

ACIPC

Australasian College  
for Infection Prevention and Control

**ACIPC Toolkit**  
**Construction and Renovation**

## ACIPC Toolkit: Construction and Renovation

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## Acknowledgements

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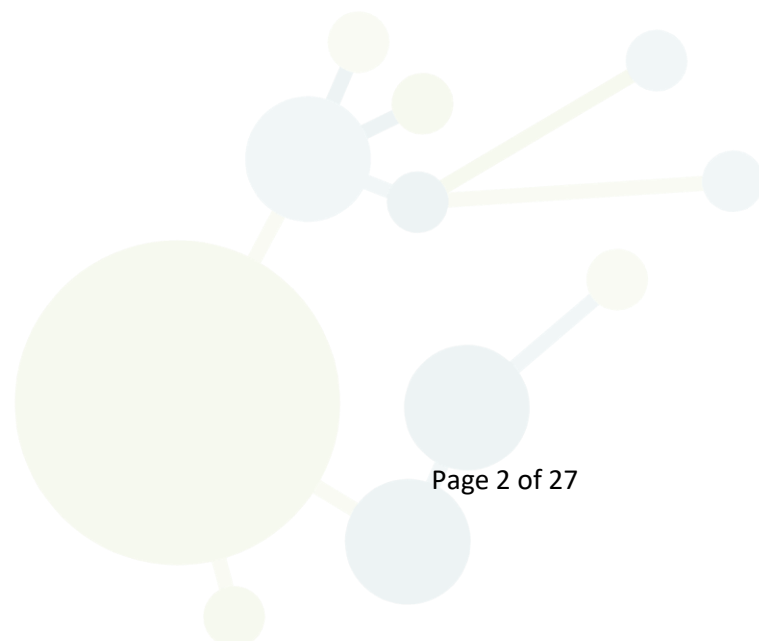
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## Introduction

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Health service organisations are required to have processes and procedures in place to minimise the infection risk to patients, residents, consumers and the workforce from environmental hazards, including during the planning and design process, construction and maintenance activities, repair and upgrading of buildings, equipment, and furniture and fixture selection<sup>1,2</sup>.

The purpose of this toolkit is to provide guidance and sample resources of the Infection Prevention and Control (IPC) requirements and considerations during the design, planning, implementation and occupation phases of construction and renovation projects within health services.

## IPC during construction and renovation

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The World Health Organization IPC standards to provide the minimum protection and safety to patients, residents, consumers and healthcare workers (HCWs), recommend IPC professionals be involved in the planning and design of buildings and infrastructure, and construction activity within healthcare facilities<sup>1</sup>.

The risks associated with construction and renovation activities within the healthcare setting include planning and design to reduce transmission risk, environmental dust contamination, dissemination of bacteria and fungi, and disruptions to and contamination of water supplies which can lead to healthcare-associated infections<sup>2</sup>.

The healthcare facility leadership and administrative team must provide support and promote IPC activities during periods of construction and renovation and authorise IPC professionals to intervene when construction and renovation activities pose infection risks to patients, residents or consumers<sup>2</sup>. Prior to the commencement of any new construction or renovation project, the facility leadership team must implement the following to support IPC key strategies, including:

- Establish an interdisciplinary project team that includes IPC representation.
- Implement a formal risk management approach for all construction and renovation activities, with consideration to IPC risk assessments<sup>3</sup>.
- Provide support and promote IPC activities during construction and renovation activities.

Authorise IPC professionals to intervene when construction and renovation activities present infection risks to consumers, including halting building and construction activities<sup>2</sup>.

## Health facility policy and procedure

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Health service organisations should ensure policy and procedures are in place to guide planning and design of construction and renovation activities, and the maintenance and repair of buildings, equipment, fixtures and fittings<sup>1,2</sup>.

