

Chapter 4 Risk Management

4.1 Introduction

Risk management in healthcare is a complex set of clinical and administrative systems, processes, procedures, and reporting structures designed to detect, monitor, assess, mitigate, and prevent risks to patients (McGowan et al., 2023), visitors and health workers. Health Organisations are responsible for the evaluation of, managing and minimising risks in the healthcare environment (McGowan et al., 2023). Furthermore, Health Organisations are to take a proactive risk management approach by identifying the types of risk exposure within an organisation, measuring those potential risks, and proposing means to mitigate or exploit them. For more information refer to NSW Health policy directive on [Enterprise-wide Risk Management](#) (NSW Health, PD2022_023).

4.2 Health worker education

Healthcare organisations need to have an established and on-going risk management plan in place with detailed employee training requirements including new employee orientation, ongoing and in-service training, annual review of risk management plan, competency validation, and event-specific training.

4.2.1 Mandatory education

Completion of mandatory training helps maintain a safe and healthy work environment and must be undertaken by all NSW Health workers to meet the criteria specified in NSW Health policy directive [Infection prevention and control in Healthcare Settings](#) (NSW Health, PD 2023_025) and the [Australian Commission on Safety and Quality in Healthcare Preventing and Controlling Infections Standard](#) (Australian Commission on Safety and Quality in Health Care, 2021b).

Infection prevention and control training of health workers is the core foundation of an effective infection prevention and control program. The Health Organisation is responsible for ensuring health workers complete this training. In addition, health workers are to undergo onsite practical training and competency assessments, where relevant, on the following: hand hygiene, aseptic technique, sharps use and disposal, waste management, donning, and doffing of personal protective equipment (PPE) including respiratory protective devices, cleaning of shared patient equipment and cleaning of the healthcare environment.

There are a number of mandatory, core infection prevention and control training modules for clinical staff as well as additional modules based on roles and responsibilities within the organisation. Refer to the below list of course names and codes from Health Education and Training (HETI) [My Health Learning](#).

Table 9 Examples of mandatory training course names and codes

Course name	Course code
Donning and fit checking of P2 or N95 respirators in NSW healthcare settings	319438161
Hand hygiene for clinical healthcare workers	526958944
Hand Hygiene for non-clinical Healthcare workers	526960138
Aseptic technique	40027445
Environmental cleaning	45738936

Further training may be directed by a Chief Executive (CE) in response to specific local training requirements and is deemed “CE Directive Training” rather than mandatory training.

4.2.2 Local education and training

Each Health Organisations should recognise that additional local education and training may need to be delivered to address specified local infection prevention and control issues. Such issues may be identified through an education gap analysis. Information for the gap analyses may be determined from:

- new or revised local procedures
- debrief recommendations made following an outbreak
- outcome from surveillance trends
- auditing results
- accreditation recommendations or requirements
- mandatory training requirements
- clinical competency/assessments required for the local facility.

The delivery of local education, training and competency/assessments can take many forms. Consideration of the content being delivered, and the knowledge levels of the target audience should influence what modes are applied with adult learning principles.

Informal education should be considered as an essential part of the continuing development of all health workers. If practical, and without compromising patient dignity or safety, opportunities at the bedside are useful in providing informal one-on-one or small group infection prevention and control education to health workers.

4.3 Consumer education

A healthcare consumer is an individual who uses or is a potential user of health services and includes the family, participants in care, patient's carers, clients, or residents. Health Organisations are to develop a process consistent with the Australian Commission on Safety and Quality in Healthcare [Partnering with Consumers Standard](#) when assessing risks and implementing infection prevention and control practices.

Consumer education, including for visitors, is an effective way to raise awareness about infection prevention and control and to reduce the spread of microorganisms in healthcare facilities and in the community. At a minimum patients, visitors and carers must be educated on appropriate hand hygiene and respiratory etiquette, and where required, donning, and doffing of PPE.

Health Organisations should continually provide education to consumers:

1. All patients should receive basic education on hand hygiene and cough etiquette.
2. Patients should receive additional education based on their needs – for example, when to perform hand hygiene, vaccination programs, wound management, caring for indwelling devices, isolation requirements and transmission-based precautions.

