Australasian Health Facility Guidelines

Part D – Infection Prevention and Control

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Australasian Health Facility Guidelines

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Cultural Acknowledgement and Terminology

The Australasian Health Facility Guidelines (AusHFG) are developed in collaboration with stakeholders across Australia and Aotearoa, New Zealand.

Acknowledgement of Country

We acknowledge the Aboriginal people and Torres Strait Islander People as traditional owners and continuing custodians of the land throughout Australia and the Torres Strait Islands.

We acknowledge their connection to land, sea and community and pay respects to Elders past and present.

Acknowledgement of Te Tiriti o Waitangi

We acknowledge Māori as tāngata whenua in Aotearoa New Zealand.

Te Tiriti o Waitangi obligations have been considered in developing these resources.

Terminology and Language in the AusHFG

Throughout the AusHFG resources, the term ‘Indigenous Peoples’ is used to refer to both the Aboriginal and Torres Strait Islander Peoples of Australia and Māori of Aotearoa, New Zealand. Where references to specific cultural requirements or examples are described, the terms ‘Aboriginal and Torres Strait Islander Peoples’ and ‘Māori’ are used specifically. The AusHFG respect the right of Indigenous Peoples to describe their own cultural identities which may include these or other terms, including particular sovereign peoples or traditional place names.

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List of Acronyms

ABHR	Alcohol-based hand rub
ACIPC	Australasian College for Infection Prevention and Control
ACSQHC	Australian Commission on Safety and Quality in Health Care
AHIA	Australasian Health Infrastructure Alliance
AICG	Australasian Institute of Clinical Governance
AGP	Aerosol Generating Procedures
ANZICS	Australian and New Zealand Intensive Care Society
AS	Australian Standard
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
AusHFG	Australasian Health Facility Guidelines
BMT	Bone Marrow Transplant
CDC	Centers for Disease Control and Prevention
CEC	NSW Clinical Excellence Commission
CPO	Carbapenemase Producing Organisms
FFE	Furniture, Fittings & Equipment
GHG	Greenhouse Gas
HAI	Hospital Acquired Infection
HEPA	High Efficiency Particulate Air
HCID	High Consequence Infectious Diseases
HPU	Health Planning Unit
HVAC	Heating Ventilation and Air Conditioning
ICU	Intensive Care Unit
IPC	Infection Prevention and Control
IPU	Inpatient Unit
IT	Information Technology
IV	Intravenous
MME	Major Medical Equipment
MRSA	Methicillin Resistant Staphylococcus Aureus
NHHI	National Hand Hygiene Initiative
NHMRC	National Health and Medical Research Council
NCC	National Construction Code
NZ	New Zealand
NZS	New Zealand Standards
PCA	Plumbing Code of Australia
PPE	Personal Protective Equipment
RLS	Room Layout Sheet

Acronym	Meaning
RMD	Reusable Medical Devices
SOA	Schedule of Accommodation
SSU	Sterilizing Services Unit
TMV	Thermostatic Mixing Valve
VHF	Viral Haemorrhagic Fever
VRE	Vancomycin Resistant Enterococci
WHO	World Health Organization
WHS	Work Health and Safety

01 Introduction

1.1 Scope

Part D of the Australasian Health Facility Guidelines (AusHFG), Infection Prevention and Control, has been written to assist project teams in the planning, design and construction or refurbishing of healthcare facilities. It is informed by a comprehensive review of infection prevention and control (IPC) literature, and input from experts in the field of IPC.

IPC is influenced by environmental factors, building services and human activity. Part D addresses environmental and building services factors relating to IPC.

Part D is intentionally general in scope and does not address IPC policy or specific service requirements. Further details may be found in:

- the IPC policies of individual jurisdictions
- service-specific Health Planning Units (HPU) provided in the Australasian Health Facility Guidelines (e.g., HPU 190 Sterilizing Services and Endoscope Reprocessing Unit)
- Australasian Health Facility Guidelines Project Resources (including Pandemic Preparedness – Health Infrastructure Planning & Design Guidance and Isolation Room - Engineering and Design Requirements)
- For Aotearoa / NZ facilities refer to Ngā Paerewa Health and Disability Services Standard (NZS 8134:2021) Outcome 5: Te kaupare pokenga me te kaitiakitanga patu huakita Infection prevention and antimicrobial stewardship.

This document should be read in conjunction with relevant policies and Australian and New Zealand Standards relating to IPC, work health and safety, and environmental health. Many of these are listed in the References and Further Reading section of this guideline.

Also refer to Section 1.5 Terminology for explanation of many key terms, as well as:

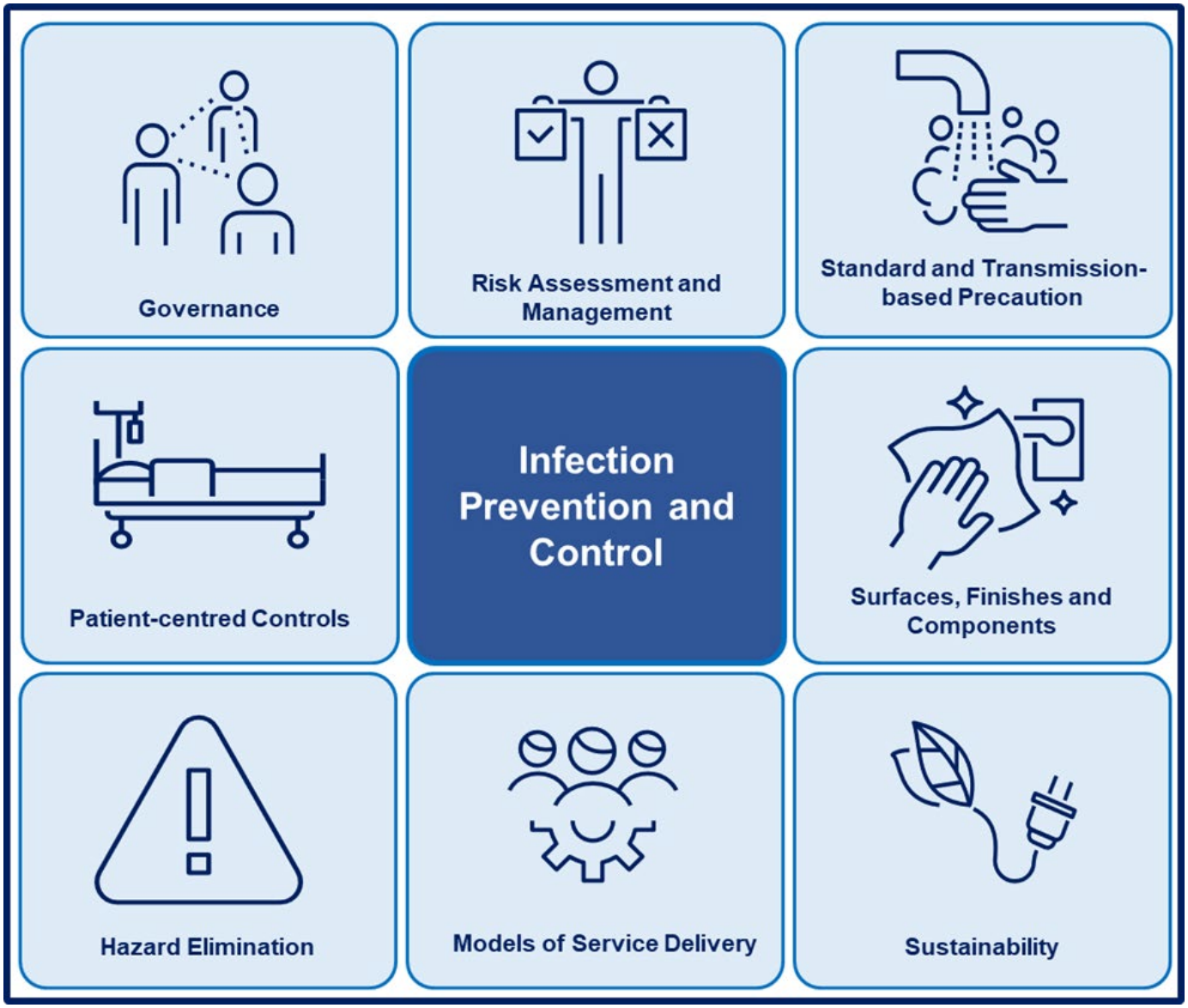
- Australian Commission on Safety and Quality in Health Care, National Safety and Quality Health Service Standards, 2021, Preventing and Controlling Infections Standard. 2nd ed. – version 2
- National Health and Medical Research Council (NHMRC), 2019, Australian Guidelines for the Prevention and Control of Infection in Healthcare
- World Health Organization (WHO), 2016, Guidelines on core components of IPC programmes at the national and acute health care facility level.

1.2 Overarching Principles

The implementation of effective Infection Prevention and Control (IPC) principles will impact on the patient, staff, family and carer experience, the provision of an efficient service, the safety of patients and staff working within the unit, and the continuity of high-quality healthcare service delivery.

Overarching IPC principles are outlined below for all healthcare facilities, and will underpin the detailed planning, design and construction or refurbishment process. These principles are also used as the framework for this document.

Figure 1 Infection Prevention and Control (IPC) Overarching Principles



1.3 Contributing Factors

In Australian and New Zealand healthcare settings, patients are often in close proximity to each other and interact with a variety of clinical and non-clinical members of the workforce. They may also undergo invasive procedures, have medical devices inserted, and receive antimicrobials and immunosuppressive therapies. All these conditions create ideal opportunities for the spread of infections and development of antimicrobial resistance. (National Safety and Quality Health Service Standards, Preventing and Controlling Infections Standard, 2021, p. 23-24).

The design of healthcare facilities can influence the transmission of healthcare-associated infections (HAIs). Key design features that minimise transmission include:

- ventilation and air conditioning which facilitates the supply and movement of clean indoor air, removes contaminated air and meet prescribed standards
- water systems including premise plumbing and cooling towers, that meet prescribed standards and are designed to minimise biofilm risk
- surface finishes, soft furnishings (e.g., curtains, upholstery), fixtures and fittings that are easy to clean and maintain
- the ability to isolate patients who are suspected/confirmed infectious or immunocompromised
- workplace design with consideration of how the built environment can support desired IPC practices.

Workplace design features include:

- separation of clean and dirty workflows
- ready access to hand hygiene facilities and personal protective equipment (PPE)
- adequate storage
- adequate systems and procedures for waste management, cleaning and linen handling (Australian Guidelines for the Prevention and Control of Infection in Healthcare, 2019).

For more information, refer to:

- Australian Commission on Safety and Quality in Health Care, 2021, National Safety and Quality Improvement Guide for Standard, 2nd ed. – version 2, Section 3: Preventing and Controlling Healthcare Associated Infections Standards
- National Health and Medical Research Council (NHMRC), 2019, Australian Guidelines for the Prevention and Control of Infection in Healthcare

1.4 Pandemic Preparedness

When considering IPC requirements, contingency plans should be identified for the bio-preparedness of each facility/service, from initial planning and design phase through to completion. These may include fever clinic locations, cohort areas, isolation rooms, access, flow and logistics of an infectious disease outbreak, air conditioning supply and controls, donning and doffing zones, water and waste management. Morawska et al. (2024) provides insights and key lessons learned from the COVID-19 pandemic regarding the role of ventilation in the transmission of airborne pathogens.

Refer to AHIA, AusHFG Pandemic Preparedness – Health Infrastructure Planning & Design Guidance for further guidance.

1.5 Terminology

1.5.1 Definitions

The definitions of the IPC terms used in this document are noted below:

- *Clinical hand hygiene* specifically refers to the use of ABHR when hands are visibly clean or thorough washing of hands by healthcare staff consistent with the '5 Moments for Hand Hygiene' approach of the National Hand Hygiene Initiative (NHHI) to prevent pathogen transmission in healthcare settings. Clinical handwashing is generally performed at scrub troughs or at Type A and B basins.
- *Non-clinical handwashing* typically refers to the practice of washing hands in everyday situations such as after toileting, after handling waste, etc. outside of clinical areas to maintain personal hygiene and prevent the spread of potentially harmful infectious agents.
- *Healthcare Associated Infection (HAI)* are those infections that are acquired as a direct or indirect result of healthcare. HAIs are one of the most common complications affecting patients in hospital. (ACSQHC, 2024).
- *Multi-resistant Organisms (MRO)*, in general, are infectious agents that are resistant to one or more classes of antimicrobial agents and are usually resistant to all but one or two commercially available antimicrobial agents. They include Methicillin Resistant Staphylococcus Aureus (MRSA), Vancomycin Resistant Enterococci (VRE) and Carbapenemase Producing Organisms (CPO). Other and emerging pathogens may also be considered in this class.
- *Cohorting* refers to the accommodation of patients with the same infectious condition in the same area.
- *Immunosuppressed/immunocompromised* refers to the suppression of the normal immune system response potentially resulting in a person becoming more susceptible to infection.
- *Biofilm* is defined as the accumulated mass of microorganisms and extracellular material that is tightly adhered to a surface and cannot be easily removed.

See also:

- Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards, 2021, Preventing and Controlling Infections Standard. 2nd ed. – version 2

Immunocompromised Patients

Highly immunocompromised patients, including those suffering from neutropenia, those receiving allogeneic bone marrow transplants (BMT) and those receiving intensive chemotherapy, are identified as high-risk patients. They have the greatest risk of infection from contact with surfaces, airborne or waterborne infectious agents. Specific engineering parameters may be required in their patient care areas.

Refer to:

- Centers for Disease Control and Prevention (CDC), 2003, Guidelines for Environmental Infection Control in Health-Care Facilities

Standard and Transmission-based Precautions

Standard precautions are the primary strategies for minimising the transmission of infectious agents in healthcare settings. Standard precautions must be used when providing care to all patients, regardless of whether they have an infection or not.

Standard precautions include:

- hand hygiene, as consistent with the '5 Moments for Hand Hygiene' approach
- the use of appropriate PPE
- the safe use and disposal of sharps
- routine environmental cleaning
- reprocessing of reusable medical equipment and instruments
- respiratory hygiene and cough etiquette
- aseptic technique
- waste management
- appropriate handling of linen.

Standard precautions should be used in the handling of blood (including dried blood); all other body substances, secretions, and excretions (excluding sweat), regardless of whether they contain visible blood; non-intact skin; and mucous membranes.

Transmission-based precautions are used in addition to standard precautions, where the suspected or confirmed presence of infectious agents represents an increased risk of transmission. The application of transmission-based precautions is particularly important in containing multi-resistant organisms and in outbreak management.

