



Final Project Submission Form

Health Service: Western Health

Title of project: Discontinuing the use of disposable shoe covers in Operating Theatres

Department: Operating Theatres

Introduction

As a junior doctor at Western Health with a strong interest in public health, evidence-based care and environmental sustainability, I evaluated the routine use of disposable shoe covers. I conducted a review that found no clear clinical benefit, while also identifying an opportunity to reduce waste and costs.

This project aimed to reduce or eliminate the use of disposable shoe covers in Operating Theatres (OT) at Western Health by translating evidence-based research into practice. As a single-use item, these disposable shoe covers contribute significantly to waste. Reducing their use creates positive environmental and financial outcomes, particularly when operating theatres are already a major source of healthcare waste.

More broadly, this work reflects a commitment to evidence-based clinical practice while reducing Western Health's environmental footprint through practical, low-risk change.

What was the problem you tackled?

This project aimed to reduce or eliminate the use of disposable shoe covers in operating theatres at Western Health. At Western Health, the main consumers of disposable shoe covers are either patients admitted for day surgery or staff working in operating theatre environments.

Research showed the effectiveness of disposable shoe covers in preventing surgical site infections or reducing floor contamination is unsubstantiated by existing evidence (2). Eliminating and/or limiting shoe cover use in operating theatres and encouraging reusable fluid-resistant footwear can provide environmental and cost benefits.

What was your SMART Goal?

This project aimed to reduce the routine use of disposable shoe covers for perioperative patients in Western Health's Operating Theatres by at least 80% during an 8-week pilot. This would be achieved by limiting shoe cover use to operations where fluid exposure was anticipated.

The project measured changes in utilisation rates, aiming to demonstrate a substantial reduction in the use of disposable shoe covers, decreased environmental waste, and associated annual cost savings. This was achieved while maintaining safe perioperative practices consistent with national perioperative standards.

What system factors contributed to the problem?

Several system-level factors contributed to the routine use of disposable shoe covers in the operating theatre environment. Historical practices and ingrained perioperative workflows led to the widespread use of shoe covers, despite limited evidence that they reduced surgical site infections or floor contamination. This practice has persisted largely due to habit and perceived infection control benefits rather than current evidence. At Western Health, all day-patients were routinely

given disposable shoe covers prior to entering the operating theatre.



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This was supported by procurement and supply systems which made disposable shoe covers readily available at point of care, facilitating use without consideration of environmental or financial impacts.

There was also limited staff awareness of the environmental footprint and waste associated with single-use perioperative products. Operating theatres are known to generate substantial volumes of waste, and disposable shoe covers contribute to this waste stream despite offering minimal clinical value.

Who were the key stakeholders?

- Operating Room staff including but not limited to clinicians, nursing staff, technicians etc.
- Infection Prevention & Control team
- Hospital Sustainability
- Executive and procurement teams
- Occupational Health & Safety representatives
- Visitors or contractors entering OT areas

What was the intervention?

The intervention reduced the use of disposable shoe covers at Western Health OT sites. Previously, disposable shoe covers were available at accessible locations along with disposable face masks and hats. Their removal from these areas decreased accessibility and more importantly, limited their use as compulsory theatre attire.

The initiative was also presented at Western Health's Sustainability Theatre Group. From July 2025, a decision was made to phase out mandatory shoe covers for patients/day cases at all WH theatres.

What impacts/outcomes were measured? How did you measure them?

The effectiveness of this intervention was evaluated using a combination of procurement, and environmental metrics to assess both financial and sustainability outcomes.

Procurement data was analysed to compare the volume and cost of disposable shoe covers before and after the intervention. Data was obtained from Western Health's procurement and supply systems to quantify purchasing changes over time. This provided an estimated cost saving as well as validating the sustained nature of this change across the system.

The intervention's environmental impact was assessed through carbon footprint calculations. Using procurement data based on the number of shoe covers used, and emissions based on Life Cycle Assessment to end of life, an estimate was calculated by applying standard carbon conversion factors for single-use plastic products. The reduction in carbon dioxide equivalent (CO₂e) emissions attributable to decreased consumption of disposable shoe covers provided a measurable indicator of environmental benefit.

In calculating changes to disposable shoe cover use, changes in procurement and stock usage data were assessed. Comparing pre- and post-intervention use provided a clear measure of behavioural change and intervention effectiveness by reducing reliance on low-value, single-use items.

Together, these measures demonstrated the intervention's positive impact across financial, environmental, and operational outcomes.



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What challenges did you face? What enablers facilitated the change? What were the learning points?

Several challenges were encountered during implementation. The routine use of disposable shoe covers was an entrenched practice within operating theatre workflows, with many staff perceiving them as necessary for infection control despite limited evidence. Continued alignment with Infection Prevention & Control and Occupational Health & Safety requirements was also necessary.

Key enablers included strong leadership support from theatre management and sustainability groups, as well as multidisciplinary engagement with Infection Prevention and Control and frontline staff. A scoping review conducted as part of this project further reinforced the lack of evidence supporting shoe covers in preventing surgical site infections, strengthening the evidence base and facilitating stakeholder buy-in. The removal of shoe covers from point-of-care access was particularly effective, reducing default use without relying solely on behaviour change.

