

Chapter 14 Environmental sustainability and infection prevention and control

14.1 Background

Australia's health system is responsible for approximately 5.4% of nation's total carbon emissions, with public hospitals contributing around one-third of that footprint (Malik et al., 2018). Key sources of emissions include energy, waste, water, transport, procurement, and infrastructure. Within clinical care, emissions arise from pharmaceuticals (for example, medications, anaesthetic gases, metered dose inhalers), medical equipment, and their supply chains.(Malik et al., 2018).

The NSW Government's [Climate Change \(Net Zero Future\) Act 2023](#) legislates net zero greenhouse gas (GHG) emissions by 2050, including a 50 per cent reduction by 2030, and a 70 per cent reduction by 2035 (based on 2005 GHG emissions).

On 29 May 2025, NSW Health released its first [Net Zero Roadmap 2025–2030](#), outlining how the health system will reduce its environmental impact while continuing to deliver safe, high-quality care to the people of NSW. The roadmap is guided by four principles and sets out six strategic priorities. It identifies 18 key emission sources that account for approximately 80% of NSW Health's estimated carbon footprint. The roadmap is informed by the NSW Government's Climate Change (Net Zero Future) Act 2023 and the Net Zero Government Operations Policy (NSW Health, 2024 and 2025).

This chapter focuses on infection prevention and control in the context of sustainability. It provides targeted guidance for maintaining a safe and high-quality healthcare environment while supporting environmental goals. It does not cover all sustainability requirements; for broader legislative context, refer to [The Climate Change \(Net Zero Future\) Act 2023](#).

Infection prevention and control is a critical aspect of healthcare, with a profound impact on patient safety and the overall effectiveness of healthcare systems. A robust infection prevention and control program is integral in responding to current and emerging infectious disease challenges and to achieving a resilient, responsive, and sustainable health system (Saravanos et al., 2024). It is important to ensure sustainability efforts support infection prevention and control which is carefully considered. Ensuring sustainability is vital, but must not compromise provision of safe, quality care (Saravanos et al., 2024).

Infection prevention and control play a key role in delivering a sustainable healthcare system by generating specific policies and guidelines incorporating a holistic approach to safety and quality improvement. Infection prevention and control practitioners should be engaged early, as a collaborative partnership between Infection prevention and control practitioners, sustainability experts and clinicians. This collaboration supports NSW Health becoming a leading modern, high-quality, low- carbon and climate resilient health system by focusing on quality, value, innovation and equity.

14.2 Sustainable infection prevention and control program

Infection prevention and control programs play an important role in improving environmental sustainability in healthcare (Jain et al., 2025). Infection prevention and control practices should aim to reduce the spread of infections while also considering the longer-term impact of practices on the environment, which can be complicated ([ACSQHC 2024](#)).

Expanding the scope of a sustainable infection prevention and control program is essential to ensure it supports a resilient and responsive health system, particularly in the face of climate change. Infection prevention and control play a critical role not only in routine healthcare safety but also in disaster and emergency management responses to climate-related hazards such as floods,

bushfires, and heatwaves. These events can disrupt healthcare access, increase the risk of infectious disease outbreaks, and strain already burdened systems.

To build health system climate resilience, infection prevention and control programs must integrate strategies that address the health risks driven by climate change, including shifts in vector ecology leading to increased incidence of vector-borne and water-borne diseases. This includes strengthening surveillance systems, adapting protocols for extreme weather events, and ensuring continuity of infection prevention and control practices during infrastructure disruptions.

Embedding climate resilience into infection prevention and control also means aligning with broader safety and quality systems to reduce vulnerabilities and enhance preparedness. For example, sustainable infection prevention and control practices such as reducing reliance on single-use plastics and improving ventilation systems can contribute to both environmental sustainability and infection prevention and control effectiveness. For more information refer to the ACSQHC, 2025 [Healthcare Sustainability and Resilience Module](#).

Health Organisations can consider developing and integrating specific Key Performance Indicators (KPIs) or metrics such as waste reduction percentages, energy and water efficiency improvements, and training participation rates to measure and report performance. Embedding regular program audits and feedback loops will support continuous improvement and organisational learning.

