measures to substitute nitrous oxide or volatile anaesthetic gases, such as desflurane, with more environmentally sustainable alternatives, reflecting an area requiring further advocacy and intervention. The elimination of desflurane and/or nitrous oxide generally involved a whole-of-hospital effort, and the reported alternatives included sevoflurane or methoxyflurane. Another reported measure was checking the nitrous reticulation system for leakage, which is an important consideration for administering anaesthetic gases. This is crucial as it is estimated that the loss of gas from pipe leakage could be between 77% and 95% of total gas usage (Seglenieks, Wong et al. 2022, Martindale, Morris et al. 2024)

Strategies shown to be effective in reducing the carbon footprint in the ED and healthcare setting included:

- Improving the telecommunication technology available to clinical staff in EDs to create increased use of telehealth services, including digital triage services, which may reduce the number of people attending EDs and the associated emissions (Spruell, Webb et al. 2021).
- Preventing the misuse of non-sterile gloves, which has been shown to reduce the number of gloves used by 21% in a NSW local health district (Hunter New England Local Health District).
- Using reusable equipment and supplies such as laryngoscopes, which has been found to be more environmentally friendly and cost-effective than single-use laryngoscopes through life cycle assessments (McGain and Naylor 2014, Sherman, Raibley IV et al. 2018).
- Minimising energy-wasting practices in healthcare facilities, such as through removing the heating and cooling of unused spaces and fixing air and water leaks (Kaplan, Sadler et al. 2012).

In the 2023 Site Census, less than half (47%, n=70) of the ACEM-accredited EDs reported having taken measures to reduce the carbon footprint in their ED or hospital. Feedback on sustainability measures to reduce the carbon footprint included:

- ***Incorporating sustainable building designs**, such as solar panel system installation and graphene paint to reduce energy consumption.*
- ***Sourcing greener energy**, either upgrading to a more energy efficient system (e.g., LED lighting, five-star green rating HVAC system), or using renewable alternatives (i.e., phasing coal-powered applications, or moving from natural gas to electricity for heating and cooling).*
- ***Use of hybrid or fully electric fleet vehicles**.*
- *Introducing **food waste management**, such as using an industrial composter for food waste and food donation.*
- ***Reducing paper and printer use**, moving from a paper-based to an electronic sign-off test ordering system.*
- ***Staff education campaigns**, such as 'Turn It Off' for unused lights/computers, green transportation or travel plans, and various recycling initiatives.*

7. Reduction of Unnecessary or Low-value Tests and Procedures

Choosing Wisely is an initiative first developed in the USA in 2012 to reduce unnecessary tests, treatments, and procedures. There are now Choosing Wisely organisations worldwide, including in Australia and Aotearoa. Healthcare delivery is a complicated process; studies suggest that an average 60% of care is in line with evidence of consensus-based guidelines, with the remaining 40% either of low value or harmful, reflecting an enormous scope in eliminating low-value care to reduce carbon emissions without impacting patient care (Braithwaite, Glasziou et al. 2020, Barratt, Bell et al. 2022).

A Choosing Wisely audit of blood gas ordering in the Royal Melbourne Hospital ED discovered that 32% of blood gases ordered were unnecessary for the patient's clinical management (Kumarakurusingham and Yousif 2023). Not only would a reduction in tests save time and money (an estimated $200,000 annually within a single ED) (Kumarakurusingham and Yousif 2023), reducing the number of tests would significantly reduce greenhouse gas emissions. A study conducted at several Melbourne hospitals estimated that 49 grams of carbon dioxide equivalent (CO_2e) are produced for every blood gas test, (McAlister, Barratt et al. 2020). Thus, the environmental impact of reducing unnecessary tests is immense, considering approximately 150,000 blood gas tests were completed in Australia in a six-month period from July to December 2023 (Australian Government 2024).

Another example of low-value care is the use of just-in-case intravenous cannulations. A single-site study in southeast Queensland reported that around a third of all intravenous cannulas inserted into patients in the ED or pre-hospital setting were for just-in-case scenarios and unused (Evison, Sweeny et al. 2021). A more robust study estimated around half of the ~2.5 million intravenous cannulas that are inserted into adults in EDs in Australia every year, are unused. This is projected to cost the health industry over $300 million and waste almost 12,000 days in ED staff time (Morgan, Callander et al. 2022). While these studies did not measure the environmental impact of unused intravenous catheters, one can imagine that the environmental impact of millions of unused cannulas annually would be substantial.