The time, content, and context on the provision of infection prevention and control information varies from person to person and not every patient/consumer will require specific infection prevention and control education. In general, individualised education should be provided to a consumer:

- when an infection risk is identified and continued until the risk has subsided. For example, chemotherapy, organ, or tissue transplant
- with a suspected or confirmed infectious disease
- when undergoing surgery

- who has an identified medical condition or immune disorder that increases their risk of acquiring an infection or multi-drug resistant organism (MRO), for example, diabetes, hypogammaglobinemia
- who has permanent indwelling devices such as a tracheostomy, supra-public catheter, intravascular device
- who has been recently hospitalised overseas in countries with known [high prevalence of MROs](#) or emerging novel infections
- under transmission-based precautions.

Consumers should also be provided with education at the time of discharge if ongoing infection prevention and control measures are required. In community health settings, infection prevention and control education should be provided when an infection risk is identified and then continually reviewed as part of the patient's, client's or resident's care plan until the risk has abated.

When providing infection prevention and control education to consumers, treating clinicians should provide tailored answers to the following questions:

- Why am I at risk?
- What is the level of risk that I have?
- Am I contagious?
- What symptoms will I experience if I get an infection?
- How does my condition affect me, my family, and my visitors?
- What can I expect is going to happen to me?
- What can I expect from the health workers who are looking after me?
- What are my treatment options?
- What are the risks and benefits associated with the different treatment options?
- Are there any alternatives or other options that I should consider?
- What do I need to do if have signs or symptoms of an infection?
- When and how do I take my medication?
- How can I protect myself, my family, and my friends?
- What do my family and visitors need to do to protect me and themselves?
- What should I do if I am concerned about the transmission and infection risks around me?
- How can I protect myself in my room?
- How can I protect myself and others if I leave the room?
- Who can I contact if I have any further questions or need to check something?

Health workers should first provide verbal education to the consumer and then, if appropriate, provide the consumer with written information that has been approved by the Health Organisation. Any written material should be provided to consumers as reference material rather than as a primary source of education. Written material should always be explained and discussed with the consumer. Any education and/or information provided to the consumer is to be documented in the health record.

Every health worker has a responsibility to provide infection prevention and control education to consumers in their care, their family, participants in care, carer, and visitors. Infection prevention and control education should be based on the scope and context of the consumer/health worker relationship, as illustrated by the following examples:

- A physiotherapist may educate a consumer on why their wound must heal before the patient can use the hydrotherapy pool
- A nurse may educate a carer on how to help a patient take a shower prior to surgery
- A diabetes educator may educate the spouse of a diabetic patient on how to check the patient's feet for signs of a skin breakdown or infection
- An infection prevention and control professional may educate a visitor with a persistent cough not to visit a relative in neonatal intensive care unit (NICU)
- An infectious diseases physician may educate a consumer regarding their new diagnosis of Carbapenemase-producing *Enterobacterales* (CPE) when discussing their treatment options
- A nurse may educate their consumer with an MRO on performing hand hygiene before leaving the room to go to medical imaging.

There may be times when infection prevention and control education may include discussing sensitive information (for example, sexual history, disease status, pregnancy). When providing education to a consumer or their family, participants in care, carer and visitors, clinicians should be aware of the physical environment and seek permission from the consumer to disclose any sensitive information to family, carers or visitors.

Health literacy is the skills, knowledge, motivation, and capacity of a person to access, understand, appraise and apply information to make effective decisions about health and healthcare and take appropriate action.

The health literacy of one person may vary to the health literacy of the next person and is usually very different to that of a health worker. Therefore, clinicians should be mindful to use simple and clear language and avoid using medical jargon, such as medical abbreviations, terms, and phrases when providing information and education to consumers.

There needs to be a clear process for the provision of education and information in languages other than English. This can be done by engaging in the services of a language interpreter or information sheets written in the consumers' preferred language. Consider aboriginal health needs including aboriginal health teams where available.

Many support groups provide information on specific conditions, diseases, surgical procedures, and treatments. These should be explored as an option when providing education and where local information sheets are not available.

Health Organisations need to ensure that the consumer infection prevention and control information is both accessible and understandable. The development of education and information sheets, pamphlets, videos for mass distribution and consumption should include consideration of the most effective modes and mediums, for example, verbal, written, face to face, paper or online. The language of the information materials should be tested by a broad range of consumer advisors to ensure they are suitable for the target consumer group. Clinicians also should seek consumer advice on whether to use signs and symbols, diagrams, images, colours, and other visual tools to simplify and reinforce meaning.