Infection prevention and control teams should also establish clear links to procurement policy, ensuring that selected products and equipment reflect both lifecycle sustainability and infection prevention and control best practice.

Infection prevention and control measures, such as hand hygiene, cleaning and disinfection of the environment, shared patient care, and isolation strategies, significantly contribute to the reduction in healthcare associated infections (HAIs). These practices form the cornerstone for safeguarding patients and health workers in addition to playing a pivotal role in sustainability efforts, reducing the environmental impacts tied to HAIs (Haque et al., 2020).

A sustainable infection prevention and control program should consider (Lee et al., 2024, Morgan and Synnott, 2024) the following:

Leadership and culture

As part of any sustainability initiatives, Health Organisations must ensure engagement with infection prevention and control to promote a culture where sustainability is integrated with infection prevention and control, supporting an environment that maintains safe, high-quality care.

1. Infection prevention and control leadership should advocate for sustainable practices, integrating environmental considerations into policy and decision-making (Alruwaili et al., 2023).
2. Promote a culture of sustainability within infection prevention and control teams through targeted training and role modelling, ensuring infection prevention and control aligns with broader environmental goals.

Environmental impact and resource management

1. Low-emission procurement: Influence purchasing decisions to favour products and other supplies with lower carbon footprints. For example, reusable, biodegradable materials where practical and applicable.
2. Lifecycle analysis of products: Evaluate the environmental impact of items used in infection prevention and control, from production to disposal and promote alternatives with reduced emissions.
3. Resource-efficient procedures: Design infection prevention and control procedures that minimise unnecessary use of water, energy, and materials without compromising safety.

Waste management and environmental contamination

1. Sustainable waste segregation: Ensure infection prevention and control procedures support correct segregation of clinical, recyclable, and general waste to reduce contamination and improve recycling rates.
2. Microplastic and contaminant reduction: Collaborate with environmental health teams to monitor and mitigate the release of microplastics and other contaminants from waste.

A centralised and standardised education model, developed and endorsed by relevant health authorities, can help ensure consistency and credibility across healthcare settings. While sustainability leads can deliver education locally, teams often respond more effectively to guidance from trusted, system-level entities.

Patient care and disease containment

1. Eco-conscious zoning: Implement patient zoning strategies that optimise resource use. For example, reusable equipment, efficient room turnover.
2. Sustainable containment practices: Balance effective containment with environmental considerations, such as reducing single-use items where safe and feasible.

Education and training

A centralised and standardised education model, developed and endorsed by recognised health authorities, can help ensure consistency and credibility across healthcare settings particularly. While sustainability leads can deliver education locally, teams often respond more effectively to guidance from trusted, system-level entities.

1. Sustainability-focused education: Embed environmental stewardship into infection prevention and control training modules, highlighting the intersection of infection prevention and control and sustainability.
2. Virtual and hybrid learning: Reduce travel and resource use by promoting online and blended learning formats for infection prevention and control education.

14.3 Reducing the use of medical devices classified as single use

The healthcare sector faces a growing environmental burden from the widespread use of single-use devices (SUDs), which contribute significantly to waste generation, resource depletion, and carbon emissions. While SUDs have historically supported infection prevention and control by reducing cross-contamination risks, their environmental impact has prompted a shift toward more sustainable practices.

There is increasing recognition of the need to incorporate SUDs into a circular economy framework one that prioritises resource efficiency, waste reduction, and product lifecycle extension. However, infection prevention and control and the delivery of safe, high-quality care must remain paramount in any sustainability initiative.

Reusable medical devices are the first preference where clinically appropriate, supported by robust reprocessing advice, infrastructure, and resources to enable their safe and effective use. This approach ensures that sustainability does not compromise infection prevention and control standards.

To support sustainability and reduce reliance on SUDs, Health Organisations are encouraged to adopt clinically appropriate reusable items. Where effective cleaning and disinfection can be assured such as with reusable tourniquets, these items may be safely reused without compromising infection prevention and control standards. This approach aligns with both environmental goals and safe clinical practice.