Personal Protective Equipment (PPE)

In the context of IPC, PPE refers to a variety of barriers and respirators used alone, or in combination, to protect mucous membranes, airways, skin, and clothing from contact with recognised and unrecognised sources of infectious agents in healthcare settings. The type of PPE used will vary, based on the level of precautions required.

PPE includes:

- gowns
- plastic aprons
- masks and respirators
- gloves
- eye protection

- head coverings such as hoods
- over-shoes or boot covers in protected environments such as Operating Rooms to reduce introducing contaminants or in rooms where patients with high consequence infectious diseases (HCIDs) is cared for.

Dedicated space for PPE storage should be provided outside all isolation rooms, including Class S. A PPE bay may be shared between two or more rooms.

For more details, see Standard Components: Room Data Sheets and Room Layout Sheets.

1.6 References

- Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards, Preventing and Controlling Infections Standard. 2nd ed. – version 2. Sydney: ACSQHC; 2021.
- AHIA, 2023, AusHFG Pandemic Preparedness – Health Infrastructure Planning & Design Guidance, St Leonards, Australia.
- Centers for Disease Control and Prevention (CDC), 2003 (updated 2019), Guidelines for Environmental Infection Control in Health-Care Facilities, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), Atlanta, GA.
- Clinical Excellence Commission (CEC), 2024, High Consequence Infectious Diseases – Infection Prevention and Control Principles, Version 1.0., St Leonards, Australia.
- Morawska, L., Yuguo, L., and Salthammer, T., 2024, Lessons from the COVID-19 pandemic for ventilation and indoor air quality, Science 385, 396–401.
- National Health and Medical Research Council (NHMRC), 2019, Australian Guidelines for the Prevention and Control of Infection in Healthcare, Australian Government, Canberra, Australia.
- Standards Australia, 2018, AS/NZS ISO 31000:2018 Risk management – Guidelines Standards Australia, Sydney, Australia.
- Standards New Zealand, 2021, Ngā Paerewa Health and Disability Services Standard (NZS 8134:2021), Outcome 5: Te kaupare pokenga me te kaitiakitanga patu huakita Infection prevention and antimicrobial stewardship, Wellington, New Zealand.
- World Health Organization (WHO), 2016, Guidelines on core components of infection prevention and control programmes at the national and acute health care facility level, Geneva, Switzerland.

02 Governance

2.1 Consultation Process

The documentation and implementation of IPC principles is critical to the planning, design and construction or refurbishment process of healthcare facilities. Building services should comply with the relevant national standards, legislative and regulatory requirements, and relevant guidelines issued by each jurisdiction.

IPC staff have a fundamental role at each stage of a new build or redevelopment project. Their involvement will ensure the implementation of IPC guidelines and standards, and that changes to the design are cognisant of IPC implications.

During the IPC consultation process, the following steps are required:

- Engaging with IPC specialists from the earliest stage of the development to ensure that IPC principles are adhered to.
- In addition to the IPC specialists and delegates, identifying other key personnel and their responsibilities, during the planning, design and construction phases, including:
  - Project/Engineering Manager
  - General Manager
  - Facilities Manager
  - Architect
  - Building Contractor
  - Work Health and Safety Officer
  - Environmental Services Manager
  - Sterilization Services Manger
  - Unit representative(s)/staff, such a nurses and medical staff.
- Identifying relevant Australasian and International IPC standards.
- Identifying resources such as IPC toolkits and checklists. For example, Australasian College for Infection Prevention and Control (ACIPC) provides IPC templates, toolkits and other resources to guide and support users, ensuring consistency in IPC practices.
- Determining expectations for development of IPC strategies, across the span of building works and development.
- Ensuring that the roles and responsibilities for developing and formulating an IPC building management plan are clearly defined and agreed upon.

2.2 Implementation

Implementation of IPC principles and strategies must be underpinned by effective governance and leadership, collaborative multi-stakeholder partnerships, consultation with IPC experts, and establishment of a community of IPC advocates.

Continuous consultation between architects, engineers, IPC practitioners and staff working in the unit throughout the development process is essential.

A well-supported and educated IPC workforce will foster behaviours and culture that are aligned with evidence-based, cost-effective, and sustainable practices throughout the planning, design, and implementation phases.

2.3 Evaluation

Evaluation and surveillance should be conducted to assess the effectiveness and impact of IPC-based designs and developments across all healthcare settings, including the effects of deviations from evidence-based IPC strategies and the consequences of inaction.

IPC strategies, carefully considered through project governance such as the effective changes to the built clinical environment and/or successful implementation of innovations, can be communicated through an efficient feedback system.

2.4 References

Further information regarding IPC governance can be found in the sources below:

- Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards, Preventing and Controlling Infections Standard. 2nd ed. – version 2. Sydney: ACSQHC; 2021.
- Australasian Institute of Clinical Governance (AICG), 2022, What is clinical governance? Health Education Australia Limited, Melbourne, Australia.
- Australasian College for Infection Prevention and Control (ACIPC), 2023, ACIPC Position Statements: ACIPC IPC Workforce Guidance Document, Hobart, Australia.
- Australasian College for Infection Prevention and Control (ACIPC), various IPC templates, tool kits and guides, Hobart, Australia.

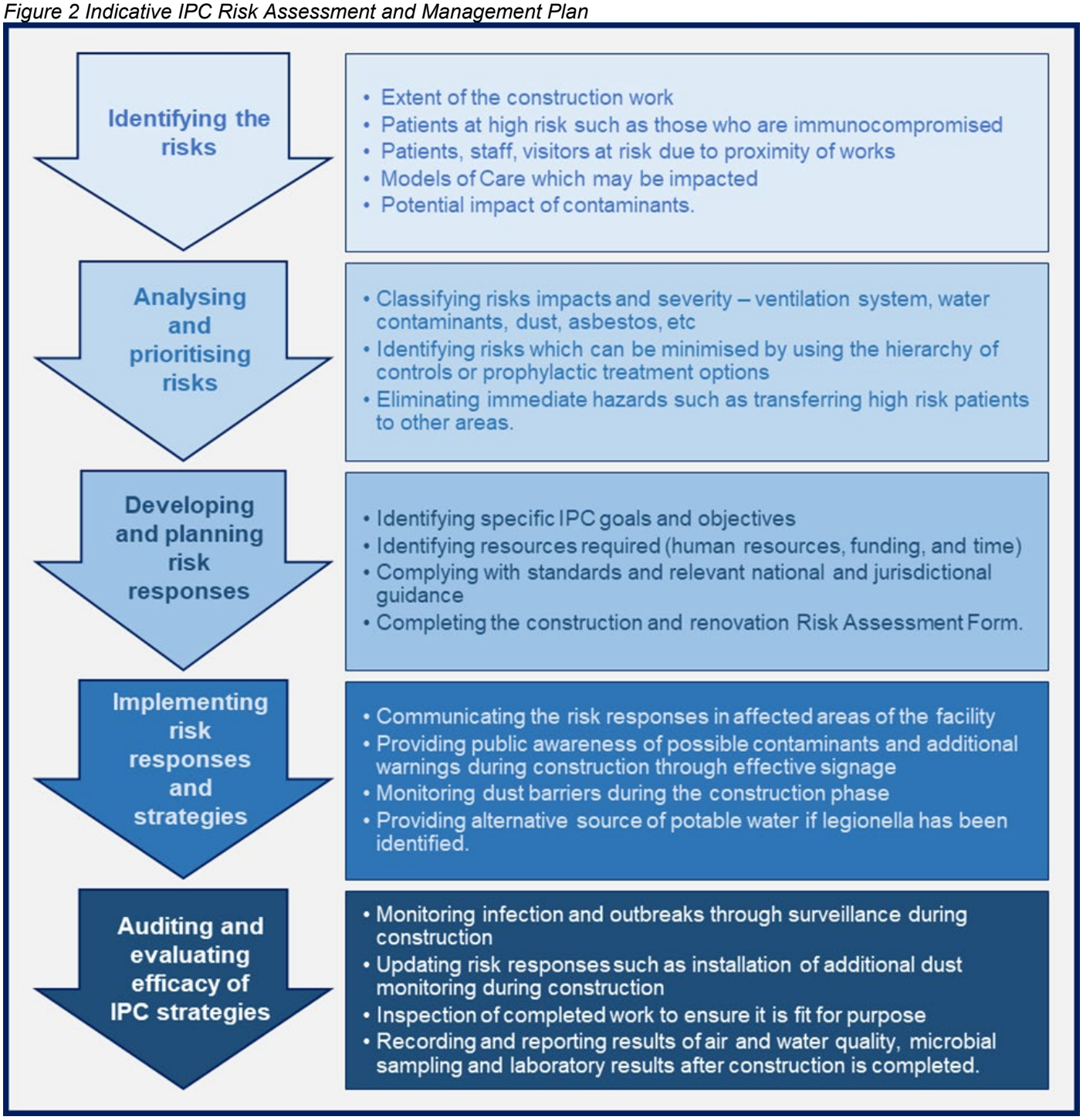
03 Risk Assessment and Management

3.1 IPC Risk Assessment and Management Plan

An IPC risk assessment and management plan is important to reduce risks associated with the built environment, prevent spread of infection, control outbreaks, mitigate hazards for high-risk individuals and ensure continuity of health service delivery.

The plan should be appropriately tailored to the specific stage of the project. To illustrate an indicative risk assessment and management plan during the delivery stage of a healthcare project, the following process diagram is provided, including sample specific approaches.

Figure 2 Indicative IPC Risk Assessment and Management Plan



Risk identification and management strategies throughout the life of the project are critical and are further addressed in Section 08 Hazard Elimination of this guideline.

Work health and safety (WHS) legislation requires the design team to consult with stakeholders and identify, assess and control risks, in order to provide an optimal design outcome utilising the hierarchy of controls.

By adopting a risk management approach, many safety and security related hazards can be eliminated or minimised at the planning stage, reducing the likelihood of adverse incidents occurring.

3.2 References

For further information refer to:

- Australian Commission on Safety and Quality in Health Care, 2021, National Safety and Quality Improvement Guide for Standard, 2nd ed. – version 2, Section 3: Preventing and Controlling Healthcare Associated Infections Standards, Sydney, Australia.
- AHIA, 2018, AusHFG Part C: Design for Access, Mobility, Safety and Security, St. Leonards, Australia.
- ISO 45001:2018 Occupational health and safety management systems - Requirements with guidance for use.
- ISO 45006:2023Occupational health and safety management - Guidelines for organizations on preventing, controlling and managing infectious diseases.
- National Health and Medical Research Council, 2019, Australian Guidelines for the Prevention and Control of Infection in Healthcare, Canberra: Commonwealth of Australia.
- Standards Australia, 2018, AS/NZS ISO 31000:2018 Risk management – Guidelines Standards Australia, Sydney, Australia.

04 Standard and Transmission-Based Precaution

4.1 Building Elements

4.1.1 Introduction

It is recommended that project staff refer to jurisdictional policies relating to IPC such as hand hygiene and PPE, to fully inform requirements relating to the following building elements. Many of these policies and guidelines are listed in the References and Further Reading sections of this guideline.

4.1.2 Hand Hygiene

General

Effective hand hygiene is one of the most important strategies in preventing HAIs. Hand hygiene is a general term applied to the use of soap/solution (non-antimicrobial or antimicrobial) and water or a waterless antimicrobial agent, to the surface of the hands (e.g., ABHR). The preferred mode of hand hygiene in most clinical settings is the use of ABHR. The principle is that hand hygiene needs to be accessible/achievable and there are circumstances where handwashing is the preferred mode. However, risk assessment regarding hand hygiene product placements should be undertaken depending on patient/resident/client cohort.

When performed correctly, hand hygiene results in a reduction of microorganisms on hands. Hand hygiene is classified as routine/social, hand hygiene for asepsis and hand hygiene for surgical procedures. For additional information on hand hygiene, refer to the National Hand Hygiene Initiative and the NSW Clinical Excellence Commission (CEC) Infection prevention and control practice handbook.

Hand Washing

Hand washing in hand basins must be undertaken when hands are:

- visibly soiled
- contaminated with proteinaceous material
- visibly soiled with blood or other body fluids
- exposed to potential spore forming organisms, such as gastroenteritis (suspected or confirmed)
- after using the bathroom
- in situations defined by jurisdictional hand hygiene policies.

Descriptions of the various types of handwash basins and their location are provided in section 4.1.3.

Soap

All handwash basins should be provided with near neutral pH soap. Clinical handwash basins and scrub troughs should, in addition, be provided with antimicrobial liquid soap. Soap dispensers are to be the closed-cartridge type and are to be mounted on, or above, the splashback.

Hand Drying

Single use paper towels are to be provided at all handwash basins. Paper towel dispensers should be located adjacent to the splashback to prevent splash contamination. Dispensers should be smooth-surfaced and easy to clean to prevent dust or soil contamination.

Paper towel may be used in public amenities and beverage bays.

Hot air hand dryers are not recommended for installation in clinical areas or staff amenities of healthcare facilities as they increase the risk of dispersal of pathogenic organisms. High speed hand dryers may be considered in non-clinical areas, such as public toilets. In non-clinical areas where hand dryers are provided, it is not recommended to provide tapware with integrated airdrying function as this can cause water aerosolization.

Sterile cloth hand towels are used after surgical handwashing. These should be stored and handled as per applicable sterile store standards and operational policies.

Alcohol-based Hand Rubs / Sanitisers

Alcohol-based hand rub (ABHR) improves compliance with hand hygiene and acts as a visual cue for hand hygiene practice.

National Hand Hygiene Initiative (NHHI) recommends making ABHR available:

- at the foot of every patient bed or adjacent wall using either a fixed or removable bracket (at the point of patient care)
- affixed to mobile work trolleys (e.g., IV, drug and dressing trolleys)
- in high staff traffic areas (e.g., staff station, utility rooms and at the entrance to patient rooms)
- in other multi-use patient care areas such as consultation rooms
- at the entrance of each inpatient unit, outpatient clinic and other departments
- in public areas such as waiting rooms, receptions areas, hospital foyers, and near elevator doors in high traffic areas.

Additional points of placements include:

- point of entry to the Sterilizing Services Unit (SSU), inspection, packing and sterilizing areas
- on entry to sterile storerooms
- in decontaminations rooms in SSU and endoscopy units
- adjacent to endoscope-controlled environment storage cabinets
- isolation anterooms and donning and doffing stations
- in areas where food is prepared or consumed (e.g. beverage bays).