Checking whether a consumer understands the infection prevention and control information provided is just as important as providing the information itself. One way to test if a consumer has clearly understood the information provided is to use the '[teach back](#)' method. A follow up

conversation a few days later is also a good way to reinforce education and check that information is clearly remembered and understood.

4.3.1 Education on acute respiratory infection prevention and control practices

To prevent transmission of [respiratory infections](#) Health Organisations should implement infection prevention and control measures including provision of education to consumers, carers, and visitors. Provide instructions when scheduling appointments and display visual alerts at the entrances to the Health Organisations reminding consumers and people who accompany them (for example, family, friends, visitors) to:

- Inform health workers about the symptoms of any respiratory infection when they attend a Health Organisation.
- Defer non-urgent routine visits if symptoms of respiratory infection and consider alternative mechanisms (for example, video-call applications on cell phones or tablets) until they have recovered.
- Wear a surgical mask while in the facility if they have symptoms of respiratory infection (for example, cough) or have recently been in close contact with someone with [SARS-CoV-2](#) infection.
- Clean their hands after having contact with respiratory secretions (respiratory hygiene and cough etiquette).

Instructions and alerts should be provided in appropriate languages and with consideration for individuals with learning disabilities or visual impairment.

Practice respiratory hygiene and cough etiquette

Health Organisations are to:

- Ensure the availability of materials for adhering to respiratory hygiene and cough etiquette at facility entrances, triage areas, and waiting areas for consumers and visitors
- Provide face masks for people with symptoms of respiratory infection (for example, cough) or who have recently had close contact with someone with SARS-CoV-2 infection and advise those older than 12 years of age to wear it while they are in the facility unless there are medical contraindications
- Facilitate hand hygiene, provide conveniently located dispensers of alcohol-based hand sanitiser; where sinks are available, ensure that supplies for hand washing (such as soap, disposable towels) are consistently available
- Provide tissues and no-touch receptacles for used tissue disposal.

4.4 Evaluating the delivery of information to consumers

As part of a Health Organisation's commitment to quality and consumer focused care, all infection prevention and control consumer information should be evaluated to ensure that the information provided is clear, relevant, easily understood and meets the needs of the healthcare consumer. Examples of methods on how to evaluate information include:

- Review of information by Health Organisation consumer advisory groups.
- Consumer surveys or focus groups.
- Testing on a small number of consumers.

Additional information and resources on the development and evaluation of information for healthcare consumers is available from:

- [Clinical Excellence Commission - Person centred care](#)
- [Health Consumers NSW](#).

4.5 Communication between providers

Processes must be placed to ensure that a patient's precaution status (for example, infectious diseases, behavioural risks, or other clinical risks) is clearly and consistently communicated whenever responsibility for their care is transferred between healthcare providers or organisations. This includes communication with:

- receiving healthcare facilities or services
- health-related transport providers, such as NSW Ambulance or Patient Transport Services (PTS).

This communication is essential to maintaining continuity of care, ensuring patient and health worker safety, and supporting appropriate clinical and infection prevention and control practices.

4.6 Risk management in specific healthcare settings

Risk management in Health Organisations, including specialty settings, improves the quality and safe delivery of healthcare by introducing systems that identify and prevent circumstances that put consumers and health workers at risk of harm. All Health Organisations are required to implement locally based risk management systems, or to enhance their existing process in line with NSW Health policy directive on [Enterprise-wide Risk Management](#) (NSW Health, PD2022_023).

4.6.1 Oral health settings

Health Organisations providing oral health services are to comply with state and national policies and standards in accordance with the [Dental Board of Australia](#), [National Safety and Quality Health Service \(NSQHS\) Standards](#) and NSW Health Policy Directive- [Infection prevention and control in healthcare settings](#).

Oral health settings are to ensure that infection prevention and control practices and strategies outlined in the [Australian Guidelines for the Prevention and Control of Infection in Healthcare](#) and NSW Health Policy Directive- [Infection prevention and control in healthcare settings](#) are to be implemented to reduce or eliminate the risk of transmitting microorganisms such as bacteria, viruses, and fungi between patients/clients, from staff to patients/clients, and from patients/clients to practitioners or other staff members.

For more information refer to [Australian Dental Association Guidelines for Infection prevention and control](#).

4.6.2 Community settings

In the community setting, care may be provided in a clinical environment like community health or in a non-clinical environment like a private home, residential aged care facility, group home or community hall.