To support safe reuse, infection prevention and control teams should provide targeted training and conduct regular audits, ensuring that cleaning protocols are followed and embedded into routine practice. These checks can be incorporated into existing audit tools and checklists. Additionally, some items currently packaged as single use may be available in alternative reusable formats through different suppliers or presentations, offering further opportunities to reduce waste.

This approach aligns with the broader goal of integrating circular economy principles into healthcare, as outlined in the [CEC's Applied Sustainability for Safety and Quality in Health Care](#) framework. It ensures that environmental sustainability is achieved without compromising the safety, quality, or regulatory compliance of patient care.

To guide decision-making, the following priority list outlines the preferred hierarchy for device use in clinical settings:

1. Reusable Devices – First preference, with appropriate reprocessing protocols and infrastructure.
2. Single-Use Devices (SUDs) – Used when reuse is not feasible or safe.
3. Remanufacturing by original equipment manufacturer (OEM) – Where validated processes exist.
4. Third-Party Reprocessing – Must follow strict listing principles and regulatory compliance.

Sustainability teams have a responsibility to support infection prevention and control professionals in evaluating and implementing environmentally responsible alternatives. Collaboration between infection prevention and control and sustainability teams is essential to ensure that environmental goals align with clinical standards and infection control requirements.

Reuseable medical devices (RMDs)

Reusable medical devices (RMDs) are devices that can be reprocessed and reused on multiple patients. Australian Standard (AS) 5369:2023 Reprocessing of reusable medical devices and other devices in health and non-health related facilities, stipulates the required standards for safe and effective reprocessing of RMDs and other devices to ensure patient and health worker safety.

The Spaulding Classification System provides a system to determine, based on intended use, the level of reprocessing necessary for shared patient equipment or RMDs. The RMDs and other shared patient care items were categorised according to the degree of risk for infection involved in use of the items:

- critical (items that enter sterile tissue or the vascular system) require sterilization
- semi-critical (items contact mucous membranes or nonintact skin) require sterilization or high-level disinfection
- noncritical (items are those that have contact with intact skin but not mucous membranes) require low-level disinfection.

The level of reprocessing is determined by the categorisation of these items. Medical device features vary considerably in design complexity, thus effective cleaning prior to disinfection or sterilization is important to reduce elicited toxicological risks to patients from residual organic matter on inappropriately reprocessed items. This classification is not intended for use for the reprocessing/remanufacturing of single use devices.

Single use devices

Single use devices are those devices that are intended for use as either single use once or single patient use and then discarded ([Therapeutic Goods Act 1989](#)). They are governed by policy, legislation and regulations such as the [Australian Guidelines for the Prevention and Control of Infection in Healthcare 2019](#), NSW Health Policy Directive [Infection prevention and control in Healthcare Settings](#), the Therapeutic Goods (Medical Devices) Regulations 2002 (Commonwealth)

Section 41BG (2) of the [Therapeutic Goods Act 1989](#) (Commonwealth) and Health Practitioner Regulations.

Remanufacturing process

Remanufacturing is a comprehensive and rigorous industrial process that involves rebuilding a product back to its original manufactured form with parts that are new, repaired or re-used (Teixeira et al., 2022).

Manufacturer's responsibility for reusable devices

For medical devices intended, by the manufacturer, to be reused according to the essential requirements, the manufacturer must provide information on the appropriate process to allow reuse including cleaning, disinfection, packaging and, where appropriate, the method of sterilization to be used, and any restriction on the number of reuses ([Spaulding Classification System](#)). The decision to market a reusable or a single-use medical device is the responsibility of the product manufacturer.

Policies and standards

Infection prevention and control policy and standards do not recommend reprocessing of single use or single patient use devices. TGA requires a device to be used as intended and to perform as intended and where labelled as single use, the device is required to be used once and then disposed of ([Therapeutic Goods Act 1989](#)). The TGA enforces strict compliance with the Essential Principles under the Therapeutic Goods Act 1989. According to the [Australian Regulatory Guidelines for Medical Devices \(ARGMD\)](#):

- Devices must be used as intended by the manufacturer and perform as intended.
- If a device is labelled as single use, it must be used once and then discarded.
- Reprocessing of single-use devices is not permitted unless the device has been re-manufactured and approved under ARTG.