Dispenser systems should minimise the possibility of ‘dripping’ to avoid potential damage to wall and floor coverings. Consider locks in high risk setting for patient/consumer safety.

Hand Cream / Lotion

Moisturising cream/lotion dispensers are to be located at, or near, staff nurses’ stations or in staff-only areas. Dispensers should be non-refillable. Hand cream/lotion should be compatible with all hand hygiene products.

Arrangement of Dispensers at Clinical Handwash Basins

Dispensers should be arranged in a consistent manner across the healthcare facility. Soap dispensers should be mounted over the basin to ‘catch’ drips.

Refer to the following for further detailed information regarding placement of hand hygiene products:

- AusHFG Standard Component Room Layout Sheets (RLS) (Bay – Hand Washing, Type A and B)
- AS 1071:2015 Placement and presentation of hand hygiene materials in relation to the basin in healthcare settings.

Signage

Clear visible signs should be provided to remind all staff and visitors of the necessity to attend to hand hygiene. Consider the size, location and holder type of the signage adjacent to the handwash basin.

Waste Receptacles

Waste receptacles should be located at each handwash basin for the disposing of single use towels. The bins should be of adequate size, non-touch and easy to clean.

4.1.3 Handwash Basin Types and Design

The following descriptions are derived from the Room Data and Room Layout Sheets pertaining to Standard Components (Bay – Handwashing).

Handwash Basin Types

Hand hygiene compliance significantly improves when handwash basins are visible and accessible. Clinical handwash basins must be reserved for hand washing.

Depending on their use, handwash basins may be defined as:

- clinical – large 'scrub' (Type A)
- clinical – medium (Type B)
- non-clinical – small or medium (including vanities and Type C)
- surgical scrub troughs.

Handwash basins are required in all patient care areas and in all areas where careful attention to hand hygiene is essential such as kitchens, laundries, pharmacies, laboratories and amenities. Reticulated, free-flowing warm and cold water are to be provided. Drain plugs should not be provided.

Handwash Basin, Taps and Waterspouts Design

Design should ensure that handwash basins:

- have no overflow
- have curved sides; to minimise splashing and channel the water to the waste to avoid pooling (this includes removing ledges where possible to avoid items being stored inappropriately)
- are large enough to enable good hand hygiene techniques
- are wall mounted to allow effective cleaning
- have the spout and waste offset so water does not directly enter the drain.

  This will reduce the risk of aerosolization of any biofilm that may have built up in the drain. No minimum or maximum offset distance is recommended. However, achieving this offset will be improved if compatible basin and tapware are used. For this reason, the selection of basins and tapware should be coordinated and approved by clinical staff as a single unit.
- clinical handwash basins and scrub sinks or troughs should have waterspouts fitted with anti-splash devices

  Consider use of laminar flow to eliminate aerosolization of droplets.
- have sufficient space between the waterspout and the basin, sink or trough to enable adequate washing up to the elbow
- have taps that are fit for purpose (e.g., elbow operated for clinical applications and easy to operate for the aged/disabled in non-clinical use) and are compatible with the handbasin

  A single lever operation is considered an appropriate substitute for a wrist-operated tap.
- have a waterproof splashback

  Splashbacks are required behind all handwash basins. The splashback should be large enough to contain splashes and prevent moisture seepage. The surface should be water-resistant and easy to clean.
- do not include integrated plugs/caps
- feature a detachable shroud that encloses the pipe fittings.

  This shroud should be designed as a separate component, rather than being integrally moulded with the basin itself. This separation ensures convenient access to the drainage system, including the P-trap or S-bend, without requiring the removal of the entire basin.
- should have plug holes that are easily cleanable and maintained
- have water delivered at a suitable temperature to allow hand washing under running water (refer to jurisdictional health guidelines for legionella control and Part D Section 4.2 Physical Environment)
- should have water resistant, non-slip and non-staining floor covering under the handwash basins. Carpets are not recommended.

Consider using embedded antimicrobial finishes that are consistent with international standards (e.g., on basin). Applied antimicrobial finishes must not be used.

Handwash basins should be made of a hard, non-scratch material (usually porcelain) and easy to clean. They should also be made from material that prevents or reduces biofilm. Polycarbonate or other moulded plastic materials are not suitable.

Design should ensure:

- drainage is easy to access and removed for regular cleaning of 'P' or 'S' traps to remove biofilm buildup
- drainage does not include a bottle trap drain
- drainage holes are located in the base of the handwash basin and not on the basin sides/walls.

The use of spray taps and hoses is not supported in clinical environments as they create aerosols.

For further details relating to handwash basins, taps and waterspouts, refer to the Standard Components of handwash basins and scrub sinks.

Healthcare facilities should comply with AS/NZS 3718:2021 Water Supply – Tap Ware.

Type A – Clinical Handwash Basin – Large (Scrub Basin)

The Type A clinical handwash basin is used by staff in the context of provision of clinical care in selected areas requiring clinical hand washing prior to undertaking selected procedures that may occur in non-operating room settings (e.g., delivery room).

The basin is a large wall-mounted type, with hands-free taps that may be wall-mounted elbow taps, foot/knee operated, or electronic sensor taps, with warm and cold water delivered by a common spout. Spout and tap placement should have sufficient spout height that allows washing of hands up to the elbow.

Refer to Standard Components: Room Data and Room Layout Sheet (Bay - Handwashing, Type A).

Type B – Clinical Handwash Basin – Medium

This handwash basin is used by staff and visitors for patient care situations and for undertaking aseptic procedures. The basin is a medium wall-mounted type. The taps are typically wall-mounted with elbow or wrist hands-free operation, with warm/cold free-running water. Spout and tap placement should have sufficient spout height that allows washing of hands up to the elbow.

Refer to Standard Components: Room Data and Room Layout Sheet (Bay - Handwashing, Type B).

Type C – Non-Clinical Handwash Basin – Small / Medium

The Type C handwash basin is used for non-clinical handwashing in the context of generally accepted community standards of hygiene. It is required in public, patient, and staff amenities and in areas of domestic preparation of food.

Type C is a small wall-mounted basin, which may be part of a vanity unit. The taps are typically basin mounted. Supply warm and cold water. Cold water-only may be provided to Type C facilities in areas such as public amenities.

For ease of cleaning and use, taps should be lever operated, in line with commercially available options (i.e., mixer style tap).

Handwash basins in accessible toilets must comply with Standards Australia, AS 1428 (Set) Design for access and mobility set.

Scrub Sink / Trough

This is a long sink that can accommodate one or more staff scrubbing for a surgical procedure (see AusHFG Standard Components: Room Data and Room Layout Sheets – Scrub Up, 4m2).

Sinks

Sinks are different from clinical or non-clinical handwash basins and are used for cleaning food items and food preparation equipment when used in kitchens and for the disposal of waste.

4.1.4 Handwash Basins and Body Substance / Other Liquid Wastes Disposal

Improper disposal of liquid waste (such as dialysis waste, drainage fluids, antibiotics, IV medication and fluids, drinks, and nutritional fluids) in handwash basins has been linked to outbreaks caused by infectious agent contamination of biofilms in basins and plumbing. Placement of basins must mitigate risk of contaminated sink biofilms causing environmental contamination in patient environments. It is important that appropriate sink types and handwash basins are placed for different clinical environments and that handwash basins are not used for the disposal of body fluids to mitigate infection transmission associated with these environmental reservoirs. Appropriate drainage fixtures must be used to dispose of pharmaceutical liquids, body substances and other liquid waste (dialysis waste, urine, drainage fluids, surgical fluid waste, and other body fluids) such as toilets, dedicated sinks or troughs, closed collection system or as required by the handling, packaging, containment, and disposal policies of the facility.

Also refer to the NSW Clinical Excellence Commission (CEC) Infection Prevention and Control Practice Handbook, Section 4.1 Hand Hygiene.

4.1.5 Schedule and Placement of Hand Hygiene Facilities

While this guideline provides detailed guidance on handwash basin placement, the built solution is to be in accordance with IPC policies and guidelines.

Placement details for handwash basins and ABHR are included in Table 1. This list is not exhaustive but provides sufficient detail to extrapolate for the specific rooms and spaces that are not included. Further information regarding the placement of ABHR is provided in the National Hand Hygiene Initiative Implementation Guide. Where possible, ABHR should be placed at the foot of every bed or within each patient cubicle. ABHR dispensers should not be placed next to handwash basins, as this can cause confusion for healthcare workers about which hand hygiene technique to use.

A risk-based approach is recommended for determining handwash basin location, the size of splash zones, and whether ABHR is an appropriate alternative to hand washing in rooms/treatment spaces. Currently, there is no universal consensus on the appropriate splash zone distance from the handwash basin to the patient's bedspace. However, basins should be positioned at a sufficient distance to prevent water splashes from reaching the patient's bedspace and any other equipment within the room. If this is not feasible, consider placing the handwash basin outside the patient's room after consultation with the project's IPC specialist. Based on currently available information, a splash zone of 1.2m - 2m is recommended, however project team members should refer to emerging evidence and knowledge relating to this issue. As further evidence emerges regarding splash zones, the information in this guideline and other relevant AusHFG resources will be updated.

Expert IPC input is required at key stages of the project to ensure site and/or service specific considerations are identified. Recommended involvement is also needed at:

- Project briefing, including within the functional brief, to ensure the approach to hand hygiene meets the services requirements.
- Schematic design to assess whether the proposed layout supports the briefed number of handwash basins. For example, where sharing of a basin is proposed, whether the proposed layout facilitate this shared basin. In some cases, additional basins may be needed. The design may also locate two basins in very close proximity so it may be possible to remove basins without compromising clinical safety.
- Design development to ensure that the placement of basins has not changed and that ABHR brackets, where used, are situated in the right locations. This will include a whole of unit assessment to ensure that all requirements for ABHR are included (e.g., entry and waiting areas, corridors etc.).
- Fitting, Furniture and Equipment (FFE) selection where sample basins (a Group 1 item) are approved by the health service. This approval must include IPC experts, to ensure that the basin meets the performance and design requirements, as detailed in Section 4.1.3 of this guideline.

The Appendices contains a checklist for assessing design compliance and addressing relevant issues.

Table 1 outlines overarching assumptions to considered when using the information. These include:

- Handwash basins should be positioned for easy access by staff within. They should also be placed at a sufficient distance from the patient's bed space/zone and equipment to avoid splashing. Where adequate positioning of the handwash basins within the rooms is unable to be achieved, locating them directly outside each single bedroom will be based on local IPC team assessment.
- Where basins are shared between patient bays, the location should facilitate ready access from each bay.
- Handwash basins in clinical areas must not have equipment or clinical trolleys stored in the splash zone.
- Soap dispensers are to include both a general liquid hand soap product and a liquid antiseptic product dispenser in areas where physical contact with patients occurs. The provision of liquid antiseptic soap may be risk assessed in areas where direct patient contact may be minimal such as in mental health units. A general soap dispenser is to be provided in all other locations (e.g., staff/public/visitor toilets).
- Glove dispensers are not to be located with basins.
- Moisturisers are not required at every basin but are to be strategically located through the unit.
- Where available, information in the below table is consistent with National Hand Hygiene Implementation Guide 2024.

The following table recommends the minimum number of basins and ABHR dispensers for particular rooms/spaces. For rooms that are not listed, refer to a similar rooms/spaces.

Table 1 Schedule and Placements of Hand Hygiene Facilities

Room / Space	Basin Type	ABHR	Placement Details
Clinical Rooms / Spaces			
Acute and Subacute inpatient bedrooms (single & multi-bed)	B	At point of care in every bed space.	Handwash basins should be positioned for easy access by staff within or directly outside each single bedroom (based on local IPC team assessment). One handwash basin to be provided within each double room and four bedrooms. ABHR will be located on the end of every bed or on wall of each bed space using either a fixed or removable bracket.
Mental health inpatient bedrooms	Not provided within the room.	To be located in staff areas only.	Type B handwash basin to be accessed in corridors. (1 for approx. 6 beds).
Birthing rooms	A	At point of care in every bed space.	A handwash basin to be provided within each birthing room. ABHR will be located on the end of every bed or on wall using either a fixed or removable bracket.
Intensive Care – adult & paediatric	A	At point of care in every bed space.	A handwash basin to be provided within each single enclosed room. For open bays, one handwash basin to be shared between two to four bays subject to the unit layout and ease of access from each bay (assume one basin between two bays in early planning and assess opportunities for a more efficient allocation during schematic design). ABHR will be located on the end of every bed, on equipment trolley, on write up station or on wall using either a fixed or removable bracket.
Neonatal Care	A	At point of care in every bed space.	A handwash basin to be provided in each single enclosed room. For open bays, one handwash basin to be shared between four to six bays subject to the unit layout and ease of access from each bay (assume one basin between four bays in early planning and assess opportunities for a more efficient allocation during

Room / Space	Basin Type	ABHR	Placement Details
			schematic design). ABHR will be located on every cot, on equipment trolley, on write up station or on wall using either a fixed or removable bracket.
Day medical bed bays (oncology, dialysis etc)	A/B	At point of care in every bed space.	A handwash basin to be provided for every four patient bays. Type of basin will depend on the services provided. Type A may be required for specialty unit where procedures are undertaken (e.g., renal dialysis). ABHR will be located on the end of every bed, on equipment trolley or on wall using either a fixed or removable bracket.
Day Procedure Rooms (endoscopy etc)	A	Within the room, close to entry/exit.	A handwash basin to be provided for each procedure room unless a scrub trough is provided directly outside and provided for each room or shared between two rooms. ABHR will be located on trolleys (except on procedural set up), or on anaesthetic machine, or wall mounted.
Imaging Rooms – Diagnostic	Provision of a handwash basin within the room is optional and must be informed by local clinical requirements. A Type B handwash basin may be shared between two rooms.	Within the room, close to entry/exit.	The inclusion of a handwash basin is optional and should be informed by consultation with medical imaging and IPC staff. Handwash basins will be required within imaging rooms with contrast usage, those used for procedures or to support trauma services. For MRI, basins musty be located external to the room for safety but with close access for staff. A handwash basin shared between two rooms must be directly accessible in the corridor from both rooms. ABHR will be located within the imaging room, on trolleys, or wall mounted.
Imaging Rooms - Interventional *(Angiography & Catheter Laboratory)*	Scrub bay to be located outside the procedural room.	Within the room, close to entry/exit.	ABHR will be located on trolleys (except on procedural set up), or on anaesthetic machine, or wall mounted.
Imaging Rooms – Interventional *(Other)*	A	Within the room, close to entry/exit.	A handwash basin to be provided for each procedure room (not for MRI) unless a scrub trough is provided directly outside. ABHR will be located on trolleys (except on procedural set up), or on anaesthetic machine, or wall mounted (not for MRI).
Anaesthetic Room	A	Within the room.	A handwash basin to be provided for each Anaesthetic Room. ABHR will be located on either a fixed or removable bracket within the Anaesthetic Room.
Operating Room	Scrub trough	Within the room, close to entry/exit.	Provided for each Operating Room or shared between two rooms. ABHR will be located on trolleys (except procedural set up), or on anaesthetic machine, or wall mounted).
Patient Bay – Recovery Stage 1 Stage 2/3	A B	At point of care in every bed space.	A handwash basin to be provided for every six patient bays subject to the unit layout and ease of access from each bay. ABHR will be located on the end of every bed or on wall using either a fixed or removable bracket.