Key learning points include the effectiveness of system-level interventions in driving sustainable change, particularly by modifying default behaviours. Early stakeholder engagement and alignment with governance frameworks were critical for implementation. The project also demonstrated that environmentally sustainable practices can be introduced without compromising patient safety when supported by evidence.

What are the next steps with this project?

The next steps for this project will focus on scaling and embedding the change into practice. This will be achieved through:

ongoing procurement data monitoring to ensure reductions in disposable shoe cover use is maintained over time.

Updating theatre policies and perioperative guidelines to ensure shoe covers are no longer considered routine attire and are reserved for specific clinical needs.

ongoing stakeholder engagement and education, particularly for new staff and rotating trainees, to reinforce practice change and alignment with Infection Prevention & Control standards.

An opportunity exists to expand this initiative across other Western Health departments and healthcare providers within Victoria. Findings from the project and accompanying scoping review will be shared through presentations and publication to support broader adoption of environmentally sustainable, evidence-based perioperative practices. This project will be presented at the Royal Australian College of Surgeons Annual Conference in Perth in April 2026.

Points will be awarded in the following categories:

Environmental sustainability: What were the carbon savings from your project? (Please include your raw data and calculations)

The carbon savings from this project were estimated using a life cycle assessment (LCA) approach based on procurement data and standard emission factors for single-use plastic products.

Each disposable shoe cover weighs approximately 6.01 grams and is associated with an emission factor of 31.3 grams CO₂-equivalent (CO₂e) per unit (Healthcare Carbon Lab, University of Melbourne 2026) accounting for manufacturing, transport (from China to Melbourne) and end-of-life landfill disposal. As the material is non-recyclable, all used shoe covers ultimately contribute to landfill or clinical waste streams.

Using procurement data, total utilisation was converted into carbon emissions as follows:

2024 (pre-intervention baseline):

128,100 shoe covers used

Total emissions = $128,100 \times 31.3 \text{ g CO}_2\text{e} = \sim 4,009 \text{ kg CO}_2\text{e}$

2025 (post-intervention):

16,900 shoe covers used

Total emissions = $16,900 \times 31.3 \text{ g CO}_2\text{e} = \sim 529 \text{ kg CO}_2\text{e}$

This represents a reduction of approximately 3,480 kg CO₂e annually when comparing 2024 to 2025, corresponding to an approximate 87% reduction in emissions associated with disposable shoe cover use.

Site-specific reductions were also observed across all Western Health campuses, demonstrating consistent system-wide impact. However, specific data was collected for Sunshine and Sunbury theatres given that Sunshine and Sunbury data represent site-specific subsets, with remaining emissions attributable to other Western Health sites.

Overall, the intervention resulted in a substantial decrease in carbon emissions by reducing reliance on single-use, non-recyclable plastic products, highlighting the environmental benefit of eliminating low-value perioperative practices.

Carbon footprint calculations for 2024 and 2025:

Year	Whole WH*	Sunshine	Sunbury	units
2024	4,009	445.8	113.3	kgs CO ₂
2025	529	74.9	37.8	kgs CO ₂

Savings comparison and kgs avoided from landfill:

2024	pieces	cost	landfill (kgs)
total WH 2024*	128,100	\$13,566	770
total SH	11,900	\$1,286	72
total SUN	3,600	\$391	22

2025	pieces	cost	landfill (kgs)
total WH 2025*	16,900	\$2,076	102
total SH	2,000	\$195	12
total SUN	500	\$49	3

**note Sunshine and Sunbury sites are included in the WH totals.*

These estimates were derived using a full life cycle approach including production, transport, and disposal phases. Assumptions included non-recyclable polypropylene material and landfill disposal pathways. Sensitivity analysis varying emission factors by $\pm 20\%$ did not materially change the magnitude or direction of results.

This reduction is equivalent to approximately 3.5 tonnes of CO_{2e} annually, representing a substantial system-level environmental impact from eliminating a single low-value consumable.

Environmental sustainability: What were the waste reductions? (If possible, please specify what waste stream – reduced clinical waste by diverting to recycling, reduced clinical waste by using reusable equipment etc.)

The project saw a substantial reduction in waste generated from single-use disposable shoe covers, primarily impacting the general waste stream and to a lesser extent, clinical waste.

Disposable shoe covers are made from non-recyclable polypropylene and are typically disposed of in general waste after single use or classified as clinical waste if visibly soiled or contaminated. Based on procurement data, usage decreased from 128,100 units in 2024 to 16,900 units in 2025, representing a reduction of approximately 111,200 shoe covers annually.

Given each shoe cover weighs approximately 6.01 grams, this corresponds to an annual reduction of approximately 670 kg of waste diverted from landfill.

This represents a direct reduction in non-recyclable plastic waste generation, rather than diversion to recycling, and contributes to decreased landfill burden and reduced downstream environmental impact.