The Australian Commission on Safety and Quality in Health Care reinforces that:

- Reprocessing must follow AS 5369:2023 standards and manufacturer's guidelines.
- Single-use items must not be reprocessed under any circumstances.

The Health Practitioner Regulation (New South Wales) Regulation 2025 includes provisions under Part 2-Infection Control Standards, which outline mandatory compliance for health practitioners with infection control standards set out in Schedule 2. Under Part 3, Schedule 2, includes a clear directive regarding single-use equipment:

"Equipment designed for single use must be discarded after use."

This statement reinforces the legal and clinical requirement that single-use medical devices (SUDs) are not to be reused under any circumstances. It aligns with infection prevention and control standards and supports safe, high-quality care by preventing cross-contamination and maintaining device integrity. View the full regulation here: [NSW Legislation – Health Practitioner Regulation 2025](#).

Risks to patients

Patients may be at risk from the presence of biological or chemical residues from the reprocessed single use item, changes in the physical characteristics of reprocessed item and risk to vulnerable patient population such as immunocompromised or prematurely born infants (Mansur, 2017). There is a scarcity of data and on the safety and efficacy of reprocessed single use items. There is also a lack of information on the risk-benefit analysis on the practice of reprocessing single use items and there is a need for high quality studies evaluating patient outcomes following the use of reprocessed single use items regardless of their classification or categories (Kaulback and Horton, 2024).

Additional concerns for consideration include patient safety, patient informed consent, equivalent manufacturing standards for both the original manufacturer and the reprocessing company, and the potential ethical issues of 'single use' device re-use. Reprocessed single-use medical devices could lead to an increase in cross infection from patient-patient ([European Union 2020](#)).

Validation and quality control

Validation and quality control check to ensure safety and performance as intended by the manufacturer is the responsibility of the end user. Health Organisations are responsible for ensuring the conformity assessment procedure is in place ([Therapeutic Goods Act 1989](#)).

Health Organisations are responsible for ensuring patients and health workers know when a reprocessed single-use device is being used (Grantcharov et al., 2019) and are informed of any potential risks. Health Organisations must regularly update incident detection systems and support open disclosure if harm is caused by a failure or malfunction of a medical device ([Australian Open Disclosure Framework - Better communication, a better way to care](#), 2013).

Remanufacturing and reprocessing concerns

Remanufacturing is a comprehensive and rigorous industrial process that involves rebuilding a product back to its original manufactured form with parts that are new, repaired or re-used ((Teixeira et al., 2022). According to device classification, additional decontamination is also required for this process. The terms reprocessing and remanufacture are often used interchangeably with very different meanings and actions. The proposal to remanufacture/reprocess single use devices has raised a number of concerns in relation to patient safety and carries potential significant risk to the patient.

Potential risks of reprocessing single use devices

Reprocessing single-use medical devices (SUDs) involves cleaning, sterilising, and reusing devices intended for one-time use. While this practice can reduce costs and waste, it carries several potential risks (Mansur, 2017), [Therapeutic Goods Act 1989](#)) including:

- Design limitations for cleaning
 - Many single-use devices are not designed to allow thorough cleaning, making it difficult to completely remove contaminants
- Alteration of device characteristics
 - Reprocessing may alter physical or functional properties, compromising device performance and safety
- Lack of validation for reuse
 - Single-use devices typically do not undergo validation or extensive testing for repeated use, so safety and efficacy after reprocessing are uncertain
- Risk of cross-infection due to design
 - Certain designs (for example, fine bore tubes or complex lumens) can harbor microbes and are difficult to disinfect, increasing the risk of cross-contamination
- Absorption and leaching of cleaning agents
 - Some materials absorb disinfectants or cleaning chemicals, which can later leach out, potentially causing toxicity or adverse reactions
- Chemical corrosion and material changes
 - Cleaning agents or sterilant may chemically react with device materials, causing corrosion, degradation, or other material changes
- Mechanical stress and device failure
 - Device materials may experience stress during cleaning and reuse cycles, leading to stretching, cracking, breakage, or outright failure during use
- Residual endotoxins

- Inadequately cleaned devices may carry bacterial endotoxins that remain even after sterilization, potentially causing inflammatory or toxic reactions in patients.