To determine whether the environment is likely to promote the establishment or spread of infection, the following risk factors need to be considered:

- **Procedures:** Performing an invasive procedure that breaches the skin and exposes normally sterile body substances and tissue may increase susceptibility to infection.
- **Cleanliness:** Cluttered, unkempt, or unhygienic environments are more likely to be a stimulus for development of reservoirs for organisms and a build-up of bioburden. This increases the risk of microorganism transmission and possible infection.
- **Equipment and stock:**
 - Single-use equipment including sharps must be used once only. Where an incomplete portion or sets are used, remaining parts should be disposed of according to current waste management procedures.
 - Single-patient-use devices and equipment can be used multiple times on the same patient following manufacturer's instructions for cleaning between uses.
 - Reusing single-use or contaminated sterile equipment and stock increases the risk of infection.
 - Sterile products or equipment are to be stored in a manner to maintain their sterility.
 - Event related sterility applies to all sterile stock ([event related shelf-life practice](#)) means the product should remain sterile until an event causes the item to become contaminated. For example, tears in packaging, packaging becomes wet, seal is broken. Event-related factors that contribute to the contamination of a product include bioburden (such as, the amount of contamination in the environment), air movement, traffic, location, humidity, insects, vermin, flooding, storage area space, open/closed shelving, temperature, and the properties of the wrap material).
 - During transport and storage, sterile stock should be stored in an environment that maintains the integrity of sterile stock.
 - When storing sterile stock there should be a process for stock rotation to ensure the oldest manufactured date is at the front/top so that it is used first.
 - Do not over stock. Keep storage containers clean, dry and in good condition.
- **Reprocessing of reusable clinical and non-clinical equipment:** Failure to clean and/or reprocess reusable medical devices prior to use on a patient and after use will increase the risk of subsequent microorganism transmission.
- **Waste management:** Inappropriate clinical waste disposal may promote the spread of infection.
- **Contacts:** The type of contact between patients or their family and health workers may increase the possibility of microorganism transmission. This is particularly the case if there is poor personal and environmental hygiene.
- **Individual:** Consider whether there are certain individuals that may be more susceptible to infection than others.

This assessment should be done initially before the delivery of any care and then reviewed routinely if ongoing care needs to be provided in the setting.

Home visits

Home visits from healthcare and non-government organisation (NGO) providers enable personalised and individualised care for patients/clients. While planning and providing care to patients with a communicable disease or an infection, the providers are continuing to ensure that there is minimal impact on patient/client care activities.

The impact of communicable disease recognition and prevention must not impede routine and necessary patient/client models of care, safety, and quality of care. It is expected that home care providers will maintain adequate supplies of appropriate PPE, cleaning materials and alcohol-based hand rub to protect themselves if caring for a patient/client with suspected or confirmed communicable disease, in preventing exposure and cross transmission.

4.6.3 Ambulance and paramedic settings

Infection prevention and control principles equally apply to paramedics and ambulance settings. Paramedic and ambulance care is provided in a variety of settings, and with varying degrees of urgency. The environment within an ambulance vehicle may be considered more controlled than that outside the vehicle. It may be difficult to control the transmission risks present outside the ambulance vehicle; however, identification of the transmission risk factors should form part of scene safety and patient assessment processes.

To determine whether the environment is likely to promote the establishment or spread of microorganisms that potentially cause infection, the following risk factors need to be considered:

- **Procedures:** Performing an invasive procedure that breaches the skin and exposes normally sterile body substances and tissue may increase susceptibility to infection.
- **Cleanliness and hygiene of the environment:** Poor environmental cleanliness and hygiene may impact on the application of aseptic technique in this setting.
- **Equipment and stock:** Certain equipment and stock must be used only if sterile. Maintaining stock sterility in a crowded, mobile and temperature labile environment is difficult, and this may increase the risk of infection if it is not managed adequately.
- **Reprocessing of reusable clinical and non-clinical equipment:** Failure to clean and/or reprocess reusable equipment after its use will increase the risk of subsequent transmission.

4.6.4 Patient transport service settings

Patient transport service vehicles and fixed wing aircraft should be considered as similar to an ambulance setting and risk assessed in the same way as an ambulance setting.

For transport of patients with specific MRO should refer to Chapter 7 Management of MROs.