Room / Space	Basin Type	ABHR	Placement Details
Emergency Department Patient Bay – Resuscitation	A	At point of care in every bed space.	A handwash basin to be provided for every patient bay. A handwash basin to be provided in each single enclosed room. ABHR will be located on the end of every bed or wall mounted using either a fixed or removable bracket.
Emergency Department Acute, ambulatory treatment bays, short stay zones etc.	B	At point of care in every bed space.	A handwash basin to be provided for every four to six patient treatment bays subject to the unit layout and ease of access from each bay. In some cases, a lower ratio will be provided as less than six patient treatment spaces may be provided. A handwash basin to be provided in each single enclosed room. ABHR will be located on the end of every bed using either a fixed or removable bracket.
Emergency Department Triage Room	Provision of a handwash basin within the room is optional and must be informed by local clinical requirements. A Type B handwash basin may be shared outside the triage rooms.	At point of care in every bed space.	The inclusion of a handwash basin is optional and should be informed by consultation with ED and IPC staff. A handwash basin shared outside the room must be directly accessible in the ED clinical side corridor of the triage rooms. ABHR will be located on either a fixed or removable bracket within the triage space.
Treatment/ Procedure Room	A	Within the room, close to entry/exit.	A handwash basin to be provided in each room. ABHR will be located on the end of every bed using either a fixed or removable bracket.
Dental Room	B	Within the room, close to entry/exit.	A single handwash basin to be provided for each closed dental room or shared between two open surgeries. ABHR should be located on a bench or bracket, so it can be used when non-sterile gloves are donned and doffed. The use of these gloves is required for every oral health procedure.
Consult Room	Generally, not required within room (may require a Type B for some services depending on clinical requirements).	Within the room, close to entry/exit.	Inclusion of a handwash basin within the room will depend on clinical requirements. Some specialties may require this where consultation has a high risk of hands becoming visibly soiled. Generally not required within standard consult rooms, however, access to a handwash basin nearby will be required, e.g. corridor. ABHR will be located on the end of every bed using either a fixed or removable bracket.
Shared Entry / Communal / Therapy Areas			
Entry to or from a clinical unit (e.g., inpatient unit) and other public areas.	Not required except for specialised/ high risk units e.g., Bone Marrow Transplant Unit.	At entry to units with associated signage.	ABHR should be available in waiting rooms, reception areas, hospital foyers and near elevator doors in high-traffic areas.
Communal/ Multipurpose Areas e.g. Family Rooms, Patient Lounge	Not required.	At entry to the room.	Access to a handwash basin should be in close proximity, e.g., adjacent corridor.

Room / Space	Basin Type	ABHR	Placement Details
Gymnasium	Not required.	Provided within each space.	Access to a handwash basin should be in close proximity, e.g., adjacent corridor. ABHR will be located on brackets within the gym so that staff can access easily when patient treatment is being undertaken. Within each plinth space, ABHR will be located on the end of every plinth using either a fixed or removable bracket.
Hydrotherapy	Required as part of the toilet/change areas.	Provided at entry/waiting room.	
Clinical Support Rooms			
Clean Store	Not required.	Within the room, near entry.	
Medication Room (stand-alone or combined with Clean Store)	Optional. Where provided a Type B handwash basin is required.	Within the room, near entry.	The inclusion of a handwash basin in medication stores is optional based on IPC risk assessment with consideration of the risk associated with waterborne pathogens. Where not provided in the room, a basin should be accessible directly outside the room and operational policies should be established relating to management of medication spills and splashes.
Clean-up Room/ Dirty Utility Room	B	Within the room, near entry.	A handwash basin to be provided for each room in a clean zone of the room.
Mortuary	B		
Postmortem (autopsy)	A		A handwash basin to be located in each autopsy room.
Pathology Laboratory	B		Allocation will be dependent on layout of laboratory areas.
Isolation anteroom/ airlock	B	Near entry to negative pressure room.	A handwash basin to be located within anterooms. It is recommended that Type A handwash basins are located in airlocks that support Q Class rooms.
Inpatient unit corridors	B	ABHR to be strategically located throughout the unit.	While staff may need access to a handwash wash basin in the corridor, it is likely that in most circumstances, access to ABHR will be adequate given access to hand wash basins in patient care and other support areas is provided.
Beverage Bay	Not required.	Access to ABHR.	Access to a handwash basin in close proximity,
Food Servery	C		A handwash basin to be located where patient food is routinely prepared/served.
Formula Rooms	B	Not required.	Access to handwash basin with soap and water only.
Sterile Supply Unit (SSU)	B	Access to ABHR.	Handwash basin to be provided in the cleaning/ decontamination area. Handwash basins should not be located in the packing and sterilizing areas as the basins pose a hazard for contamination of RMDs. ABHR is more suitable in these areas.
Cleaners Room	C	Access to ABHR.	
Disposal (Waste Holding) Room	Not required.	Access to ABHR.	A handwash basin should be provided in close proximity but does not need to be within the room.
Back of House Areas			
Maintenance Areas	C		
Dirty Linen Storage	C or close access.		Access to handwash basin nearby is required.

Room / Space	Basin Type	ABHR	Placement Details
Kitchen	C		Access to handwash basin at entry. Sinks used for the preparation of foods should not be used for handwashing.
Amenities and Staff Support Areas			
Staff/Public/Visitor Toilets	C	Not required.	
Parent room/Baby change room	C	Not required.	
Meeting/Education Rooms	Not required.	In multiple locations depending on size of room.	
Staff work areas, including staff rooms	Not required in staff areas except for easy access from the staff room.	In multiple locations depending on size of area.	ABHR does not need to be wall mounted, can be placed on desks and must be accessible. Access to handwash basin near staff room is required.

4.1.6 Mirrors

Mirrors may be installed in anterooms, near PPE bays and near the entry to surgical scrub rooms, to assist staff in correctly donning and doffing caps, masks and to check their hair is appropriately covered.

4.1.7 PPE Storage / Dispensers Location

PPE may include aprons, gowns, gloves, surgical masks, respirators, protective eyewear and face shields or a combination of several of these items (NHMRC, 2019, pg. 108). The PPE locations and type of storage/dispensers should be considered early in the planning and design of the facility.

Transmission-based precautions are recommended for specific patients known (or suspected) to be infected or colonised with infectious agents that may not be contained by standard precautions alone.

All patient rooms should have storage available for PPE. Depending on the ward layout and local infection risk, PPE should be located outside:

- each single bedroom or pair of single rooms or
- each two or four-bedded room (where cohorting is common).

A dedicated handwash basin is not needed as basins are available in clinical corridors. PPE and associated products will routinely include:

- a bracket for ABHR
- gowns
- a disposable gloves dispenser
- masks
- eyewear/face shields.

In negative pressure isolation rooms, PPE is stored in the anteroom.

Some health services have developed custom solutions to accommodate PPE which needs to be approved by the IPC team.

Gloves Dispensers

A disposable glove dispenser, sufficient to hold all glove sizes (usually four sizes), should be located near areas at point of use or where staff are likely to come into contact with body substance, blood and body fluids. Long cuff protective gloves dispensers should be available in birth suites with birthing pools, SSU and endoscope reprocessing areas. The dispenser should allow re-stocking without the need to touch new gloves and be located away from the splashback to prevent splash contamination. Also consider risk of contamination if glove dispenser is located in patient toilet/shower/bathroom.

4.2 Physical Environment

4.2.1 Air Conditioning and Ventilation

General

The control of infection is influenced by the design and effectiveness of the air conditioning and ventilation systems. Specialised areas of a healthcare facility (e.g., operating rooms, sterilization units, birthing rooms, negatively and positively pressured isolation rooms, burns unit, intensive care units (ICU), emergency departments and special treatment or procedural areas) should always provide high quality air.

The management of airflows and the creation of a turbulence-free environment are essential to the control of the spread of infection.

The minimum standards for ventilation suggested in the ACSQHC (2022) states that minimum rates for ventilation in healthcare settings are:

- At least six air changes per hour for standard rooms
- At least twelve air changes per hour for rooms where patients are requiring airborne precautions or aerosol-generating procedures (AGP) are being performed
- At least ten air changes per hour for dirty utility rooms for odour control.

The clinical procedures considered as AGPs are noted below. However, there is no universal consensus as to what constitutes an AGP.

- Autopsy procedures
- Bronchoscopy
- Cardiopulmonary resuscitation (including chest compressions)
- Dentistry procedures
- Manual ventilation (before intubation)
- Non-invasive ventilation
- Sputum induction using nebulised hypertonic saline
- Tracheal intubation
- Tracheostomy

This is general advice and while these minimum rates will be applied to most patient care areas, there are exceptions which are detailed in engineering services guidelines published by many jurisdictions in Australia including NSW and Victoria. The Thoracic Society of Australia and New Zealand issued a position statement for the safe clinical use of sputum induction for bio-sampling of the lower airways in children and adults (2024).

The provision of natural ventilation to patient care areas should be approached with caution. Non-air-conditioned spaces rely on natural airflows to achieve comfortable conditions. The natural airflows required to achieve comfortable conditions, and the airflows generated by supplementary ventilation (e.g., bladed or bladeless fans that generate turbulence and unpredictable airflows) have the potential to spread infection from person to person. Sweep ceiling fans, portable fans and evaporative cooling systems should not be installed or used. Ventilation equipment should maintain the temperature, humidity, and purity of the air, plus the inflow of fresh air, all within prescribed limits.

Return air paths in clinical areas will be provided via dedicated return air ducting.

All supply air and return air registers and grilles should be removable for regular scheduled cleaning. They should not be installed directly above a patient bed.

Jurisdictions without national/regionally developed guidance within the past 5 years should use an accepted international guidance e.g., American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 170:2021. Ideally, and where appropriate, this should be augmented with ASHRAE 241:2023 or similar.

Resources that address air conditioning topics can be found in the following sources:

- ACSQHC, 2022, Optimising ventilation for infection prevention and control in healthcare settings
- AHIA, AusHFG Isolation Rooms – Engineering and Design Requirements
- AHIA, AusHFG Pandemic Preparedness – Health Infrastructure Planning & Design Guidance
- CDC, 2003, Guidelines for Environmental Infection Control in Health-Care Facilities
- AS 1668.2:2024 The Use of Ventilation and Airconditioning in Buildings, Part 2. Mechanical Ventilation in Buildings
- Other specific jurisdictional guidelines.

Split Systems

The use of split system air conditioners is a common way of resolving local cooling problems in new developments or retrofitted facilities. Their use should be avoided in patient care areas due to IPC issues. The following factors need to be considered:

- routing of condensate drains
- air flow and turbulence effects
- maintenance and adequacy of filters.

The use of split system air conditioners should be confined to process cooling for equipment such as those used in computer rooms and MRI equipment rooms, and staff only and non-patient care areas.

4.2.2 Water Systems

Healthcare facilities can reduce water-based risks through effective design and management of the facility's water system. Considerations for water systems include:

- Design should avoid 'dead legs'. Dead legs should not be designed or built into a new system. Pipe work should be designed to be as direct as possible, avoiding stretches that do not recirculate. Consideration should be given to the removal of dead legs at every available opportunity when sites are undergoing renovations.
- Consider installation of sample points e.g. relevant to AS 5369:2023 to ensure smooth integration that minimises biofilm and dead legs. Sample points should be accessible and reflect the water source at the required point.
- Design should promote good turnover of water to reduce risk of stagnation.
- All pipework should be easily accessible for inspection, maintenance and repair.
- All pipe components should be simple and avoid internal channels or surfaces that cannot be cleaned/replaced in order to avoid biofilm formation.
- Thermostatic mixing valves (TMV) which controls water temperature should be monitored to ensure temperature range is correct.
- Fixtures including tapware, showers, drains and pipes should be chosen to minimise formation of biofilm on internal surfaces and to minimise splash risk.
- Consider and review risks of water system work being conducted during redevelopment or blockages repair to ensure effluent does not spill to clinical spaces especially in high-risk departments, plant and equipment in areas such as operating theatres or medical imaging.
- In addition to design considerations, water safety requires a governance structure to ensure there is a programme for monitoring, maintenance, repair and facilitation of response/escalation when there are water quality and safety issues.

Also refer to below for water quality and sampling requirements for reprocessing of RMDs:

- AS 5369:2023 Reprocessing of reusable medical devices and other devices in health and non-health related facilities.

Reticulated Water Systems

For further information refer to the following documentation:

- National Construction Code (NCC), 2022, Volume 3 Plumbing Code of Australia (PCA)
- AS/NZS 3666.1:2011 Air-handling and Water Systems of Buildings – Microbial Control – Design, Installation and Commissioning.

Thermostatic Mixing Valves

Where thermostatic mixing valves (TMV) are fitted, water temperature should be routinely checked to ensure warm water is maintained within the prescribed range. The valves should also be easily removed for maintenance purposes. Risk assessment relating to the need for more secure fixture should be undertaken in areas where TMV covers may be utilised as weapons such as emergency departments or mental health units.

Ice-Making Machines

Ice intended for human consumption should be obtained from self-dispensing 'on-demand' ice machines. Ice from trough reservoir type ice machines must not be consumed orally but may be used for clinical uses, such as ice packs.

Ice intended for receptacles for therapeutic use or conventional ice storage for donor organs can be obtained from an ice-making machine located in a dedicated clean area/bay. A clean storeroom will not be suitable for storage of such a machine. Routine cleaning and maintenance should be incorporated into the equipment surveillance program and the facility's legionella water management processes. Carbon filter with particulate filters is used in ice machines in some instances.