Decision to reprocess single-use devices

The decision to reprocess and reuse single-use or single patient use devices is complex, with minimal evidence to provide clear direction. Quality of recycled products that are classified as single use only by the product manufacturer cannot be guaranteed. This is further complicated where the remanufacturer is not the original device manufacturer. The legal and ethical implications for the organisation and the end user must be considered. Sustainability strategies claiming to remanufacture single-use devices raise infection prevention and control concerns that requires greater understanding before deemed appropriate for both infection prevention and control and sustainability.

Quality check and risk assessment

An approved quality check by the government agencies such as Therapeutic Goods Administration (TGA), NSW HealthShare, consultation with relevant experts and infection prevention and control is needed to ensure the care provision will not be impacted. The Health Organisations are to conduct a risk assessment as part of any decision making to reprocess single-use medical device (Lee et al., 2024) (Appendix 14A – infection prevention and control risk assessment for reprocessing single-use devices). This risk assessment should be conducted alongside all relevant legislation and policy requirements.

14.4 Environmental cleaning – application of novel technologies to support sustainability

Like single-use medical devices, environmental cleaning consumes vast quantities of plastics, increases waste generation, and disperses chemicals into water ways, thus increasing cost to organisations and the environment. Although reducing consumption of chemical agents may seem easy, this may negatively impact on the contamination levels of healthcare environments. Health Organisations introducing new or emerging technologies as part of environmental sustainability initiatives are to follow Appendix 14B Risk assessment checklist for emerging environmental cleaning technology (Jain et al., 2025) to guide their decision making.

Refer to [NSW Health policy Directive on Cleaning of the Healthcare Environment](#) and [Guideline on New Health Technologies and Specialised Services for further information](#).

14.5 Supporting infection prevention and control building a culture of sustainability

The ACSQHC has developed the [Healthcare Sustainability and Resilience Module](#) as a strategic framework to help Health Organisations integrate environmental sustainability and climate resilience into their safety and quality systems. This module supports health services in addressing both the health impacts of climate change and the environmental footprint of healthcare delivery, aligning with existing standards such as the NSQHS Standards.

To align with this module and future accreditation expectations, health workers can play a vital role in mitigation efforts. For example, safely disposing of unused, unwanted, or expired medications helps reduce pharmaceutical pollution, which can harm aquatic ecosystems and contribute to antimicrobial resistance ([ACSQHC Medication Safety Standard](#)).

By embedding these practices into routine infection prevention and control operations, Health Organisations can contribute to climate-resilient care while maintaining high standards of safety and quality ([ACSQHC Environmentally Sustainable Healthcare](#)). This positions infection prevention and control teams as key enablers of sustainable healthcare transformation.

The [Environmental Sustainability in Quality Improvement](#) initiative by the CEC supports NSW Health staff in integrating environmental considerations into safety and quality improvement (QI) projects. Aligned with the CEC Strategic Plan 2024–2027, the program provides practical resources and guidance to help healthcare professionals design, implement, and evaluate QI initiatives that reduce environmental impact. It encourages staff to consider sustainability throughout the project lifecycle from planning and implementation to measurement and reporting, while maintaining high standards of care. The initiative promotes a systems-thinking approach to healthcare improvement that balances environmental, social, and financial outcomes.

For more information refer to CEC [Environmental Sustainability in Quality Improvement resources](#).

Infection prevention and control professionals can integrate a range of strategies into their practices and programs to help reduce the carbon footprint and promote environmental sustainability. (Lee et al., 2024).

Reducing use of single use items

The Health Organisations are to implement strategies to enable an effective and sustainable approach to healthcare provision by (Davies et al., 2024):

- engaging local infection prevention and control and sterilization department
- source reusable medical devices where practical and available
- circularity, environmental impact and life cycle assessment to evaluate relevance of medical devices materials and reusability
- product procurement decision should include environmental sustainability
- educate health workers on the advantages and disadvantages of reusable versus single use items
- consider resource requirements for reprocessing reusable medical devices.