A construction and renovation policy and procedure document must be in place to provide guidance for planning, construction activities, and a process for corrective actions. The policy should include:

- Risk assessment and management plans for construction, refurbishment and renovation activities<sup>1</sup>.
- Risk assessments and evaluation of buildings, furnishings and fittings in both clinical and non-clinical areas<sup>1</sup>.
- Reporting, escalation and corrective actions for unsatisfactory incidents, outcomes and corrective actions in clinical and non-clinical areas<sup>1</sup>.
- Documentation requirements where items pertaining to buildings, furniture and fittings are reviewed and discussed, including business and decision-making, and meeting minutes<sup>1</sup>.
- Commissioning reports for new or refurbished sites<sup>1</sup>.
- Audit results of compliance with maintenance activities, including maintenance schedules for buildings, furniture, and fittings in clinical and non-clinical areas.
- Results of microbiological testing of air and water, when required.

## Risk Assessment and Management

Risk management is the implementation of programs and systems to identify, and avoid or minimise risks to patients, residents, consumers, HCWs and the organisation<sup>4</sup>. It is a process that is ongoing and proactive, and includes four key steps:

Key steps for risk assessment and management:

- 1. Identify hazards** – What are the real or potential hazards that could cause harm?
- 2. Assess risks** – What are the risks if someone is exposed to these hazards, and how likely is it that someone could be exposed to a hazard in the organisation?
- 3. Control risks** – What actions can be taken to control the risks?
- 4. Review control measures** – How effective are the controls that are in place, and how can they be modified as required, to ensure the ongoing safety of everyone?

Source: ACHS Factsheet<sup>4</sup>

The use of evidence based risk assessment frameworks during planning, construction and renovation, in conjunction with IPC principles, provides a two-tiered approach to risk mitigation strategies<sup>4</sup>. Using contemporary evidence to assess risk and implement design guidelines in the post-pandemic era will ensure key IPC risks are identified and mitigation strategies implemented.

### The hierarchy of controls framework

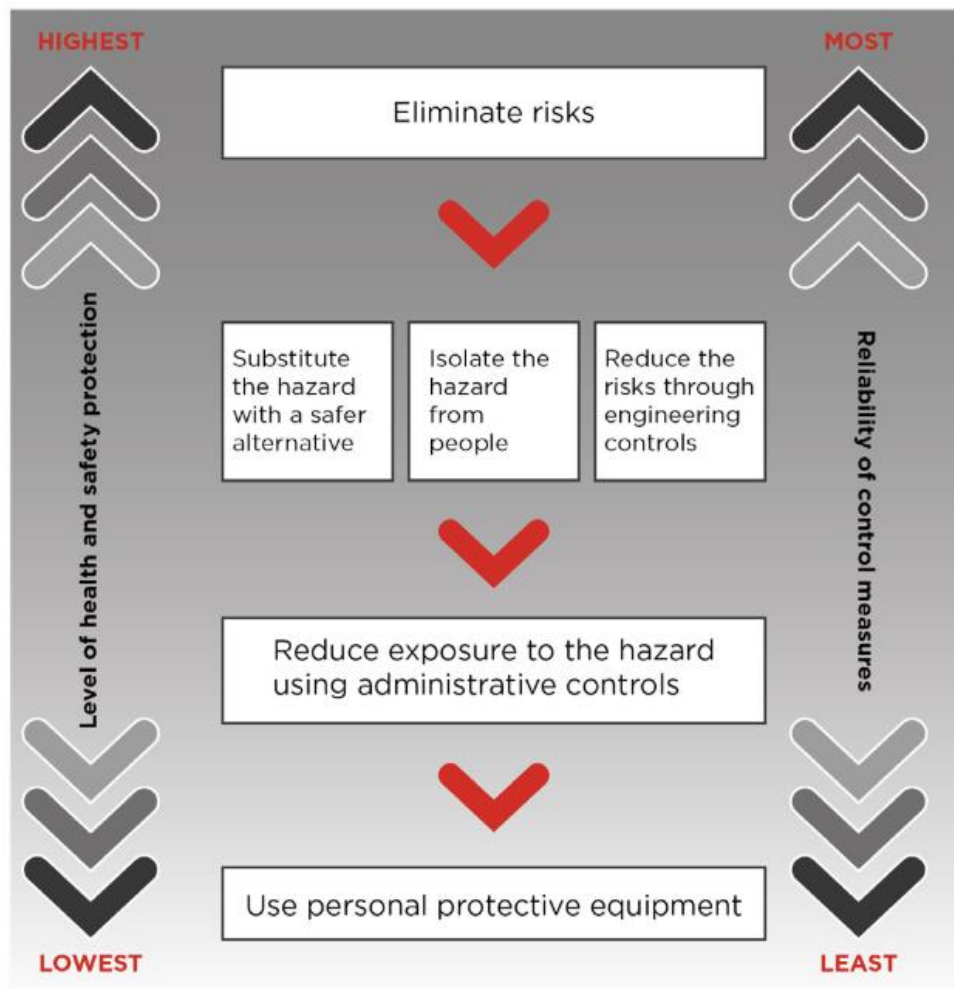
The hierarchy of controls framework provides a tiered approach to implement multiple strategies simultaneously to minimise hazards and where possible eliminate risk<sup>3</sup>. Within the framework the ways to control risks are ranked from the highest level of protection and reliability to the lowest<sup>5</sup>.