Communal patient transport vehicles (such as transporting more than one patient at a time) should also be considered as a community setting for the purposes of this Handbook. Communal patient transport vehicles are like outpatient clinic waiting rooms, as a varied mix of patients may be present at any given time. Infection risks in these settings should be identified in line with guidance provided for community settings.

4.7 Risk management in patient care settings

All NSW Health Organisations must assess the risk at different levels, across many functions and activities as appropriate for the size and complexity of the organisation.

4.7.1 Food

All Health Organisations are regulated by the [NSW Food Act 2003](#) and are to be licensed by the NSW Food Authority. Health Organisations are to comply with the [Food Standards Australia New Zealand Standard Code 3.3.1](#) Food Safety Programs for Food Service to Vulnerable People, NSW Food Authority - [Vulnerable persons](#) and [National Safety and Quality Health Service Standards](#) (Australian Commission on Safety and Quality in Health Care, 2024).

It is important that the principles of food hygiene are followed by all those who are involved in the preparation, handling and serving of food.

High risk patient groups

High risk patients in Health Organisations may be at risk of acquiring a foodborne illness if food safety standards are not maintained. Even if food safety is not compromised, certain patients are more vulnerable to serious infection from certain foods. These patients include pregnant women, young children, the elderly and the immunocompromised (for example, diabetes, immunosuppressive treatments, or leukemia). Seek dietary advice from local dietetics services prior to providing food to these individuals. For more information refer to Agency for Clinical Innovation (ACI) [Nutrition Network](#) and [Nutrition Network resources](#).

4.7.2 Food provided by the hospital (or other HOs)

[Food Standards Australia New Zealand Standard Code 3.3.1](#) outlines the local governance structures and processes required for:

- Food storage requirements and temperature control.
- Food sanitation.
- Stock rotation and food expiry.
- Cleaning of food preparation areas and equipment.
- Documentation.

At the ward level, the following practices are advised for implementation:

- Serve hospital-provided food immediately after its preparation.
- Storage of uneaten or partially uneaten meals is not recommended. Uneaten meals are to be disposed of after the meal service.
- Use enteric feeds immediately after opening. Dispose of any feed that has been exposed to the environment (for example, left sitting open on benchtops).
- The ward-based kitchen and beverage preparation areas (including designated patient food storage refrigerators) should not be considered or treated as a main access thoroughfare for clinicians, patients, or visitors. Before implementing any access restrictions, Health Organisations should consider the need for patient and/or visitor access. For example:
 - Settings where patients access to the kitchen is imperative for their health and recovery (for example, mental health settings, occupational therapy, rehabilitation)
 - Settings and/or occasions where patients, particularly those hospitalised for a long period, may communally gather in the kitchen (for example, celebrations).
- Good hand hygiene practice should always be employed when preparing and handling food. Hand hygiene products are to be available.
- Safe and appropriate handling practices should be used when preparing eggs, raw meat, poultry, noodles, cheeses and fruit and vegetables ([NSW Food Authority - Special care foods](#)).
- Dedicated refrigerators should be available to separate stores:
 - Patient food and beverages
 - Staff food

- Medication and vaccines (refrigerator should be outside of food preparation areas)
- If required, medical equipment (the refrigerator should be outside of food preparation areas)
- Regular monitoring, documentation and preventative maintenance should be provided for these refrigerators.

Refer to the NSW Health [Breastmilk: Safe Management](#) guideline for advice on the storage of breast milk.

4.7.3 Food not provided by the hospital (or other HOs)

Food brought into hospitals by patients and their families and carers is outside the scope of this handbook. This includes foods brought from commercial food outlets on the hospital campus (for example, takeaway shops and convenience stores). However, health workers should inform patients, families, and carers that wards do not have the capacity to store food that has not been provided by the hospital and cannot guarantee the integrity and preservation of externally bought foods. Health workers should seek dietetic advice regarding the risks associated with consuming externally brought food.

Note: Health workers should not purchase, reheat, prepare, or serve any externally brought food on behalf of patients.

Accumulation of food products inadequately stored, whether from internal or external sources potentially increases the risk to patients due to poor preservation. There is also an increased risk of attracting insects and vermin if not managed.

4.7.4 Oral nutritional supplements

To prevent contamination, portion controlled nutritional supplements should be dispensed in a clean environment. The full portion should be consumed when given. If the full portion is not consumed within 2 hours, it is to be discarded.

Open supplement containers or cans must be labelled with the date and time opened, covered, and stored in a patient food storage refrigerator. Use the contents or discard within 24 hours of opening.