A centralised approval process for reusables, supported by evidence-based evaluation, would help standardise practice and remove barriers to adoption.

Circulatory and life cycle considerations and infection prevention and control

The application of circular economy principles in healthcare, particularly in clinical and patient care settings, must be carefully aligned with existing regulations, policies, and clinical guidelines to ensure that care remains safe and of high quality.

Circular systems such as reuse, repair, refurbishment, and recycling aim to extend the life of products and reduce waste, pollution, and carbon emissions. In healthcare, this approach can be integrated into both non-clinical and clinical domains, but clinical applications require a more nuanced, hierarchical approach to avoid compromising infection prevention, patient safety, or therapeutic outcomes.

The CEC's [Applied Sustainability for Safety and Quality in Health Care](#) initiative supports this integration by promoting sustainable practices that align with safety and quality goals. For example, infection prevention strategies can shift from resource-intensive practices to more sustainable ones, such as prioritising hand hygiene over glove use, thereby achieving both environmental and clinical benefits.

Building on the importance of aligning circular economy principles with clinical safety and quality, Health Organisations must also assess the risks associated with circularity, particularly when it involves the reuse or recycling of clinical materials. This includes evaluating the life cycle parameters of products and ensuring that any circular initiatives such as companies offering to collect and recycle used single-use devices are subject to rigorous consultation with infection prevention and control, clinical governance, and procurement experts.

The CEC's Applied Sustainability for Safety and Quality in Health Care framework reinforces that sustainability efforts must not compromise patient safety or regulatory compliance. Instead, they should be integrated through structured, evidence-informed approaches that uphold the integrity of care while reducing environmental impact.

Health Organisations are to consider the risk associated with circularity and life cycle parameters and subject matter consultation must be sought for agreements where companies promising capacity to recycle and pick up used single-use devices as waste. The Health Organisation are to ensure that (Mansur, 2017, Davies et al., 2024, Alruwaili et al., 2023):

- the agreement should specify sustainable destruction or recycling methods to be used in connection with collections made
- related sustainability impacts are to be brought into the discussion (collection, shipping, remanufacture, disposal, and recycling processes)
- Health Organisations comply with disposal of clinical items (given the potential risks associated), which includes how they may be used or misused
- Health Organisations are to consider legal implications such as liability for selling or gifting a manufacturer's used, single-use product, to another organisation for their resale in the market and use outside of the advised parameters. This may also be perceived poorly with health impacting or subverting manufacturer sales where resale potential exists due to 'remanufacture'
- health workers are to be educated on the risks, benefits, legal obligations and work health and safety requirements.

Waste storage and equipment considerations in circularity projects

When planning the waste volume and bin location the anticipated volume of waste, including the need for additional bins, must be incorporated into the initial planning phase of circularity or sustainability projects. This ensures alignment with the NSW Health Waste Management Plan (WMP) requirements.

Existing infrastructure and bin placement

Health facilities already utilise a significant number of bins for various waste streams. Any increase in bin numbers must be assessed for:

Space availability

- Safe placement, particularly avoiding high-traffic or hazard-prone areas
- Work Health and Safety (WHS) risks, in accordance with PD2020_049.

Placement of bins must not obstruct emergency exits, corridors, or clinical pathways. Risk assessments should be conducted to mitigate trip hazards, contamination risks, and ensure compliance with WHS protocols.

Storage of exposed clinical equipment

If clinical equipment is stored for extended periods, especially in exposed conditions, accreditation standards and infection prevention and control protocols must be strictly followed. This includes:

- Ensuring equipment is stored in designated clean areas
- Avoiding prolonged exposure that may compromise integrity or safety
- Accreditation and compliance.

All waste and equipment storage practices must meet the minimum standards outlined in NSW Health directives. This includes:

- Licensing and segregation of waste streams

- Documentation and auditing
- Alignment with environmental and infection control legislation.

Standard precautions

Infection prevention and control measures incorporating appropriate hand hygiene and sustainable glove use by developing a [checklist for glove use](#), such as when to wear gloves, when to change them and when to perform hand hygiene. Refer to Chapter 5 Standard precautions for more information.