Overall, the intervention demonstrates that removing unnecessary single-use items in perioperative settings can result in meaningful reductions in both general and clinical waste streams without compromising patient care.

Importantly, this represents a true reduction in waste generation rather than diversion, achieved through elimination of a non-essential consumable at a system level, with sustained reductions confirmed through procurement data over a 12 month period.

Clinical outcomes: How did your project improve patient care? (Include outcome data if available)

A scoping review conducted alongside this project demonstrated that disposable shoe covers provided no clear benefit in reducing infection risk, supporting their removal without compromising clinical outcomes for patients.



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From a patient safety perspective, discontinuing routine shoe cover use may reduce unintended risks such as slips and falls associated with poorly fitting covers, particularly during patient transfers and mobilisation. Streamlining perioperative processes by removing unnecessary steps also improves efficiency and patient flow, reducing delays and enhancing the overall patient experience.

Importantly, no increase in adverse clinical outcomes or infection-related concerns was reported during the pilot period. The project therefore supports the delivery of evidence-based care by reducing unnecessary interventions, while maintaining patient safety and aligning with best practice perioperative standards.

Financial sustainability: Have there been any financial savings? (please include your calculations)

The project resulted in substantial financial savings by reducing the procurement of disposable shoe covers.

Based on procurement data, expenditure decreased from \$13,566.17 in 2024 to \$2,076.01 in 2025 following implementation of the intervention. This represents an 85% reduction in expenditure on a non-essential consumable, equating to a direct cost saving of \$11,490.16 over a 12-month period.

This reduction corresponds to a decrease in utilisation from 128,100 units in 2024 to 16,900 units in 2025. Using these figures, the approximate unit cost of each shoe cover is $\$13,566.17 \div 128,100 \approx \0.11 per unit. Applying this to post-intervention usage aligns with observed expenditure ($\$0.11 \times 16,900 \approx \$1,859$), with minor variation attributable to procurement pricing differences.

In addition to direct procurement savings, there are likely downstream cost benefits from reduced waste disposal, particularly for clinical waste, which incurs higher processing costs, although these were not formally quantified. A rough estimate shows that 86% of waste-disposal costs were reduced. Amount cannot be shared due to contractual obligations.

Social sustainability: How did your project socially benefit patients, staff, or the wider community?

The project delivered social benefits for patients, staff, and the wider community by promoting a culture of evidence-based, environmentally responsible healthcare.

For patients, the removal of routine shoe cover use simplified perioperative processes and reduced unnecessary interventions, contributing to a more streamlined experience. It also reinforced that care provided was aligned with best available evidence, supporting patient trust and confidence in clinical decision-making.

For staff, the project improved workflow efficiency by eliminating a redundant step in theatre preparation and reducing reliance on single-use items. It also increased awareness of environmental sustainability within everyday clinical practice, empowering staff to engage in and advocate for sustainable change. The initiative fostered a sense of shared responsibility and multidisciplinary collaboration across clinical, infection control, and sustainability teams.

At a broader level, the project contributes to reducing the environmental footprint of healthcare, which has downstream benefits for community health. By decreasing plastic waste and associated emissions, the initiative aligns with public expectations of environmentally responsible healthcare.

systems and supports long-term population health. It also serves as a model for how small, evidence-based changes can collectively contribute to more sustainable health services.

Generalisability: Could this project be replicated in other areas of the hospital?

This project is highly generalisable and can be readily replicated across other areas of the hospital and other health services.

The intervention is simple, low-cost, and primarily involves system-level changes by removing unnecessary single-use items from point-of-care access and updating local practice guidelines. As disposable shoe covers are widely used across operating theatres in many institutions, the same approach can be implemented in other perioperative settings with minimal resource requirements.

The key components underpinning success were leadership support, alignment with Infection Prevention & Control standards and use of evidence to support practice change - all of which are transferable across different departments and organisations. Similar principles could also be applied to other low-value, single-use items in healthcare, extending the impact beyond shoe covers alone.

Importantly, the intervention does not rely on complex infrastructure or significant financial investment, making it scalable across both large tertiary centres and smaller health services. With appropriate stakeholder engagement and governance approval, this model could be adopted at a state or national level to support more sustainable, evidence-based perioperative practices.

Please attach some photos of you and your team undertaking this project

Overshoe Cover



Product Code	Description	QTY
OSNSLB	Large, Blue non-skid	Box 1000
OSNSLG	Large, Green non-skid	Box 1000
OSNSXLB	Ex-Large, Blue non-skid	Box 1000
OSNSXLG	Ex-Large, Green non-skid	Box 1000

- Non-skid
- Splash proof
- Made from Non-woven Polypropylene(PP)



1. Warda G. Anesthesia and operating room waste management. Academic Medicine & Surgery. 2024.
2. Soh QR, Moffroid H, Eaton E, Isles N, Marshall C, Gillespie BM, et al. Does the evidence support the use of operating room shoe covers to prevent surgical site infections? A scoping review. Antimicrobial Stewardship & Healthcare Epidemiology. 2026;6(1):e54.