Drinking Water Fountains and Drinking Water Dispensers

Conduct a thorough risk assessment and establish a comprehensive water management program where drinking water sources are installed. In clinical areas, choose drinking fountain designs that prevent microorganism growth, reduce contamination, and are easy to clean/disinfect. Additionally, consider the following:

- Eliminate sections with no or low water flow (dead legs).
- Recognise that low-flow and mechanically complex fixtures (e.g., electronic sensor taps) can increase the risk of Legionella growth.
- Identify water system components that accelerate the decay of disinfectant residuals.
- Regularly clean and maintain water system components, such as aerators, filters, dispensing systems, and storage tanks.
- Consider installing sampling ports in strategic locations to facilitate water parameter monitoring and validation.

Water Features

The provision of water features such as aquariums, fountains and waterfalls inside healthcare facilities is not recommended as they have IPC associated risks. An IPC risk assessment should be conducted if any water features are to be included in the healthcare facility design. If these features are proposed as part of the design, a closed system pump design that prevents aerosolization must be provided. Additionally, the cost of operation, cleaning, maintenance and water testing should be considered from the outset to ensure water health and safety. This includes agricultural testing of aquariums, ponds and other open water which hold fish and water plants which may be accessed by birds, pests and insects.

4.2.3 Legionella

Legionnaires' disease is a serious and potentially life-threatening lung infection caused by the bacteria Legionella.

Transmission of Legionella pneumophilia is through air by inhaling fine droplets of water contaminated with the organism and are associated with warm water environments such as cooling towers, evaporative air

conditioners, showers, warm water systems, spa pools, misting or droplet sprays and fountains. Legionella bacteria thrive at the optimum temperature of 37°C and die at approximately 46°C.

Plant and equipment, including air handlers, water cooled cooling towers, pipe work systems in warm water and domestic hot water systems should be designed, installed and maintained in accordance with all federal, state/territory regulations, standards and guidelines on cooling towers and hot and cold-water services.

For more information see:

- Heymann, D.L. (ed), 2022, Control of Communicable Diseases Manual, 21st Edition
- AS/NZS 3666 Air-handling and Water Systems of Buildings Set
- Australian Building Codes Board (ABCB), WaterMark
- Specific jurisdiction's Legionella guidelines.

4.3 References

- American National Standards Institute (ANSI), 2021, ANSI/ASHRAE/ASHE 170-2021: Ventilation of Health Care Facilities, American National Standards Institute, New York, NY.
- American National Standards Institute (ANSI), 2023, ASHRAE 241-2023: Control of Infectious Aerosols, American National Standards Institute, New York, NY.
- Australian Building Codes Board (ABCB), 2024, WaterMark, Canberra, Australia.
- Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards, Preventing and Controlling Infections Standard. 2nd ed. – version 2. Sydney: ACSQHC; 2021.
- Australian Commission on Safety and Quality in Health Care, National Hand Hygiene Initiative – NHHI, Sydney, Australia.
- Australian Commission on Safety and Quality in Health Care, 2024, National Hand Hygiene Initiative Implementation Guide, Sydney, Australia.
- Australian Commission on Safety and Quality in Health Care, 2022, Optimising ventilation for infection prevention and control in healthcare settings, Sydney, Australia.
- Australian Commission on Safety and Quality in Health Care, 2021, Recommendations for the control of carbapenemase-producing Enterobacterales, Sydney, Australia.
- AHIA, AusHFG Standard Components, Bay – Handwashing, St Leonards, Australia.
- AHIA, 2018, AusHFG Part C: Design for Access, Mobility, Safety and Security, St Leonards, Australia.
- AHIA, 2016, AusHFG Isolation Rooms – Engineering and Design Requirements, St Leonards, Australia.
- AHIA, 2023, AusHFG Pandemic Preparedness – Health Infrastructure Planning & Design Guidance, St Leonards, Australia.
- AHIA, 2020, AusHFG Part E: Building Services and Environmental Design, St Leonards, Australia.
- Centers for Disease Control and Prevention (CDC), 2003 (updated 2019), Guidelines for Environmental Infection Control in Health-Care Facilities, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), Atlanta, GA.
- Clinical Excellence Commission (CEC), 2020, Infection Prevention and Control Practice Handbook, Version 3, St Leonards, Australia.
- Heymann, D.L. (ed), 2022, Control of Communicable Diseases Manual, 21st Edition, APHA Press, Washington, DC.
- National Construction Code (NCC), 2022, Volume 3 Plumbing Code of Australia (PCA), Australian Building Codes Board, Canberra, Australia
- National Health and Medical Research Council (NHMRC), 2019, Australian Guidelines for the Prevention and Control of Infection in Healthcare, Canberra, Australia.

- Schultz A, Balaguruswamy S, Dentice R, Dobler CC, Geake J, Gibson P, et al., 2024, Thoracic Society of Australia and New Zealand position statement: The safe clinical use of sputum induction for bio-sampling of the lower airways in children and adults. Respirology. 2024;29(5):372–8.
- American Society for Health Care Engineering (ASHE), 2015, Using the Health Care Physical Environment to Prevent and Control Infection. Chapter 2: Hand Hygiene Infrastructure, New York, NY.

Australian / New Zealand Standards

- Standards Australia, 2015, AS 1071:2015 Placement and presentation of hand hygiene materials in relation to the basin in healthcare settings, Standards Australia, Sydney, Australia.
- Standards Australia 1995 (Reconfirmed 2016), Handbook 32: Control of microbial growth in air-handling and water systems of buildings.
- Standards Australia, AS/NZS 3666.1:2011 Air-handling and Water Systems of Buildings – Microbial Control – Design, Installation and Commissioning.
- Standards Australia, AS/NZS 3666.2:2011: Air-handling and water systems of buildings - Microbial control, SAI Global: Part 2: Operations and Maintenance
- Standards Australia, 2021, AS 1428 (Set) Design for access and mobility set, Standards Australia, Sydney, Australia.
- Standards Australia, 2024, AS 1668.2:2024 The Use of Ventilation and Airconditioning in Buildings, Part 2. Mechanical Ventilation in Buildings, Standards Australia, Sydney, Australia.
- Standards Australia, 2011, AS/NZS 3666.1:2011: Air-handling and water systems of buildings — Microbial control, Part 1: Design, installation and commissioning, Standards Australia, Sydney, Australia.
- Standards Australia, 2021, AS/NZS 3718:2021 Water Supply – Tap Ware, Standards Australia, Sydney, Australia.
- Standards Australia, 2023, AS 5369:2023 Reprocessing of reusable medical devices and other devices in health and non-health related facilities, Standards Australia, Sydney, Australia.
- eHealth, 2015, Guidelines for Legionella control in the operation and maintenance of water distribution systems in health and aged care facilities, Australian Government, Canberra.

Additional information is available from local jurisdictional sources below:

New South Wales

- NSW Health Policy Directive, 2023, PD2023_025: Infection Prevention and Control in Healthcare Settings.
- NSW Health Policy Directive, 2015, PD2015_008: Water - Requirements for the Provision of Cold and Heated Water.
- State of New South Wales, 1991, Public Health Act 1991: Part 4 Microbial Control, [Available online at – https://legislation.nsw.gov.au/view/html/repealed/current/act-1991-010#pt.4 accessed 14 October 2024.
- State of New South Wales, 2000, under the Public Health Act 1991: Public Health (Microbial Control) Regulation 2000.

Queensland

- Queensland Government, Centre for Healthcare Related Infection Surveillance and Prevention & Tuberculosis Control, 2013, Guideline - Hand Hygiene.

Victoria

- Victorian Legislation, Public Health and Wellbeing Regulations 2019, Version 027.

05 Patient-Centred Controls

5.1 General

Calculation of Numbers of Single Rooms

When developing or redeveloping healthcare facilities, project planning teams should use available service planning and incidence data to determine the number and type of single rooms required, and the mix of isolation rooms.

Other factors to consider for single room provision apart from IPC include:

- patient privacy and dignity such as in palliative care units
- family/whanau-based care
- delirium management
- staff to patient ratios.

The provision of single bedrooms must be weighed against patient-staff ratio to ensure staff visibility and patient safety.

The recommendation for patient accommodation should be designed to maximise patient comfort and dignity, ensure ease of delivering safe patient care and promote patient flow. For new build facilities it is recommended that 60-80% of beds across the hospital should be provided as single rooms with their own ensuite. This acknowledges that a number of units will have predominantly 100% single bedrooms (e.g. mental health, maternity, intensive care infectious diseases and palliative care units). For acute medical and surgical inpatient units, 50-60% single bedrooms is recommended as per the advice noted in AusHFG HPU 340. For refurbishments, consideration should be given to increasing the number of single rooms towards this range, where the design will allow.

For further information, refer to:

- AHIA, AusHFG, Pandemic Preparedness - Health Infrastructure Planning & Design Guidance
- ACIPC, 2024, Position Statement on Construction and Renovation in Healthcare Facilities
- Also refer to specific HPUs including HPU 340 Adult Acute Inpatient Unit.

The need for negative pressure rooms will be dependent on an assessment of the health services baseline infection rate and recent trends. The requirement for Class P isolation rooms should be determined by data on local threats from pathogens such as Aspergillus, as well as evidence (from within and beyond the facility) on the ability to protect vulnerable patients. This will depend on the clinical specialties within the facility or catchment area, for example in specialised facilities which provide organ transplant services.

5.2 Isolation Rooms

Introduction

This guideline describes and identifies requirements for patients requiring transmission-based precautions, or for patients who require protection from external sources.

Also refer to AHIA, AusHFG Isolation Rooms – Engineering and Design Requirements.

Types of Isolation Rooms

There are four types of isolation rooms. The isolation room types and uses are detailed in Table 2.

Table 2 Isolation Room Types

AusHFG	Short Description
Class S – Standard	Standard isolation
Class P – Positive pressure	Patient protection
Class N – Negative pressure	Respiratory isolation
Class Q – Quarantine	Quarantine isolation plus airlock

Isolation rooms Class S and Class N, when not required for the care of patients with a suspected/confirmed infectious disease, can accommodate other patients once the room is vacated and cleaned as per the IPC policy of the facility.

The risk of utilising Class N rooms for patients other than those with infectious diseases is that doors can be left open, compromising the door seals. In addition, negative air pressure may be turned off, which may further compromise the integrity of the mandatory mechanics required for IPC.

Patients with airborne transmitted diseases, such as varicella, measles, and tuberculosis will not be accommodated in Class P isolation.

Controls for pressurised isolation rooms should be located to minimise the risk of tampering. Staff should be able to easily view pressure gauges.

Class S – Standard Isolation Room

A Class S isolation room is a single room with an ensuite that is not shared. The room is used for patients who require isolation to minimise the potential for infections being transmitted by contact or droplets to other patients and staff.

Self-closing doors to help control room temperature are recommended. A PPE bay may be provided outside the door and may be shared with an adjacent room.

There are no specific requirements for air conditioning.

Class P – Positive Pressure Isolation Room

A Class P isolation room is a single room with an ensuite that is not shared. This room is used to provide clean filtered air and reduce infection risk to highly immunocompromised patients e.g. haematopoietic stem cell recipients in the pre-engraftment phase and severe burns patients.

A Type A (in ICU) or B (in IPU) handwash basin is required within the room. Self-closing doors are recommended to control room pressures.

The positive pressure air handling system within the room operates at a higher pressure, with respect to adjacent rooms/spaces, and air supply is high efficiency particulate air (HEPA) filtered. For details of air changes etc., refer to Section 6.6 of AS 1668.2 (Protective Isolation Rooms) or ASHRAE 170:2021.

An enclosed anteroom is not required, but sufficient and appropriate storage space should be provided outside the room for PPE. Waste disposal should be provided inside the room.

For further information, refer to AS 1668.2:2024 The Use of Ventilation and Airconditioning in Buildings, Part 2: Mechanical Ventilation in Buildings.

Class N – Negative Pressure Isolation Room

A Class N isolation room is a single room with an ensuite that is not shared. It is used for patients who require isolation to reduce airborne transmission of disease (e.g., varicella, measles, pulmonary or laryngeal tuberculosis).

A Type A (in ICU) or B (in IPU) handwash basin within the room and a self-closing door are required, with sufficient and appropriate storage for clinical waste.

Consider safety in the planning and design of the anteroom such as not providing interlocking doors and provision of exit button in case of emergencies. Precautions with time release doors during clinical emergencies should be considered for anteroom doors.

The air handling system in Class N isolation rooms operates at a lower pressure with respect to adjacent areas such as the anteroom and corridor. Air in negative pressure rooms will be exhausted to the outside in accordance with AS 1668.2 or ASHRAE 170:2021 to prevent air recirculation. Ideally, supply air into the room should be located on the ceiling above the foot of the bed. The exhaust air to be located at the head of the bed.

The discharge points should be located as far as possible from air intakes and from where people congregate or work. If external exhaust is not possible, air should be recirculated through HEPA filters. Provision of a dedicated exhaust system to each room, separate to the common exhaust air system, will reduce the risk of contamination.

Based on the models of care, units that may require one or more Class N rooms include:

- emergency unit
- medical assessment unit
- intensive care units (adult, paediatric, neonatal)
- respiratory units
- paediatric inpatient units
- adult inpatient units
- infectious diseases units.

Procedural areas such as bronchoscopy rooms and sputum induction rooms may require similar negative pressure air handling systems.

The air handling systems designed for airborne infection isolation should be connected to the emergency backup power in case of power failure. These rooms have additional seals to prevent inadvertent escape of pathogens, therefore with no ventilation in the event of sustained power failure; isolation of airborne patients with infectious conditions becomes a patient safety risk.

For more information also see:

- AS 1668.2:2024 The Use of Ventilation and Airconditioning in Buildings, Part 2. Mechanical Ventilation in Buildings
- AHIA, AusHFG Pandemic Preparedness – Health Infrastructure Planning & Design Guidance
- AHIA, AusHFG Isolation Rooms – Engineering and Design Requirements.

Class Q – Quarantine Isolation Room

A Class Q isolation room is a single room with a dedicated ensuite that is not shared and includes all design requirements as described for a negative pressure room. In addition, the quarantine isolation room will require an anteroom designed to function as an absolute airlock.

Inclusion of an electronic communication system (intercom) between the isolation room and the airlock will assist in eliminating or reducing unnecessary traffic into the room.