Three-quarters (n=112) of 148 ACEM-accredited EDs reported efforts have been made to reduce unnecessary or low-value medical tests and procedures in their ED, which was consistently seen across most jurisdictions (Figure 3).

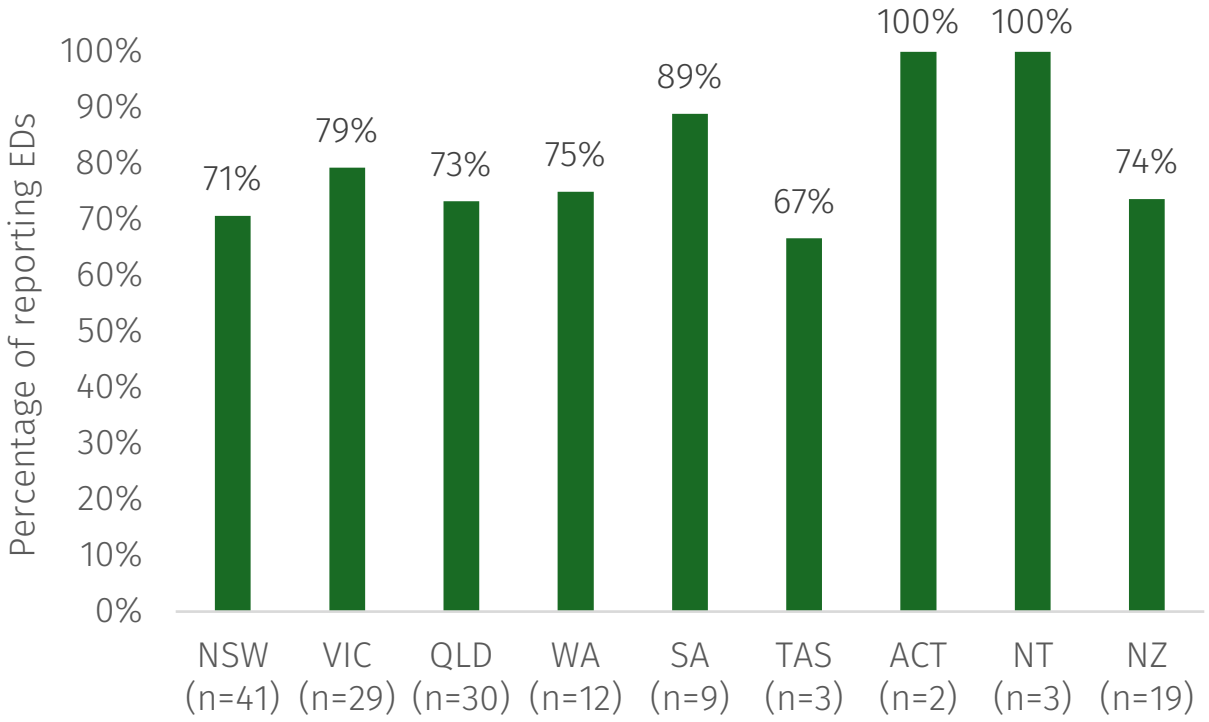

Figure 3: Percentage of EDs reported efforts being made to reduce unnecessary or low-value medical tests and procedures in their ED, across jurisdictions

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Common strategies that were reported by EDs to reduce unnecessary and low-value tests and procedures are displayed in Table 1, along with the most targeted tests and procedures.

Table 1: Five most reported strategies to reduce low-value tests/ procedures and most targeted areas of practice in ACEM-accredited EDs

Five most reported strategies	Five most targeted tests/procedures
Clinical practice guidelines, policy, or governance framework	Blood and/or urine cultures
Staff education – on-floor, monthly meetings	Venous blood gases (VBG)
Active campaign, e.g., NUTS (No Unnecessary Tests) campaign	Medical imaging, particularly CT scans of the brain and abdomen
Enforcing consultant approval for specific test requests	Intravenous cannulation
Regular audits or traffic light testing	Coagulation studies

Combined strategies are often required to achieve the goals of targeted interventions. A study conducted at the Northern Hospital in Victoria reported that there was no reduction in the number of unnecessary coagulation studies following staff education; however, when coagulation pathology tubes were made less convenient to access as part of the intervention, unnecessary testing reduced from 74% to 53% (Kalsi, Foo et al. 2020).