Transmission based precautions

Implementation of a risk assessment approach at facility level on:

- how to employ contact precautions, and other transmission-based precautions
- gloves off projects that promotes a risk assessment for glove use rather than universal use
- education to promote hand hygiene instead of glove use where appropriate to reduce glove usage which reduces glove volume to landfill
- promote a culture of risk assessed PPE use, rather than waste generating practices such as universal gown or apron use for contact precautions
- optimising waste management by reducing clinical waste, which results in high environmental footprint by autoclave or incineration.

Refer to Chapter 6 Transmission based precautions for more information.

Antimicrobial stewardship

Robust infection prevention and control strategies to ensure appropriate antimicrobial prescription, duration of treatment and waste reduction.

Safe medication disposal

Local process and procedures on safe disposal of unwanted or unused medications to prevent them from being disposed into bins, then into landfill and contamination of water or waste systems.

Diagnostic stewardship

Infection prevention and control strategies promoting diagnostic algorithms to avoid unnecessary microbiological testing, resultant misdiagnosis, wasted testing consumables, unnecessary PPE use, and antimicrobial use.

Increasing water efficiency

Water is essential for care provision. Water is used for heating, cooling, waste management, laundry services, reprocessing of reusable medical devices and equipment maintenance. To minimize unnecessary water waste, healthcare design should include the placement of handwashing sinks and the installation of water-saving devices in showers and ward appliances. Collaborate closely with engineering departments to establish water-efficient benchmarks, measure water consumption based on patient bed days, and ensure regular maintenance of patient care equipment and appliances.

Healthcare infrastructure

Promote healthcare infrastructure towards more environmentally sustainable, but still patient-centred, practices such as energy efficient heating, ventilation, air conditioning (HVAC) and air filtration practices (Silva et al., 2024).

Any move towards an environmentally sustainable approach should be taken with caution along with an understanding of the complexities and risks to patient and health worker safety and healthcare associated infection. The unique challenges in health where additional requirements

must be considered relate to the risk of contamination, potential transmission of infections and onward risk to patients, health worker and the wider community not experienced in the same manner in other industries (Silva et al., 2024, Lee et al., 2024).

New strategies to reduce carbon emissions will continue to develop and will always be required; however, their introduction and adoption should always be part of a managed process in which evidence plays a significant role. Local infection prevention and control professionals must be consulted from early discussions to ensure a balanced approach to environmental sustainability and safe care provision to healthcare.

Infection prevention and control risk assessment

Health organisations must conduct a comprehensive risk assessment before making any decision to reprocess single-use medical devices. This process must be undertaken in consultation with infection prevention and control and other relevant stakeholders, including clinical governance, procurement, biomedical engineering, and legal teams.

Where no formal LHD or local-level assessment exists, organisations may seek support from procurement teams, suppliers, reprocessing facilities, and the Therapeutic Goods Administration (TGA) (if applicable) to inform their decision-making. Any such checklist or risk assessment tool should, at a minimum, include:

- Device classification and intended use
- Manufacturer's instructions for reprocessing (if available)
- Evidence of validated cleaning, disinfection, or sterilization processes
- Assessment of residual risk to patients and staff
- Infrastructure and resources available for safe reprocessing
- Training and competency of staff involved
- Monitoring and audit mechanisms
- Regulatory compliance and TGA approval (if remanufactured).

This risk-based approach ensures that sustainability initiatives involving SUDs do not compromise patient safety, infection control standards, or regulatory obligations. Refer to Appendix 14A infection prevention and control risk assessment for reprocessing single use devices (sample) for more information.

Appendix 14A infection prevention and control risk assessment for reprocessing single use devices

The Health Organisations are to conduct a risk assessment as part of any decision making to reprocess single-use medical device in consultation with infection prevention and control, any other relevant stakeholders including procurement, supplier, reprocessing facility, TGA (if applicable).