One hospital in each Australian capital city will have designated Class Q rooms providing facilities for patients with highly infectious pathogens such as haemorrhagic fevers and pneumonic plague. These patients require a further level of containment over and above the standard negative pressure isolation room.

Combined Alternating Pressure Isolation Rooms

Combined alternating pressure rooms (enabling the room to have either negative or positive pressure) are NOT recommended due to concerns such as:

- the difficulty in the configuration of appropriate airflow for two fundamentally different purposes
- the risk of operator error
- the need for complex engineering
- the absence of failsafe mechanisms.

Design Principles for Isolation Rooms

The location and design of isolation rooms within a particular department or inpatient unit should provide environmental controls to mitigate risk of infection transmission to others. Controlled air flow may be achieved by:

- controlling the quality and quantity of intake and exhaust air
- diluting infectious particles in large volumes of air
- maintaining differential air pressures between adjacent areas
- designing patterns of airflow for particular clinical purposes.

Where possible in an emergency department, designated isolation rooms be located near the entry to ambulatory and ambulance triage to prevent spread of possible airborne infection throughout the unit.

Consideration may be given to one whole floor level, or a defined section of inpatient accommodation, being designed with separate air-conditioning and exhaust systems to enable healthcare facilities to accommodate an infectious outbreak. Refer to AHIA, AusHFG Pandemic Preparedness – Health Infrastructure Planning & Design Guidance for further information.

When planning isolation rooms, consider:

- clustering of isolation rooms that does act as soundproofing therefore hindering communication between staff in the open areas of the unit
- sufficient and appropriate storage space for waste receptacles inside the room
- sufficient and appropriate storage space for PPE outside the room
- sufficient space for adequate segregation of donning and doffing zones for rooms likely to be used for patients with High Consequence Infectious Diseases (HCID) such as viral haemorrhagic fever (VHF)
- provision of an observation window with a privacy blind between double glazing (to allow staff to observe patients without entering the isolation room)
- provision of a communication system such as a phone or intercom to allow communication between staff, patients, interpreters, visitors etc. without leaving the room
- suitable surface finishes (ceiling, walls, floor coverings etc.).

Engineering Requirements

Details of engineering requirements and services for isolation rooms are available from a number of sources including:

- AHIA, AusHFG Isolation Rooms – Engineering and Design Requirements
- AS 1668.2:2024 The Use of Ventilation and Airconditioning in Buildings, Part 2. Mechanical Ventilation in Buildings
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 170:2021
- American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 241-2023.

Jurisdictional guidelines:

- NSW Health Engineering Services Guide
- Queensland Health Capital Infrastructure Requirements, Vol 4 Section 1 & 2
- Victorian HTG-2020-004: Isolation Rooms
- Western Australian Health Facility Guidelines for Engineering Services.

Consideration should be given to individual units that may be easily upgraded with HEPA filters and other upgrades as required in the event of pandemics.

Anterooms

Anterooms allow staff and visitors to change into, and dispose of, PPE when entering and leaving rooms used for caring for infectious patients. Clean and dirty workflows within this space should be considered so that separation is possible.

Anterooms increase the effectiveness of isolation rooms by minimising the potential escape of airborne nuclei into a corridor area when the door is opened. Airflow to assist in controlling leakage into the corridor should be considered.

For Class N isolation rooms, the pressure in the anteroom is lower than the adjacent ambient (corridor) pressure, and positive with respect to the isolation room. The pressure differential between rooms should be not less than 15 Pascal.

Anterooms are provided for Class N isolation rooms in ICUs, emergency departments, birthing units, infectious diseases units, and for an agreed number of patient bedrooms within inpatient units accommodating patients with respiratory conditions. The need for anterooms for Class N rooms in other HPUs should be considered on a case-by-case basis.

An anteroom should not be shared between rooms.

The location of the anteroom is dependent on jurisdictional and operational requirements. Placing the anteroom to the side of the bed room, which is the common configuration, provides unobstructed patient observation from the corridor. A separate patient entry door to the bed room allows movement of the patient in and out of the room. In this configuration, the anteroom is only for use by staff and visitors. Placing the anteroom in front of the bed room which allows the bed to pass through requires a larger anteroom and will require further considerations for patient observation.

Airlocks for Q Class Rooms

Anterooms in Class Q rooms act as full airlocks with two interlocking doors that cannot be opened simultaneously. The airlock will need to be large enough to incorporate additional disposal facilities as well as allowing bed movement with doors interlocked.

Ensuring that the pressure in the airlock is lower than the adjacent ambient (corridor) pressure, and positive with respect to the isolation room. The pressure differential between rooms should be no less than 15 Pascals. The door to the airlock from the corridor is to be well sealed with good quality seals on each side. The airlock should have supply air (no exhaust) with a door grille between the airlock and the isolation room.

Functional Classification of Isolation Rooms

The functional classification of isolation rooms is provided in the table below.

Table 3 Functional Classification of Isolation Rooms

	Class P	Class S	Class N	Class Q
Key ventilation criteria	Greater air pressure in the room than in the corridor.	No air pressure difference between room and the adjacent corridor.	Lower air pressure in the room than in the adjacent corridor or anteroom.	Lower air pressure in the room than in the adjacent airlock.
Transmission based rationale	To prevent transmission of pathogens from the outside environment to profoundly immunocompromised patients.	To prevent contact or droplet transmission.	To prevent airborne transmission.	Quarantine of patients with highly transmissible pathogens to prevent airborne transmission.
Examples for use (noting this is not a complete list)	To prevent infections such as aspergillus (fungal infection) in allogeneic bone-marrow transplant recipients.	VRE/MRSA Gastroenteritis Cutaneous anthrax Hepatitis A	Measles and Varicella suspected or proven. Pulmonary or laryngeal tuberculosis. Suspected contact of measles, Varicella, and SARS if symptomatic.	Highly infectious pathogens such as haemorrhagic fevers, pneumonic plague.

For further information, refer to National Health and Medical Research Council (NHMRC), 2019, Australian Guidelines for the Prevention and Control of Infection in Healthcare.

5.3 Baths and Showers

A risk management plan should be undertaken prior to the installation of baths in healthcare facilities given the potential cleaning and maintenance issues.

Bath surfaces should be non-porous and easy to clean. Spa baths are not recommended due to the potential for water backflow and infectious agent contamination.

The shower hose is to be sufficiently short to prevent the shower head from reaching the floor when removed from its bracket

In specialty areas such as an ICU, where patients may be showered on shower trolleys, a longer hose may be necessary. Alternatively, two shower outlets may be preferred.

Specialist burns unit with dedicated bathroom with/without a burns treatment bath require decontamination between patients in line with burns specific guidance to prevent transmission of infection. This room needs to be planned and designed with meticulous attention to surfaces and equipment that are easy to clean and can withstand frequent disinfection.

Hoses should not be installed as part of a delivery bath/pool as the hose may fall into the pool water and become contaminated with pathogens.

In maternity and neonatal care units where baby baths are to be included, a separate handwash basin must be provided. Potential transmission of water borne pathogens must be considered.

5.4 Non-Patient Areas

Waiting areas in non-inpatient units, including ambulatory care units and community health centres, should be designed and arranged so it is possible to separate patients who have been diagnosed with, or are suspected of having, a communicable disease. These areas must have adequate air flow; hence the emphasis is on the environment rather than on the sickness of the patient. The direction of the air flow should be away from the staff that are working in the health facility to reduce their exposure to airborne pathogens.

Air handling and ventilation requirements should be appropriate for the number of people using the space (ASHRAE 241:2023).

5.5 References

- American National Standards Institute (ANSI), 2021, ANSI/ASHRAE/ASHE 170-2021: Ventilation of Health Care Facilities, American National Standards Institute, New York, NY.
- American National Standards Institute (ANSI), 2023, ASHRAE 241-2023: Control of Infectious Aerosols, American National Standards Institute, New York, NY.
- Australasian College for Infection Prevention and Control (ACIPC), 2024, Position Statement on Construction and Renovation in Healthcare Facilities, Hobart, Australia.
- AHIA, 2023, AusHFG Pandemic Preparedness – Health Infrastructure Planning & Design Guidance, St Leonards, Australia.
- AHIA, 2016, AusHFG Isolation Rooms – Engineering and Design Requirements, St Leonards, Australia.
- AHIA, 2020, AusHFG, HPU 340 Adult Acute Inpatient Unit, St Leonards, Australia.
- Centers for Disease Control and Prevention (CDC), 2003 (updated 2019), Guidelines for Environmental Infection Control in Health-Care Facilities, U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), Atlanta, GA.
- National Health and Medical Research Council (NHMRC), 2019, Australian Guidelines for the Prevention and Control of Infection in Healthcare, Australian Government, Canberra, Australia.
- NHS England, 2013, Health Building Notes HBN 00-09 Infection Control in the Built Environment, UK Department of Health, United Kingdom.

- NSW Health, 2023, Engineering Services Guide, NSW Government.
- Queensland Health, 2020, Capital Infrastructure Requirements – Volume 4 Engineering and Infrastructure Section 1: Principles, Queensland Government.
- Queensland Health, 2020, Capital Infrastructure Requirements – Volume 4 Engineering and Infrastructure Section 1: Manual, Brisbane, Queensland Government.
- Standards Australia, 2024, AS 1668.2:2024 The Use of Ventilation and Airconditioning in Buildings, Part 2. Mechanical Ventilation in Buildings.
- Victorian Health and Human Services Building Authority Health Technical Advice (HTA), 2020, Health Technical Advice HTG-2020-004: Isolation Rooms, Victoria State Government.
- Western Australia Department of Health, 2021, Building Guidelines Western Australian Health Facility Guidelines for Engineering Services, State of Westen Australia.

06 Surfaces, Finishes and Components

6.1 General

The nature and type of surfaces and finishes used in healthcare facilities are integral to the management of IPC risks.

This topic is also covered in more detail in AHIA, AusHFG Part C: Design for Access, Mobility, Safety and Security.

All surfaces in patient care areas should be smooth and impervious, and easily cleanable.

Unnecessary horizontal, textured, moisture-retaining surfaces or inaccessible areas where moisture or soil can accumulate, should be avoided.

Fixtures and fittings should be designed to allow easy cleaning and to discourage the accumulation of dust. Blinds contained in double glazing (preferred), curtains and roller-type blinds made of fabric that can be removed and laundered are preferable to louvered and vertical blinds that are extremely difficult to clean.

The bed curtain acts as a signal to staff to identify the patient space. Bed curtains should:

- be disposable or washable
- be easy to remove and hang
- provide enough room for staff to carry out procedures without brushing against the screen when pulled around the bed
- be secured when not in use.

Where there is likely to be direct contact with patients, or with blood or body substances, floors and walls should be surfaced with smooth, impermeable seamless materials such as vinyl. In equipment processing areas work surfaces should be non-porous, smooth and easily cleaned.

The use of wall, door and corner guard protection will reduce damage. This in turn will make cleaning of these surfaces easier.

6.2 Ceilings

All exposed ceilings and ceiling structures in areas occupied by patients or staff, and in food preparation or food storage areas, should be finished to ensure they can be readily cleaned with equipment used routinely in daily housekeeping activities.

In food preparation and other areas where dust fallout would present a potential problem, a finished set plasterboard ceiling should be provided that covers all conduits, piping, duct work and open construction systems.

Ceilings in operating and delivery rooms, isolation rooms, nurseries and sterile processing rooms should be monolithic from wall to wall without fissures, open joints or crevices that may retain or permit the passage of dirt particles.

Light fittings should be recessed, flush fitting and designed to prevent dust build up on the surfaces of the fitting, and to prevent ingress of dust.

Acoustic and/or lay-in ceilings should not be used where particulate matter may interfere with hygienic environmental control.

6.3 Floors

Floor coverings should be slip resistant and easy to clean and repair. The use of carpets is not supported in clinical areas for IPC and maintenance reasons. Other potential risks include patient falls (from creased corners when carpet tiles are replaced) and staff manual handling risks (e.g. from shear force when pushing/pulling beds.

The use of carpet or carpet tiles in selected areas within clinical zones such as interview rooms and office areas can be considered after a risk assessment. In areas subject to frequent wet cleaning, floor materials must be impermeable to water and able to tolerate use of disinfectants.

To comply with relevant standards, floors in areas used for food preparation or assembly should be non-slip, water resistant and greaseproof.

Floors in sterilizing services areas should be non-slip and have smooth surfaces for cleaning.

Also refer to the following standards:

- AS 5369:2023 Reprocessing of reusable medical devices and other devices in health and non-health related facilities
- AS/NZS 4674:2004 Construction and Fit Out of Food Premises.

6.4 Doors, Windows, and Privacy Curtains

Where sliding doors are provided in clinical areas, tracks need to be applied correctly, and cleaning needs to be considered. Surface mounted sliding doors are to be provided in clinical areas.

Privacy curtains may be washable or disposable (which may be recyclable). Consider the patient cohorts, operational and maintenance cost when choosing patient privacy options.

Windows should not be included in sterile storerooms.

It is important to consider the capital, maintenance, operational and life-of-product cost of window treatments in the clinical areas of the hospital. A risk assessment should also be undertaken to determine the suitability of the window treatment. IPC experts must provide oversight to ensure blinds and curtains meet cleaning requirements and standards. Some of the window treatments which can be used in clinical areas are:

Table 4 Window Treatment Comparisons

Window Treatment	Advantages	Disadvantages
Integral venetian blinds	• Suitable for all inpatient areas including high risk inpatient areas (such as infectious diseases wards, respiratory unit, haematology and oncology), all isolation rooms, procedural rooms, operating rooms and sterile stores. • Window surfaces can be easily cleaned or maintained if blinds are encased between glass that are openable. • Environmentally sustainable due to their light and solar characteristics. • Lower whole life cost.	• Higher capital cost. • Can have high maintenance cost when malfunctioning.
Smart/ switchable glass	• Suitable for critical care such as ICU. • Easy to clean. • Environmentally sustainable due to their light and solar characteristics.	• Higher capital cost. • Can have high maintenance cost when malfunctioning. • May require replacement every few years due to frequent use.
Curtains	• Feels less clinical and suitable for areas such as palliative care.	• Higher maintenance cost for replacement or laundering. • Human resource workload associated with replacement of curtains. • Potential infection risks as curtains are frequently touched by patients and healthcare workers, and may be contaminated by body fluids/other substances

Window Treatment	Advantages	Disadvantages
		• Requires additional storage for replacement curtains.
Roller Blinds	• Suitable for office spaces. • Installation within inpatient bedrooms should be risk assessed against IPC requirements, ability to effectively clean and WHS. • Can be provided as dual blinds which allows diffused sunlight or total blackout.	• Difficult to clean. Requires increased human resources to clean. • May be a transmission risk to patients as it is frequently touched and can be contaminated by body fluids and other contaminants. • Manufacturers' guidelines for cleaning may not align with IPC guidelines. • Blinds must be left down to dry as they may grow mould if rolled up whilst wet. • Not suitable for mental health and paediatric areas (due to ligature risk).