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No Unhelpful Tests (NUT)

Pictured above are the project team lead, ED consultant Dr Mark Henderson, and clinical nurse educator Amy Brewer.

Health Service

Barwon Health – University Hospital Geelong ED

Total Investment

$300 poster printing + volunteer time

Estimated annual cost saving

$840,000 (initial projects – Qiagen and VBGs), excluding substantial cost associated with staff time saved due to reduced test requests

OVERVIEW

A multi-disciplinary group of Barwon Health emergency department (ED) staff has created a No Unhelpful Tests (NUT) committee to help reduce the expanding number of low-value tests being ordered in the ED. This aims to provide more effective care by reducing wasted equipment, supplies, energy, time, and tests. This drive for change was inspired by the international 'Choosing Wisely' initiative.

UMMARY

The NUT team first targeted the most labour-intensive, frequent, and expensive tests:

(i) rapid COVID-19 'Qiagen' PCR test; and

(ii) venous blood gases test (VBGs)

Quality improvement models and change management strategies were utilised to identify drivers for testing behaviours, which then guided the tailored interventions. These involved educating nursing and medical staff, displaying posters around the ED, developing specialised request forms, and altering the locations of tests to optimise appropriate test ordering.

Granular and zoomed-out audits were conducted to monitor the progress. Since the implementation of the intervention in October 2023, Qiagen and VBG ordering have decreased by 55% and 40%, respectively, saving approximately $70,000 per month and reducing the time to perform tests with no adverse events identified.

Given the success, similar strategies were applied to reduce unhelpful coagulation studies and rolled out across a wide variety of specialties in the hospital and have since confirmed a 40%-50% reduction.

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Other projects underway included:

- Reducing unnecessary first-trimester bleeding pathology
- Decreasing the 'noise' created by unindicated ECGs.
- Alleviating unnecessary paediatric urine sample collection

WHAT WORKED WELL

- Multi-disciplinary involvement (comprising doctors, nurses, and nurse practitioners)
- A focus on understanding the problem, not delivering a pre-conceived solution.
- Multi-modal, tailored interventions
- Empowering seniors among different craft groups to own and deliver education for their targeted groups.
- Remarkable flexibility among ED staff to absorb these significant changes into their everyday practice amongst the many challenges the ED presents.
- Deemed a helpful model by other medical specialties – the first surgical NUT project was to reduce unhelpful abdominal CT scans.

WHAT DIDN'T WORK WELL

- Engaging such a diverse group of professionals (200 nursing staff of various seniority/experience levels, all levels of emergency doctors, and inpatient doctors involved in ordering tests in the ED) is extremely challenging—lower engagement and buy-in among less senior staff members.
- The timing of educational campaigns across many levels of experience/skill groups was not always well coordinated – awareness of the different projects was staggered over weeks or even several months.
- Getting junior staff involved in the day-to-day quality improvement work did not succeed as expected.

FOR FURTHER INFORMATION

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8. Waste Management

Waste within healthcare settings is diverse, encompassing both hazardous and non-hazardous (non-medical) materials. Non-hazardous waste constitutes a considerable proportion of hospital waste, estimated at approximately 85% (Kaplan, Sadler et al. 2012). Often, non-hazardous waste is inappropriately placed in medical waste containers, increasing the disposal cost (between 5-20 times higher costs) and likely worsening the environmental impact of disposal (Kaplan, Sadler et al. 2012, Hsu, Thiel et al. 2020, Joseph, James et al. 2021). For example, a study conducted in the USA reported that an ED generated an average of 2kg of waste per patient, 11% of which was disposed of in medical waste bins; however, only 15% of waste disposed of in medical waste bins was an actually hazardous waste with the remaining disposed of inappropriately (Hsu, Thiel et al. 2020). A study conducted in Tasmania also reported that only 33-45% of waste from a regional ED was disposed of appropriately (Church, Briggs et al. 2019).