Items delivered and not consumed, both opened or unopened should be discarded due to potential cross contamination risks.

4.7.6 Ice for human consumption

Heat generated by a water chiller or ice machine's compressor may create optimal growth temperatures for Legionella in the water supplying the ice machine, chilled water dispenser or ice. Immunocompromised patients are particularly susceptible to this risk if exposed to ice or chilled water contaminated with Legionella.

It is recommended that activated carbon filtration is not used in ice machines and water coolers in health and aged care facilities because of the increased opportunity for Legionella to colonise the device downstream of the carbon filter. When purchasing new ice machines, the facility is to comply with their product/equipment evaluation processes. There is a preference for non-touch dispensing ice machines.

The following should be considered when purchasing ice machines:

- Advice must be sought from the infection prevention and control team, facilities maintenance, and the local procurement as appropriate

- Machines that dispense ice directly into portable containers at the touch of a control or “hands free” should be purchased to reduce potential for contamination
- Recycling excess water onto a reservoir or ice compartment is not recommended. Machines must be plumbed into the main water supply
- Machines must be installed in accordance with the manufacturer’s guidance and instructions
- A U-bend and break in the drain is required to prevent reflux
- There should be adequate separation of air inlets and air outlet in the heat exchange mechanism to permit efficient cooling. The placement of the machine should be such that these areas are not obstructed
- The ability to implement necessary maintenance schedules should be addressed during the purchasing process
- Machines must be on a regular cleaning schedule as recommended by the manufacturer. Health Organisations should develop a process of regular cleaning and monitoring of the machines
- Adequate maintenance schedules should be developed, to ensure the machine can be maintained as per the manufacturer’s instructions and records are audited at least annually.

Health workers obtaining ice must:

- Perform hand hygiene prior to accessing the ice
- Not to handle ice with hands
- Once the ice is removed, it must not be returned to the machine.

4.8 Flowers and plants

For most patients in hospitals and other healthcare facilities, fresh flowers or potted plants do not represent a risk of infection.

Cut flowers left standing in water and soil from plants and dried arrangements can be heavily contaminated with microorganisms that are pathogenic to immunocompromised patients, such as [Aspergillus](#) species. While there is limited evidence that links the presence of these organisms to infection in these patients, it is strongly recommended that plants and dried or fresh flowers are not allowed in the hospital rooms of haematopoietic stem cell transplant recipients given the potential for severe infection in these patients (Sal Moslehian et al., 2023).

Poorly maintained flowers or potted plants can increase the risk of attracting insects. Plants are not recommended in clinical and laboratory areas (Sal Moslehian et al., 2023).

4.9 Staff attire

Health workers are to wear clean garments for each shift. Health workers are also to ensure that:

- Clinical procedures require a bare below the elbow approach to comply with asepsis and NSW Health policy directive [Infection prevention and control in Healthcare Settings](#) (NSW Health, PD 2023_025).
- If they are wearing long sleeved clothing, the long sleeves should be rolled up or removed during clinical procedures and they must be able to perform adequate hand hygiene.

- Requests from clinical staff to wear long-sleeved items (for example, compression bandages) for medical reasons should be assessed by the Health Organisation on a case-by-case basis in consultation with local infection prevention and control.

Hair

Health workers are to ensure that:

- Hair should be always clean and in the clinical environment should be contained.
- Hair below collar length should always be tied back in a manner which does not allow contact with the patient.
- Head/ hair protection is mandatory in certain areas including kitchens and operating theatres.
- Facial hair is best kept tidy, neat and trimmed and should be covered with a hood when undertaking aseptic procedures.

Health workers are to wear fluid repellent, fully enclosed shoes in the clinical environment.

The wearing of ties and lanyards in the clinical area is not recommended. Evidence suggests that ties and lanyards can be contaminated during patient care, and in turn can carry infectious material between patients (Pepper et al., 2014, Murphy et al., 2017, Kotsanas et al., 2008).

4.10 Uniforms and scrubs

Uniform 'scrubs' are supplied by NSW Health to meet uniform requirements and are referred to as 'uniform' in this guidance.

Surgical scrubs are theatre attire worn by health workers in theatre or other specialities. They are supplied by NSW linen service and are referred to as 'surgical scrubs'.