Other window treatments may be used in clinical areas, but a risk assessment must be undertaken to determine their suitability.

6.5 Gaps

A joint is any point where two planes or surfaces meet (wall and ceiling; wall and floor; or two sections of a bench top). A gap is defined as a space where two surfaces do not meet resulting in a space or opening that can harbour dust, infectious agents, mould, or vermin.

Good design and detailing of joints are important to IPC. Gaps between surfaces should be avoided or properly sealed. In particular, gaps between the following areas should be prevented:

- skirting and floor
- benches and walls
- cupboards and floor or wall
- fixtures attached to floors and walls.

Floor and wall construction, finishes and trims in dietary and food preparation areas; sterile stock areas; and pharmacies, should be free of gaps/spaces that can harbour rodents and insects. Compliance with relevant public health regulations is required.

Floor and wall penetrations by pipes, ducts, and conduits, should be tightly sealed to minimise entry by rodents and insects. Joints of structural elements should also be sealed.

6.6 Skirtings

Skirtings, floor and wall joins should be made integral with the floor, tightly sealed against the wall, and constructed without voids (coved) in:

- all patient care areas
- kitchens
- clean and dirty utility rooms
- sterilizers subject to frequent wet cleaning.

6.7 Walls

Other than special treatments included as feature face work in public or staff recreation areas, wall finishes should be smooth and easily cleaned, and where in the immediate vicinity of plumbing fixtures, water-resistant.

Wallpaper in areas of high humidity areas is not supported. They are also not suitable for the demands of healthcare disinfection.

Wall coverings should comply with IPC standards and its provision should not hinder installation of essential fixtures. Walls are to be designed to ensure space for hand hygiene and PPE dispensers when early design is carried out.

Acoustic material used on walls in clinical areas should be assessed for cleaning considerations prior to installation.

Heavy duty wall and wall protection will be required in areas where frequent bed and large equipment movement is anticipated to prevent wall damage which may potentially become an IPC concern.

6.8 Surface Materials

All fixtures and fittings should allow easy cleaning and prevent accumulation of dust. The surface material should withstand hospital grade cleaning agents and withstand corrosion from use of disinfectant. Soft furnishing in clinical spaces such as furniture upholstery should be hard wearing, anti-bacterial, fluid repellent, wipeable, and can withstand clinical grade cleaning products.

Clinical equipment and furniture also prevent transmission of infection and cross-infection through:

- design with no entrapment areas where infectious agents can survive
- having removable or sealed components that can be wiped clean
- not having materials that can hold dirt such as cork, Velcro and other reusable adhesives.

6.9 Information Technology

The use of IT equipment such as computers, workstation on wheels, imaging equipment, mobile, phones, tablets, etc., provides a mechanism of microorganism transfer in healthcare. Consider IPC in the planning and design of these equipment by:

- considering placement of these equipment in the workflow of the clinical space
- using easily cleanable and durable transparent covers on keyboards and touchscreens
- maintaining regular cleaning protocols.

6.10 References

- AHIA, 2018, AusHFG Part C: Design for Access, Mobility, Safety and Security, St Leonards, Australia.
- Standards Australia, 2004, AS 4674:2004 Construction and fit out of food premises, Standards Australia, Sydney, Australia.
- Standards Australia, 2023, AS 5369:2023 Reprocessing of reusable medical devices and other devices in health and non-health related facilities, Standards Australia, Sydney, Australia.

07 Hazard Elimination

7.1 Construction and Renovation

7.1.1 Risk Assessment and Management

Risk Management Strategy

A formal approach to risk assessment and management should be part of all building construction and renovation activities. It is not a one-off activity but rather an ongoing process throughout the whole development or redevelopment process. A process for assessing risk and adopting appropriate precautions is provided below. A more detailed review of risk is beyond the scope of this document, but reference to the following documents will provide the framework for a relevant risk management strategy:

- Department of Health, Victoria, 2014, Infection Control Principles for the Management of Construction Renovation Repairs and Maintenance within Health Care Facilities
- ISO 31000:2018 Risk Management - Guidelines
- ISO 45006:2023 Occupational health and safety management - Guidelines for organizations on preventing, controlling and managing infectious diseases
- HPSC, 2018, National Guidelines for the Prevention of Nosocomial Invasive Aspergillosis
- HPSC, 2018, Appendix D: National Guidelines for the Prevention of Nosocomial Invasive Aspergillosis during Construction/Renovation Activities.

Risk Identification

Building construction, renovation and maintenance activities within a healthcare facility impose risks. Certain construction activities can increase the risk of potentially harmful microorganisms such as invasive Aspergillosis and Scedosporium spp. among immunocompromised patients. Mortality rates from these infections are high.

In occupied facilities, a range of systems and precautions will need to be put in place to support construction and renovation activities. The broad tasks include:

- development of organisational governance arrangements and policies
- identification of the population at risk
- an understanding of the preventative measures needed to control risk.

The risk identification strategy should address as a minimum:

- the extent of construction work
- the identification of the patient population at risk
- the location of the patient population in relation to the site and construction
- ventilation system types and potential impact
- traffic and supply routes
- determination of air monitoring requirements, methodology and frequency
- air quality samples taken to establish a baseline
- the identification of possible contaminants and their locations.

Possible contaminants and/or locations include:

- ceiling dust
- location of terminal extract outlets and supply intakes
- service shafts especially in the presence of damp
- sprayed-on fire retardants
- bird droppings

- soil in internal or accessible gardens within the healthcare site.

IPC measures to be considered during construction and renovation include:

- At the time of site induction for building workers, IPC should be presented as a major component of the WHS induction. This induction process should be documented and signed off by each participating worker.
- Monitoring worker compliance with procedures. The builder should routinely communicate the results of this monitoring to the workers. A systematic approach should be in place to ensure the management of major breaches.
- Consultation with the facility microbiology department and/or microbiologist. Collaboration between the facility's microbiology department and IPC staff is essential, especially during redevelopments when infectious diseases out of the norm may appear.
- Increased frequency of filter changes in high-risk departments that may be at risk of exposure during periods of low construction work activities.
- Installation of barriers to contain the impact of construction.
- Inspections by the nominated representatives during the construction of the barriers. These inspections should be monitored and reported.
- Documenting all inspections, including a non-conformance system for defaults, complete with a corrective and preventative action loop.

7.1.2 Hand-over

Prior to handover, it is the responsibility of the commissioning team to ensure the area complies with standards for occupation. Health services should ensure:

- all surfaces including walls, ceilings, windows, ventilation systems, service cavities and ceiling spaces have been thoroughly cleaned
- all surfaces and joints are free from gaps. In clinical areas, surfaces should be smooth and impervious
- the placement of handwash basins and storage facilities comply with layout plans
- isolation rooms are operating as designed (e.g., supply air, air changes, exhaust, seals etc)
- air sampling and particle counts have been conducted.

  A program of regular air sampling should be implemented in high-risk areas, allowing time for culturing, results and repeat cleaning and testing prior to occupation, for example in operating theatre/s. Dot testing may take a period of a week to complete and receive microbiology air testing results in order to support commencement of theatre procedures. High risk areas include Operating Rooms, Oncology, BMT Unit, Burns Unit, ICUs, pharmacy clean room and other areas where risk of infection transmission and/or contamination will be detrimental to patients' health.
- Recertification of HEPA filters and laminar/clean flow systems where installed.

Microbial Testing

Air and water sampling should be part of the risk management program and be implemented during commissioning. Cumulative data should be used to establish indoor and outdoor background levels of filamentous fungi for a particular site. This will enable establishment of risk profiles for particular locations in and around the healthcare facility.

Air and water sampling is an operational issue, and the local service provider should provide operationalisation information such as who, how, when and how often it should take place. It is important to consult with a microbiologist experienced in environmental sampling to identify what outcomes are required of the sampling. Equally important is to have an approximate idea of the expected number of fungi that will be obtained, as this will determine the appropriate sampling system. For further details, refer to:

- Department of Health, Victoria, 2014, Infection Control Principles for the Management of Construction Renovation Repairs and Maintenance within Health Care Facilities
- Queensland Health, 2013, Guidelines for Managing Microbial Water Quality in Health Facilities

- Western Australia Health, 2021, Communicable Disease Control Directorate Guideline: Microbiological air sampling of operating rooms in Western Australian healthcare facilities.

7.1.3 Verification

All IPC measures described in this section are required to be verified by inspection.

A multidisciplinary team should be established comprising, but not limited to:

- IPC experts (medical and nursing)
- hospital engineers
- WHS staff
- environmental health staff
- client representatives
- project staff (architect, facility planner, consulting engineer, project manager etc.).

These staff should be involved and consulted throughout the stages of planning, design, construction and commissioning.

7.1.4 Construction Risk Assessment and Action Plan

The IPC Construction Risk Assessment and Action Plan are the construction company's and project manager's responsibility, with input from IPC and other committee members (including microbiology/laboratory staff for microbiological testing). The Construction Risk Assessment and Action Plan step will inform the development of the risk matrix and separate risk assessment, and Action Plan should be developed for different areas/projects throughout the hospital. The Action Plan should be reviewed and updated throughout the different phases of the development.

The purpose of the risk assessment is to assess the IPC risk associated with different construction/redevelopment activities. The Action Plan outlines how the team intend to manage/mitigate these risks.

The Construction Risk Assessment and Action Plan below comprises four key steps including:

1. identification of the construction activity type
2. selecting the appropriate IPC group
3. determining the construction classification class
4. implementation of the IPC construction guidelines.

Step 1 – Identify the Construction Activity Type

The identification of the construction activity type (Table 5) is defined by:

- the amount of dust generated
- the duration of the involvement of the heating ventilation and air conditioning systems (HVAC)
- the impact to co-located and adjacent areas.

Table 5 Definitions of the Construction Activity Types

Type A Inspections and general upkeep activities	Type B Small scale, short duration activities, which create minimal dust	Type C Any work that generates a moderate to high level of dust	Type D Major demolition and construction projects
Includes but not limited to, removal of ceiling tiles for visual inspection (limited to 1 tile per 5 m^2); painting (but not sanding); installation of wall covering; electrical trim work; minor plumbing; any activities that do not generate dust or require cutting into walls or access to ceiling other than for visual inspection.	Includes, but is not limited to, installation of telephone and computer cabling, access to chase spaces, cutting into walls or ceiling where dust migration can be controlled.	Includes, but is not limited to, demolition or removal of built-in building components or assemblies, sanding of wall for painting or wall covering, removal of floor covering/wallpaper, ceiling tiles and casework, new wall construction, minor ductwork or electrical work above ceiling, major cabling activities.	Includes, but is not limited to heavy demolition, removal of a complete ceiling system, preparation of foundations which causes earth disturbances, and new construction.

Step 2 – Select the Infection Prevention and Control Risk Groups

The IPC groups as defined in the table below are indicative only. Where possible, work should be conducted after patient care hours where services are not provided on a 24-hour, seven-day basis, such as outpatient clinics and day therapy services.

Table 6 Infection Prevention and Control Risk Groups

Group 1 – Low	Group 2 – Medium	Group 3 – Medium/High	Group 4 – Highest
• Office areas • Non-patient area areas not listed elsewhere	• Patient care and other areas not listed under Groups 3 or 4 • Laundry • Cafeteria • Dietary • Materials management • Allied health • Admissions/discharge • MRI • Nuclear medicine • Echocardiography • Laboratories not specified under Group 3 • Public corridors used by patients and to transport linen & supplies	• Emergency department • Medical Imaging – general • Recovery rooms • Delivery rooms • High dependency unit • Newborn nurseries • Paediatrics (except paediatric ICU) • Microbiology labs • Virology labs • Long stay, subacute units • Laboratories not specified under Group 3 • Public corridors used by patients and to transport linen & supplies	• Oncology units • Radiation therapy • Oncology clinical areas • Chemotherapy • Transplant unit • Pharmacy admixture/ clean rooms • Operating rooms • Sterile supply units • Cardiac catheterisation • Angiography rooms • Outpatient invasive procedure rooms • Anaesthetic and pump rooms • All intensive care units – adult, paediatric, neonatal • Burns unit

Step 3 – Determine the Construction Classification Class

Using the construction activity type and the infection control risk group selected, apply the matrix below to determine the construction classification class.

The construction classification class matrix (Table 7) determines the procedures to be followed during construction and renovation projects.

Table 7 The Construction Classification Matrix

Construction Activity Risk Level	Type A	Type B	Type C	Type D
Group 1	Class I	Class II	Class II	Class III/IV
Group 2	Class I	Class II	Class III	Class IV
Group 3	Class I	Class III	Class III/IV	Class IV
Group 4	Class III	Class III/IV	Class III/IV	Class IV

Step 4 – Implement the Infection Prevention and Control Construction Guidelines and Actions

IPC construction guidelines (Table 8) outline procedures to control the release of airborne contaminants resulting from construction, demolition, or renovation activities.

Implement the appropriate IPC construction guideline based on the construction activity type as identified using the construction classification matrix (Table 7).

An IPC checklist can be found in Section 10.1 Infection Prevention and Control Checklist.