The healthcare sector is the largest consumer of chemicals of any industry, many of which can have negative consequences for the environment and our health (Linstadt, Collins et al. 2020). A large proportion of the active substances used in pharmaceuticals are excreted in waste, which makes its way into the environment and, ultimately, our food chain (Kar, Roy et al. 2018, Linstadt, Collins et al. 2020). Not only could this impact our health, but a large amount of pharmaceutical packaging likely ends up as general waste as it is difficult to recycle, contributing to the global waste problem.

Almost all (n=142, 96%) ACEM-accredited sites reported their ED has clearly labelled bins for different categories of medical waste (e.g., infectious waste, sharps, general waste, etc.). However, less than half of the sites reported having a system to separate PVC-containing medical products (e.g. IV bags and oxygen tubing) for recycling (45%), or a system to separate other recyclable medical waste appropriately (48%). Aotearoa EDs were generally more likely than Australian sites to report having these recycling separation systems for medical waste management. In addition to recycling a broad range of materials (e.g., PVC, cardboard, paper, single-use metal instruments, electronics, glass bottles, pharmaceutical glass vials, and aluminium Webster packs), other examples of initiatives to reduce medical waste are presented in Table 2.

Table 2: Feedback from ACEM-accredited EDs on initiatives to reduce medical waste in their ED

Initiatives to minimise medical waste in EDs
Changing to paper/ compostable pill cups and bamboo kidney dishes
Encouraging the use of reusable SpO2 probes rather than disposable ones
Utilising biodegradable bedpans and urine bottles
Reducing the use of disposable equipment or consumables, e.g. Torniquets, gloves
Utilising non-disposable gowns
Donation of expired medical products to zoos, bushfire wildlife rescue centres and International Aid agencies
Collecting soft plastics and recycling them into meal trays and other sundry items for reuse
Fitting blood culture bottles in a universal blood collection vacutainer – minimise the use of syringes
Comingled recycling for plastic tubing or packaging
Reusing Huck towels

Gloves Off Program

Pictured above are members of the sustainability team at Wyong during the launch day of the Gloves Off program.

Health Service

Central Coast LHD – Wyong Hospital ED

Total Investment

$660 + volunteer time

Expected CO2e saving per week

380kg → 19,700kg per year

Actual CO2e saving per week

839kg → 43,600kg per year

Estimated annual cost saving

$50,000

OVERVIEW

Wyong Emergency Department (ED) adapted the Gloves Off program, which originated from the Great Ormond Street Hospital in London and was also implemented at John Hunter Hospital (JHH) in Newcastle Australia. This is an education program aiming to reduce unnecessary glove use, thereby satisfying the "triple bottom line" of **P**eople (improved hand hygiene compliance and reduced hospital-acquired complications), **P**rofit (save money off the Local Health District budget), and **P**lanet (reduce waste and environmental impact of healthcare).

SUMMARY

Local and international data suggest glove use is "inappropriate" 50-60% of the time – i.e. they are used in instances like pushing wheelchairs or performing non-invasive examinations on intact skin where there is no risk to the healthcare worker. Inappropriate glove use has also been shown to reduce hand hygiene compliance which increases risk to patients and staff.

Initial discussion with Tina Wilkie (Allied Health Net Zero Lead) at JHH was encouraging and she kindly shared multiple resources produced during their program launch which saved time and reduced overhead costs.

Data was obtained via on-the-floor auditing by the infection prevention and control (IPAC) service, as well as historical glove ordering data from the procurement team. The sustainability team at Wyong ED created an education program, put up informative signs, created local interest, baked amazing cookies and cupcakes, obtained "Gloves Off" badges, and held a launch day on 5th February 2024 to coincide with the new medical term. Education was supplied to all streams of workers in the ED including doctors, nurses, wardspersons, allied health and radiographers, then they were given a badge to wear and treats to eat.

Glove ordering data obtained 3 weeks after the launch day demonstrated a 62% reduction in inappropriate glove use resulting in 25,000 gloves, $962 and 840kg CO2e saved per week. Extrapolated to a year we hope to save over $50,000 and 43,000kg CO2e (the same as driving a petrol car around Australia 8 times!). Hand hygiene compliance has also ticked over our KPI of 80%.