No	Risk assessment	Yes	No	Unsure
1	The effects of cleaning, disinfecting, and sterilization on the function of the device have been assessed and meet requirements?	☐	☐	☐
2	Does reprocessing of the single-use device change the design specifications of the device?	☐	☐	☐
3	Can the reprocessing organisation confirm that reprocessing has not changed the device's functionality or performance?	☐	☐	☐
4	Can the reprocessing organisation provide information on how the medical device is reprocessed and provide microbiological testing assurance?	☐	☐	☐
5	If an issue is identified with a reprocessed device, is there a way to trace that device to the patient on whom it was used?	☐	☐	☐
6	Has the reprocessing facility been inspected by an authorised governmental agency?	☐	☐	☐
7	Which government authority has approved the reprocessing facility to reprocess single-use devices? Can documentation of this approval be provided? Which aspects of the reprocessing process have been validated?	☐	☐	☐
		☐ Cleaning ☐ Disinfection ☐ Sterilization		
8	Does the reprocessing facility have limits on how many times items can be reprocessed?	☐	☐	☐
9	How are those limits determined? What process is in place to make sure those limits are not exceeded?			

"No or Unsure" response needs to have mitigation strategies and local escalation processes.

Health organisations are required to undertake a risk assessment when considering the adoption of emerging environmental cleaning technologies. This process must be conducted in consultation with Infection Prevention and Control and other relevant stakeholders, including procurement teams, suppliers, clinical engineering, and regulatory bodies such as the TGA (if applicable).

In the absence of a formalised LHD or local-level evaluation, Health Organisations may draw on supplier documentation, regulatory approvals, and independent validation data to support their assessments. At a minimum, the risk assessment checklist should include:

- Technology description and intended application
- Evidence of efficacy. For example, against relevant pathogens
- Compatibility with existing cleaning protocols and materials
- Impact on patient and staff safety
- Training and competency requirements
- Infrastructure and maintenance needs
- Regulatory status and approvals
- Monitoring, audit, and reporting mechanisms

This structured approach ensures that innovation in environmental cleaning supports both sustainability goals and infection prevention standards, without compromising safety or compliance. Refer to Appendix 14B Risk assessment checklist for emerging environmental cleaning technology (sample) for more information.

Appendix 14B Risk assessment checklist for emerging environmental cleaning technology

The Health Organisations are to conduct a risk assessment as part of any decision making to reprocess single-use medical device in consultation with infection prevention and control, any other relevant stakeholders including procurement, supplier, reprocessing facility, TGA (if applicable).

No.	Item	Yes	No	Unsure
1	Is there sufficient evidence from well-designed studies that the approach or change is not inferior to the existing cleaning method/s?	☐	☐	☐
2	Have any potential unintended consequences of the approach or change been considered and evaluated? - Are there any storage requirements for products that may have shorter shelf-life? - Are there any waste disposal implications? - Is there a risk of resistance developing? - Is there a risk of skin or other allergic reactions in staff? - Will any changes in personal protective equipment be required? - Will overall costs rise, including is the system requiring more of staff's time? - Is the required contact time for efficacy achievable in normal use? - Are there any material compatibility issues? - Do manufacturers of products approve the use of the product on materials used in healthcare? - Are there any potential reactions with other chemicals? - Does the product meet all regulatory requirements?	☐ 	☐ 	☐
3	Is additional infection prevention and control education or training required for individuals who will be using this product?	☐	☐	☐
4	Have human behavioural considerations been considered? - Will this change increase or complicate workflow? - Will this change increase or complicate compliance?	☐ 	☐ 	☐
The below questions should be aimed at the industry. Additional information can also be gained from sustainability leads/program or as part of procurement process.				
5	Has the carbon cost of the product been considered?	☐	☐	☐
6	Has a Life Cycle Assessment (LCA) of the product been undertaken?	☐	☐	☐
7	Has the LCA been independently verified?	☐	☐	☐

8	Are additional actions required to reduce the carbon emissions and associated waste from the product?	☐	☐	☐
10	Does it include a net zero target?	☐	☐	☐
	What is the target? Comment:			
	What demonstrable actions are underway to meet your target? Comment:			

Source: [Jain S et al 2024](#) “No or Unsure” response needs to have mitigation strategies and local escalation processes.