NSW Health stipulates when scrubs and uniforms should be worn, as outlined in the NSW Health policy directive [Uniforms Policy](#). Employees who are required to wear a uniform are required to comply with the policy, LHD/SHN Uniform and Dress Code requirements and the [NSW Health Code of Conduct](#).

Perioperative attire (surgical scrubs) should not be worn outside of the perioperative area as per local procedures, except for emergency attendance of patients within the hospital building. If scrubs are worn outside of the perioperative setting, surgical attire is to be changed before re-entry into theatre.

At any time, if a health workers clothing becomes contaminated with blood or body substance, the clothing should be removed as soon as practical and before the health worker attends to other patients.

If skin is contaminated with blood or body substance, the health worker must remove contaminated clothing/uniform or PPE and wash any affected skin, including hand hygiene.

PPE must not be worn outside the hospital setting unless it is specific for clinical service such as during a home visit, resuscitation/first aid on campus grounds.

The choice to change out of a uniform before leaving work is a personal one. Surgical scrubs are not to be worn outside the hospital setting.

4.11 Perioperative attire

Health workers are to replace all outer garments with prescribed perioperative attire in the designated changing facilities before entering the semi-restricted and restricted areas.

Theatre attire worn during surgical or invasive procedures must provide the wearer with an appropriate level of fluid-resistant protection to prevent contamination and ensure safety. This includes gowns that serve as a barrier to blood, body substance, and other potentially infectious materials.

Where reusable gowns are used as a sustainability initiative, it is essential to ensure that their protective qualities meet or exceed those of disposable alternatives. However, reusable gowns may pose a risk of strike-through, where fluids penetrate the fabric over time or under pressure. To mitigate this risk, additional protective measures are recommended, such as:

- Wearing a fluid-resistant apron underneath gown during high-risk procedures
- Ensuring that reusable gowns meet AAMI Level 3 or 4 standards (or equivalent), depending on the procedure's fluid exposure risk
- Adhering to strict laundering and inspection protocols to maintain the gown's integrity over repeated uses
- Training health workers to recognise when additional protection is needed and how to don/doff layers safely.

Perioperative attires are not worn outside of the perioperative environment (Hafiani et al., 2022, Mohammed Al-Aamri et al., 2024), unless emergency attendance of a patient is required within the facility or transport of patients from theatre to ward within the same facility. If scrubs are worn outside of the perioperative setting, surgical attire is to be changed before re-entry into theatre.

Use of outer gowns to protect surgical attire is not recommended, due to the limited benefit in reducing the contamination of surgical attire (Mohammed Al-Aamri et al., 2024, Hafiani et al., 2022).

Health workers are to consider the following while working within the perioperative environment:

- Change into clean perioperative attire daily, or when wet or soiled
- Visibly soiled scrubs are to be changed before leaving the theatre
- Ensure hair on the back or at the neckline is covered
- Prevent perioperative attire have contact with the floor when changing
- Lanyards, pouches or other hand or wrist accessories are potential vectors for infection and are not recommended
- Apply a head cover that encloses all hair, including sideburns and facial hair, and covers the nape of the neck
- Change head covers daily and when wet (perspiration) or soiled.

There is limited evidence for the use of shoe covers to reduce microbial load in the theatre environment (Rashid et al., 2016). Fluid resistant shoe covers may provide protection against the risk of body substance contamination of the shoes. Where the use of shoe covers is indicated, health workers are to perform hand hygiene after putting on and removing shoe covers.

Shoes used for the perioperative environment should be dedicated for that use and routinely cleaned.

4.12 Use of portable fans

In healthcare settings, the use of portable or ceiling fans can promote the spread of dust, debris and microorganisms through the air and can pose a risk to patients, health workers, and consumers. Organisms dispersed through the air can have the potential to contaminate open wounds, open

areas, and environmental surfaces. Fans can disturb the normal air flow within a room or patient clinical area, altering the expected air flow pattern (for example, disturbance in negative pressure room air changes).

The use of ceiling or portable fans in high-risk clinical settings can alter the indoor air flow and can be an important vehicle for a variety of human pathogens and the bioaerosol deposition resulting in potential source of hospital-associated infections.

Bladeless fans, while they may be considered easier to clean, may promote environmental contamination through their operating mechanisms. The blades are hidden inside the pedestal stand and air flows through the channel in the pedestal through the curved path, the surrounding air becomes drawn into the fan from multiple areas around the fan. Given that the internal component of bladeless fans may not be able to be cleaned thoroughly, clinically significant microorganisms can harbour inside the cowl.