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June 2024

WHAT WORKED WELL

- Volunteer group worked well together and created a great sense of purpose and belonging.
- ED staff enthusiastically adopted the changes.
- Improvements exceeded expectation.
- This program will soon be expanded throughout the Local Health District and is also being launched at other Australian hospitals via the new Sustainable Emergency Medicine and Climate Advocacy Network (SEMCAN) ACEM network.

WHAT DIDN'T WORK WELL

- Hand hygiene improvement was not as significant as hoped.

FOR FURTHER INFORMATION

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9. Waste Management Guidelines and Education

Food waste is a significant source of non-hazardous waste in the healthcare setting. An estimated 6,000 tonnes of food waste was produced by the NSW health system in 2016, which accounted for over 50% of the general waste from the health system (NSW Environment Protection Authority 2023). A collaborative project between NSW Health and the Environment Protection Authority investigated different methods of processing and disposing of organic waste, including dehydration, maceration, and liquidisation – 24 tonnes of food waste was processed at nine sites over three months (NSW Environment Protection Authority 2023). However, considering the cost and infrastructure investment required to set up the systems and the energy and water needed to run the systems, this may not be the most sustainable way to manage food waste. Another project implemented by NSW Health at Bowral and District Hospital called Project CHEF (Co-designing Healthy and Enjoyable Food) aims to provide a more patient-centred food service model. By providing customisable and on-demand meals, food waste was reduced by more than 50% (NSW Ministry of Health 2024).

The disposal of unused medical supplies is another source of significant waste generation in the healthcare setting. A study conducted at a Level 1 Trauma Centre recovered 40kg of unused medical supplies over a one-month period, which would typically have been thrown out. The cost of these unutilised supplies over one year was expected to total over $73,000 USD (Muldoon, Chan et al. 2019).

Staff uptake is often the key factor for the success of waste management in EDs. A pilot program aimed at enhancing waste segregation in a Tasmanian ED was unsuccessful, primarily due to staff perception that waste separation was complex, time-consuming, or lacked benefits; there was limited compliance from cleaning and environmental staff; and there was insufficient support from hospital management (Church, Briggs et al. 2019). Fundamentally, improving staff education and placing waste bins in strategic locations are cost-effective strategies to improve waste management in EDs (Linstadt, Collins et al. 2020).

Over three-quarters (76%, n=113) of the 148 ACEM-accredited sites reported having waste management guidelines or policies in place in their ED or hospital; however, only one in five (22%) reported they had measurable waste minimisation targets. Most waste management guidelines focused on recycling and/ or waste segregation processes. Despite the availability of guidelines or policies, only 26 (18%) of 148 ACEM-accredited EDs reported that their ED staff received formal training or education on sustainability practices (e.g. waste management, reduced chemical usage, etc.). This finding highlights the areas for improvement, considering staff education is crucial to encourage compliance and uptake of waste management guidelines and, more importantly, to ensure sustainable behavioural change and the positive impact of optimal waste management.

10. Sustainable Procurement Practice

One other effective waste management strategy is to reduce the amount of waste produced. Encouraging suppliers to use less packaging and not discard unused items is crucial to an effective waste management strategy.

The supply chain accounts for a significant proportion of the greenhouse gas emitted from the healthcare industry. This includes the production, transport, and disposal of resources such as pharmaceuticals and chemicals, food, consumables, medical devices, and other equipment (Health Care Without Harm 2019, Commonwealth of Australia 2023). The National Health Service (NHS) of the United Kingdom (UK) has implemented policies to ensure that their suppliers are actively working to reduce their carbon footprint, with all suppliers required to publish details of a carbon reduction plan by April 2024 (National Health Service). Additionally, an international collaboration has been established between the NHS and the Department of Health and Human Services in the United States (US), aiming to align their procurement requirements, considering that many suppliers to the healthcare industry operate internationally (Commonwealth of Australia 2023). In April 2024, it was announced that Australia and several other countries would also join the collaboration with the UK and the US, and the government will join discussions that focus on green procurement, getting suppliers to disclose their carbon emissions, and aiming to reduce procurement-related emissions (Department of Health and Aged Care 2024).