Table 8 The Infection Prevention and Control Construction Guidelines

Class	Guideline
Class I	Execute work by methods to minimise raising dust from construction operations. Replace any ceiling tiles displaced for visual inspection as soon as possible.
Class II	Provide active means to prevent air-borne dust from dispersing into atmosphere. Seal unused doors with duct tape. Contain construction waste before transport in tightly covered containers. Wet mop and/or vacuum with HEPA filtered vacuum. Place dust-mat at entrance and exit of work area and replace or clean when no longer effective. Isolate HVAC system in areas where work is being performed. Wipe casework and horizontal surfaces at completion of project.
Class III	Isolate HVAC system in area where work is being done to prevent contamination of the duct system. Complete all construction barriers before construction begins. Maintain negative air pressure within work site utilising HEPA filtered ventilation units or other methods of maintaining negative pressure. In each jurisdiction, the relevant public safety officers will monitor air pressure. Do not remove barriers from work area until the entire project is thoroughly cleaned. Wet mop or vacuum twice per eight-hour period of construction activity or as required in order to minimise tracking. Remove barrier materials carefully to minimise spreading of dirt and debris associated with construction. Barrier material should be wet wiped, HEPA vacuumed, or water misted prior to removal. Contain construction waste before transport in tightly covered containers. Place dust-mat at entrance and exit of work area and replace or clean when no longer effective. Wipe casework and horizontal surfaces at completion of project. IPC signoff on completion of cleaning and prior to occupation.
Class IV	Isolate HVAC system in area where work is being done to prevent contamination of duct system. Complete all construction barriers before construction begins. Maintain negative air pressure within work site utilising HEPA filtered ventilation units or other methods of maintaining negative pressure. In each jurisdiction, the relevant public safety officers will monitor air pressure. Seal holes, pipes, conduits, and punctures to prevent dust migration.

Class	Guideline
	Construct Anteroom and require all personnel to pass through the room. Wet mop or HEPA vacuum the Anteroom daily. During demolition, dust producing work, or work in the ceiling, disposable shoes and coveralls are to be worn and removed in the Anteroom when leaving work area. Do not remove barriers from work area until completed project is thoroughly cleaned. Remove barrier materials carefully to minimise spreading of dirt and debris associated with construction. Barrier material should be wet wiped, HEPA vacuumed, or water misted prior to removal. Contain construction waste before transport in tightly covered containers. Place dust-mat at entrance and exit of work area and replace or clean when no longer effective. Keep work brooms clean and remove debris daily. Wet mop hard surface areas at completion of project, HEPA vacuum carpeted surfaces at completion of project. Wipe casework and horizontal surfaces at completion of project. IPC signoff on completion of cleaning and prior to occupation.

7.2 References

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08 Models of Service Delivery

8.1 Separation of Clean and Dirty Workflows

Workflows are to be separated in rooms where both clean and dirty functions occur (e.g., dirty utility and clean-up rooms). The cleaning area should be divided into a clean section and a dirty section.

Work should flow from dirty to clean areas, with care taken to avoid contaminated equipment re-entering clean work areas.

The dirty section should include:

- adequate bench space for dismantling and working on equipment
- at least one deep, stainless-steel sink or trough for manual cleaning of instruments and other equipment
- cleaning and disinfecting material and equipment including brushes
- receptacles for different waste streams
- mechanical disinfector/washer.

Cleaning sinks must be provided in addition and separate to clinical handwash basins and used only for disposal of fluids and equipment cleaning. Where filters are fitted to taps in place of anti-splash devices, they will be regularly cleaned.

Staff rooms and recreation areas must be separate from work areas and patient treatment areas.

Reprocessing Areas

The processing area for reusable medical devices (RMD) should be carefully defined and protected from all vapours, splashing or aerosols produced during operating, handwashing, equipment washing, disinfection and ultrasonic cleaning. The area should have adequate storage space and be used only for the storage of effectively covered or packaged, cleaned, disinfected and/or sterilized RMDs and equipment.

For detailed requirements regarding separation of clean and dirty workflows refer to:

- AS 5369:2023 Reprocessing of reusable medical devices and other devices in health and non-health related facilities
- ACSQHC, 2024, Transitioning from AS/NZS 4187:2014 to AS 5369:2023 and Transitioning from AS 4815:2006 to AS 5369:2023.

Also refer to specific AusHFG HPUs including:

- HPU 190 Sterilizing Services and Endoscope Reprocessing Unit
- HPU 280 Oral Health Unit
- HPU 520 Operating Suite

8.2 Storage and Supplies

Storerooms in healthcare facilities are fit for purpose and have varying IPC requirements, depending on their storage function.

A **‘sterile store’** refers to a storage room that accommodates reprocessed critical Reusable Medical Devices (RMDs) and will typically also store sterile consumables. These rooms must be compliant with AS 5369:2023 with requirements also typically set out in jurisdictional engineering services guidelines. It is essential that the sterility of RMDs and consumables within these stores is maintained prior to them being used within the sterile field of an Operating Room. AS 5369:2023 notes (Section 5.6.15): ‘Sterile stores adjoining operating theatres shall be ventilated in accordance with the requirements for ventilation of a sterile store and set up room in AS 1668.2. The ventilation of sterile storerooms in other locations shall be subject to a risk assessment.’

A **'clean store'** (previously termed 'clean utility' room) will typically accommodate packaged sterile consumables but does not need to meet the ventilation requirements of AS 5369:2023 as the focus of this standard is reusable medical devices. However, it needs to be protected from direct sunlight and environmental contamination. Clean stores are briefed in most clinical units where sterile consumables are stored and then used within a non-sterile clinical space. For example, an ICU patient room/bay is not a sterile, HEPA filtered environment so it would not be appropriate to have the associated consumable storage area treated to a higher standard.

A **'general store'** will typically accommodate non-sterile consumables and boxes of sterile consumables.

An **'equipment store'** used to accommodate equipment should not be combined with the above rooms.

Ideally, there should be separate loading docks or at least separate entries for food supplies, general clean supplies and linen, and for removal of waste and soiled linen.

Sufficient storage space should be provided for:

- medical equipment
- medical and administrative supplies
- clean and dirty linen
- medications
- general and clinical waste
- mattresses and spare beds (separate for clean/awaiting maintenance and dirty/for disposal).

All storage conditions should comply with any relevant standards. Shelving materials used in storage areas are to be waterproof, impervious, and easy to clean. Storage of equipment/linen should be protected from direct light (sun), dust, vermin, moisture/humidity/in a low traffic area. Stock should be stored up off the floor and away from ceiling. Stock storage should facilitate decanting from transport boxes. Refer to AusHFG Standard Components for design guidelines of storage areas.

Where shared equipment is stored in the clinical space, cleaning wipes dispenser and bracket should be provided nearby.

Sterile Supplies

Sterile supplies should be handled with care and stored in a manner that maintains the integrity of packs and prevents contamination from any source (dust, vermin, sunlight, water, condensation etc.).

Ensure temperature and light control to storage areas and ensure that they are easily cleaned. Store supplies off the floor, with the lowest shelf at least 300 millimetres above floor level to avoid mechanical damage during cleaning. Refer to:

- AHIA, AusHFG HPU 190 Sterilizing Services and Endoscope Reprocessing Unit
- AS 5369:2023 Reprocessing of reusable medical devices and other devices in health and non-health related facilities
- ACSQHC, 2024, Transitioning from AS/NZS 4187:2014 to AS 5369:2023 and Transitioning from AS 4815:2006 to AS 5369:2023.

8.3 Linen Management

The following refers to linen handling in inpatient accommodation units and other patient care areas. Clean linen should be stored:

- in a dedicated space/bay with a ABHR dispenser located nearby
- in a clean dry location that prevents contamination by aerosols, dust, moisture and/or vermin
- on clean shelves and, if necessary, wrapped in a protective dust cover
- separately from used/soiled linen
- in a manner that allows stock rotation.

The risk of infectious agent transmission from soiled linen is negligible. However, used/soiled linen should be handled as little as possible and with minimal agitation to prevent gross contamination of the air and the linen handlers, and should be placed into bags at the point of generation.

Refer to AS/NZS 4146:2000 Laundry Practice.

8.4 Waste Management

Waste can generally be categorised as follows:

- clinical waste
- chemical waste
- radioactive waste
- cytotoxic wastes
- recyclables
- organic waste
- liquid waste
- general waste
- large/bulky (e.g. beds and mattresses).

Each requires its own disposal method and, very often, colour-coded receptacles and designated storage areas.

Waste requirements should be assessed early in the project. In clinical areas, waste holding needs should be carefully identified and appropriate space allocated for waste bins and other containers. These spaces should not be accessible to patients or the general public. Additional space may be required in dirty utility rooms for temporary holding of in-use waste bins (usually mobile) and in disposal rooms for holding full containers (including sharps bins) awaiting collection by environmental services staff. Central waste holding and loading docks are not addressed in this document. Refer to AusHFG HPU 700 Logistics / Back of House Services.

All sharps bins should be positioned out of the reach of children at a height that enables safe disposal by all members of staff. Relevant Australian and New Zealand Standards include:

- AS/NZS 3816:2018 Management of Clinical and Related Wastes
- AS 23907:2023, Sharps injury protection - Requirements and test methods - Sharps containers.

8.5 References

- Australian Commission on Safety and Quality in Health Care, 2024, Transitioning from AS/NZS 4815:2006 to AS 5369:2023, Sydney, Australia.
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09 Sustainability

Sustainability is a major focus in healthcare and built solutions must include consideration of this important issue. In the context of patient safety and healthcare delivery, the focus is environmentally sustainable design (ESD), but social and financial sustainability, as well as patient safety, are also important factors to consider.

9.1 Environmental Sustainability

Ambitious net zero greenhouse gas (GHG) emissions reduction targets are being set by governments across Australia and New Zealand and healthcare services will be expected to contribute.

Some of the environmentally sustainable solutions will directly affect facilities occupied by patients. A good example is mixed mode air conditioning systems whereby fresh air is introduced by opening windows when the weather conditions are favourable. While this solution may be suitable for public entry areas and staff areas, this approach is not recommended for acute inpatient settings where it is important to control the quality of the air through ventilation (air changes per hour), air flow and filtration to remove particles.

A significant proportion of physical healthcare waste is generated from single use/disposable clinical or surgical equipment, disposable linen and curtains, packaging material of medical items and PPE materials contaminated during patient care. The use of these items is essential to provide safe healthcare, and a best practice approach is required to lessen the environmental impact of the associated waste. Refer to ACSQHC and ANZICS related references in section 9.4 for fact sheets and toolkits to guide healthcare facilities with regards to environmentally sustainable solutions.

These types of changes should be examined by a multidisciplinary team that includes the IPC team to ensure a thorough risk assessment is undertaken and patient care is not compromised. The multidisciplinary team will include medical, nursing, allied health professionals, management staff and other hospital staff including environmental services, patient services assistants and administration staff.

9.2 Social Sustainability

A socially sustainable IPC system is one that mobilises and allocates sufficient, and appropriate resources including human resources, technology, information, and funding for activities that prioritises the facility's goals to provide safe, accessible, and high-quality care for patients.

There should be acknowledgement that beyond the physical environment and technical regulation, the success of an IPC strategy will depend on the behaviours of the people within the system. Contextual barriers must be identified for IPC based design to be successful. For example, suboptimal waste management system or incorrect location of waste recycling bins will limit opportunities for sustainable hygiene and waste management practices.

There are ways to effectively support safe and sustainable use of IPC planning and design which are simple and practical. Some of the strategies include implementation of policies and staff/patient/visitor education to correctly implement the fundamentals of IPC in the workplace.

9.3 Financial Sustainability

To achieve financial sustainability in IPC, it is crucial to consider adopting an evidence-based approach and consider potential changes to the patients' physical environment over time without incurring excessive costs.

Challenges to financial sustainability in IPC include:

- high cost of PPE
- high cost of single use instruments and sterilization of RMDs
- implementation of necessary infrastructure updates, such as ventilation systems and workflow modifications, to comply with standard changes
- ensuring adequate staffing for effective IPC practices
- balancing cost-saving measures while maintaining high IPC standards

- mitigating the increasing financial burden placed on healthcare systems due to the growing prevalence and treatment costs associated with HAIs
- securing adequate funding for IPC upgrades from decision-makers to ensure necessary resources are allocated.

9.4 References

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010 Appendices

10.1 Infection Prevention and Control Checklist

The checklist provided below can be customised by project teams to align with the specific Infection Prevention and Control (IPC) needs of their facility.

Infection Prevention and Control Checklist

Name of Facility:

Name of HPU:
(Print and complete one per HPU)

Agreed Role Delineation Level:

No.	Item	Y	N	N/A	Remarks / Comments
1.0	**Hand Hygiene Facilities**				
1.1	Are the handwash basin types specified appropriate for their functions?				
1.2	Are sufficient numbers of handwash basins provided?				
1.3	Are the tap types specified appropriate for their functions?				
1.4	Is the handwash basin available in a location that makes it accessible for all patient care and aseptic procedures?				
1.5	Is alcohol-based hand rub available in a location that makes it accessible for all patient care and aseptic procedures?				
2.0	**Isolation Rooms**				
2.1	Are sufficient numbers of isolation rooms of the appropriate type provided?				
2.2	Do the isolation rooms meet the minimum requirements for the class specified?				
2.3	Are rooms identified for aerosol producing procedures (AGP) meet the minimum requirements?				
3.0	**Personal Protective Equipment (PPE)**				
3.1	Do bedrooms identified for care of patient/s with infection have PPE provided outside?				

Infection Prevention and Control Checklist

Name of Facility:

Name of HPU:
(Print and complete one per HPU)

Agreed Role Delineation Level:

No.	Item	Y	N	N/A	Remarks / Comments
3.2	Do negative pressure rooms have PPE provided in the anteroom?				
3.3	Are the PPE dispensers provided appropriate for the room/space?				
4.0	**Surfaces, Finishes & Components**				
4.1	Are the following finishes appropriate for the room usage?				
	Floor				
	Ceiling				
	Wall				
	Skirting				
	Fixture and fittings materials				
	Furniture materials				
5.0	**Physical Environment**				
5.1	Do operating areas sufficiently separate clean and contaminated areas?				
5.2	Do cleaning and clean up areas sufficiently separate clean and contaminated areas?				
5.3	Are staff eating and recreational areas sufficiently separate from work areas and patient treatment areas?				
6.0	**Storage and Supplies**				
6.1	Is the storeroom fit for purpose regarding IPC requirements?				
6.2	Do the sterile storerooms meet the minimum requirements of sterile storage standards?				

Infection Prevention and Control Checklist

Name of Facility:

Name of HPU:
(Print and complete one per HPU)

Agreed Role Delineation Level:

No.	Item	Y	N	N/A	Remarks / Comments
6.3	Do the storage fixtures and joinery meet the minimum IPC requirements?				
6.4	Are there separate storage for boxes of sterile & non-sterile consumables and equipment?				
7.0	**Linen / Waste Management**				
7.1	Are clean and dirty linen stored in appropriate locations?				
7.2	Are waste receptacles and storage locations appropriate for the types of wastes?				
7.0	**Additional IPC Items** *(Add IPC items specific to HPU)*				
7.1					
7.2					
7.3					

011 Further Reading

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