While the use of portable fans has not been proven to transmit infection, lack of appropriate cleaning procedures for portable fans is an infection control concern. Portable fans can be considered in waiting areas and non-clinical settings providing regular cleaning, maintenance and appropriate regulation of the speed is maintained.

Infection prevention and control recommendations for use of fans in patient care areas

Health workers are to perform a risk assessment before using fans in patient rooms on a case-by-case basis. Health workers are to ensure that:

- Portable fans should be used within a single patient room, or if used in a multi-patient room, within the patient's bed space with the curtains drawn
- Consult infection prevention and control team for use of fans for patients on additional isolation precautions other than airborne isolation precautions (for example, contact or droplet precautions)
- Consult infection prevention and control for use of fans in food preparation and food service areas
- Fans with blades should be accessible for cleaning
- Bladeless fans may need to have internal components cleaned between uses
- Fans should be used only as a temporary measure
- Fans should only be used at the lowest speed for less disruption of dust and debris and with least disruption to airflow such as non-oscillating.

Fans should be turned off in the room for the following, including, but not limited to:

- When a sterile field is required
- When a sterile/aseptic procedure is being performed (such as, a wound dressing, dental procedure)
- When a procedure is performed that might generate a splashing of body fluids such as fluid aspiration, emptying urinary catheter, dental procedure.

Fans are considered non-critical devices and must be regularly cleaned:

- Weekly cleaning according to manufacturer's instructions for use (IFU) and local procedure or as required
- Health Organisations are to develop a written schedule that documents when the device is cleaned and by whom

- Portable fans when not in use must be stored and covered post cleaning.

Fans must not be used in:

- Rooms/areas with directed airflow
- Rooms with patients on droplet or airborne precautions or when an aerosol generating medical procedure might be performed
- Reusable Medical Device (RMD) reprocessing departments, any area outside RMD reprocessing area that performs reprocessing and areas where sterile supplies are stored
- Adult Intensive Care Unit (ICU)
- High Acuity Units
- Neonatal Intensive Care Unit (NICU)
- Operating Room (OR)
- Dialysis Unit
- Endoscopy Suite
- Laboratory
- Oncology Unit
- Haematology Units
- Transplant units.

4.13 Biofilms in healthcare

Biofilms are complex, surface-associated communities of microorganisms (for example, bacteria, protozoa, algae, fungi), that play a crucial role in microbial survival and adaptability across diverse environments (Omwenga and Awuor, 2024). A biofilm is where microorganisms are attached to surfaces and each other by an extracellular matrix they produce. This biofilm matrix consists of various carbohydrates, proteins, lipids and extracellular DNA. The species of organism present, the surrounding environment and the availability of nutrients all influence the composition of this matrix (Chowdhury et al., 2018).

The formation of biofilms on medical devices and/or equipment enhances the survival of bacteria, rendering them resistant to antibiotics, disinfectants, and physical friction and these biofilms are associated with HAIs (Maillard and Centeleghe, 2023). The most common biofilm associated infections are ventilator-associated pneumonia, central-line-associated blood stream infection, catheter-associated urinary tract infections (UTIs), *C. difficile*, MROs and surgical site infection (Suleman et al., 2014). Furthermore, biofilms are routinely seen on medical implants and devices which include catheters and prosthetic joints, increasing the risk of persistent and difficult-to-treat infections. Bacterial biofilms contribute considerably to antibiotic resistance by building a protective environment that protects organisms from the effects of antibiotics (Mendhe et al., 2023)

Biofilms can be classified as hydrated biofilms, formed on living and non-living surfaces, for example, in drains and parts of some medical devices and equipment, and environmental dry biofilms (DSB) possibly on medical devices and surfaces in the indoor environment, including floors, walls, fittings, fixtures, furniture and equipment (Maillard and Centeleghe, 2023).

Prevention of biofilm related infections include, not limited to (Shineh, 2023, Dancer, 2022):

- Hand hygiene to reduce dry biofilm transfer from health worker hands to patients and equipment

- Aseptic non-touch technique during device implantation and handling, protecting key site, key part and scrub the hub
- Reducing the duration of device use (for example, catheters) can limit the time available for biofilm development
- Antimicrobial and antiseptic stewardship
- Routine cleaning and disinfection with appropriate product and process 'one wipe; one site; one direction'
- Appropriate reprocessing of reusable medical devices.