A project by NSW Health's Strategic Procurement Services team saw a change in processes around the shipping and packaging of products. This project led to more products being shipped in each shipment and fewer steps in the supply chain process, which resulted in a more environmentally friendly and cost-effective system (NSW Ministry of Health 2024).

It is estimated that around 24 million meals are served each year in hospitals across NSW, associated with 6,000 tonnes of waste (NSW Ministry of Health 2024). Many strategies can be implemented to improve the sustainability of food service in hospitals and EDs, including purchasing food from local sources where possible, changing to a more environmentally friendly menu, reducing the amount of food waste, and encouraging suppliers to use more sustainable practices when growing and packaging the food (Linstadt, Collins et al. 2020).

In the 2023 Site Census, just over one-third (35%) of 148 ACEM-accredited EDs reported having guidelines or policies in place to promote sustainable procurement practices in their ED or hospital, and a slightly smaller proportion (32%) reported that sustainable alternatives, such as reusable personal protective equipment (PPE) and other eco-friendly products, were considered during procurement.

Examples of sustainable procurement initiatives in place at ACEM-accredited EDs and hospitals are presented in Table 3.

Table 3: Feedback from ACEM-accredited EDs on examples of sustainable procurement initiatives in the ED or hospital

Sustainable procurement initiatives in ED or hospital
Developing a hospital-wide sustainable procurement strategy (e.g., 10% sustainability weightings to procurement matrix, adopting an evaluation tool for screening)
Supporting suppliers with carbon net zero target
Removing single-use medical products or consumables (e.g., medical trays, plastic medication cups, SpO2 probes) from procurement list
Purchasing reusable PPE
Utilising biodegradable kitchen utensils or meal packs
Transitioning to recyclable (e.g. cardboard, sugar cane) kidney dishes
Changing bottled water to filtered chilled water supplied in the ED and wards
Increasing the number of recycling bins in strategic locations around the ED

11. Summary and the Next Steps

Australia and Aotearoa New Zealand have started to join with global efforts in adapting and mitigating the risks and impacts of climate change. Governments and health services have started to establish plans and targets to reduce greenhouse gas emissions. Being one of the most energy-intensive settings in the hospital, EDs play a vital role in contributing to the shared efforts to reduce the carbon footprint. Not only will implementing sustainability iniatives reduce greenhouse gas emissions and have a positive impact on the health of the community, but most initiatives will have substantial cost savings for healthcare services.

The data collected by ACEM from ACEM-accredited EDs through the 2023 Annual Site Census has provided a profile of the current sustainability practices in place and highlights the gaps where progress can be made. The findings showed that around half of the EDs reported having a designated Environmental Sustainability Lead and/ or a formal sustainability plan for their ED or hospital, and a large number of EDs across Australia and Aotearoa have or are in the process of implementing sustainability measures and initiatives.

Various sustainability initiatives harbour the considerable potential for emissions reduction if adopted on a broader scale; however, one of the biggest challenges to achieving sustainability goals is changing the behaviours and habits of staff working on the floor. This is even more challenging in the ED setting, where staff are often under pressure and busy with competing priorities. Therefore, any initiatives introduced into EDs should ensure that they are practical for staff to implement and tailored to the busy ED setting. Support from hospital management, for instance, employing a dedicated sustainability champion and allocating staff time or other required resources, is essential to ensure the success of any sustainability initiative.

Lack of general awareness or institutional initiatives in implementing environmental sustainability plans are common barriers identified from the 2023 Site Census, highlighting more structured and regular staff education and training should be provided, particularly on implementing sustainable waste management strategies and enhancing the commitment to the Choosing Wisely initiatives in reducing low-value tests and procedures. Active campaigns and ongoing staff promotion have been shown to be cost-effective in improving staff uptake and subsequently leading to sustained success.

Every ED staff member must contribute to supporting environmental sustainability practices within their department and broader health service. The most significant progress towards sustainability will be achieved by transitioning to renewable energy alternatives and making fundamental changes to promote sustainable procurement practices hospital wide. Achieving this will require ongoing support from governments and hospital executives to enact targeted interventions and implement policies that not only advocate for but also mandate a sustainable healthcare system.

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June 2024

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