Elimination of a risk is the most effective control and provides the highest level of protection. If elimination is not reasonably practicable to achieve, then the alternative strategies (substitution, isolation, engineering controls) within the hierarchy must be worked through. Elimination controls are the most practical and effective to implement at the design phase of a project, when there is greater scope to design out hazards and incorporate control measures that improve functional requirements<sup>5</sup>.

The lower levels of the hierarchy are considered to be less effective controls, as minimising the exposure to the hazard will only minimise and not eliminate the risk<sup>5</sup>. Administrative controls and the use of personal protective equipment (PPE) are the least effective strategies to minimise risk, as they do not control the hazard at the source, and they rely on human behaviour and supervision to

achieve<sup>5</sup>. They should only be considered to supplement higher control measures as an interim measure until more effective control measures can be implemented and when there are no other practical controls available<sup>5</sup>.

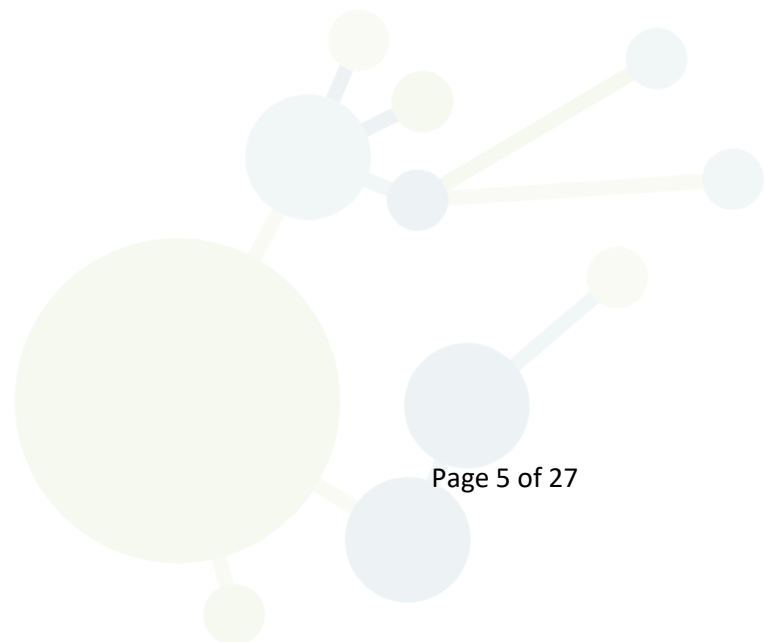
## The Hierarchy of Controls



Source: Safe Work Australia. How to manage work health and safety risks: code of practice. Canberra: SWA; 2018:19, 'Hierarchy of control measures'

Within the context of IPC, the hierarchy of controls considers the following<sup>4</sup>:

Item	Example
<b>Hazard</b>	An infectious agent that can colonise or infect patients, residents, or HCWs.
	An infectious agent that can contaminate the environment
<b>Risks</b>	Healthcare associated infections
	Occupational exposure injuries
<b>Controls</b>	Single-room allocation
	Standard and transmission-based precautions





Control	Risk mitigation strategy
<b>Elimination</b>	Remove the infection risk entirely <ul style="list-style-type: none"> <li>• Restrict entry of infectious HCWs and visitors to facility</li> <li>• Use of telemedicine to eliminate exposure</li> <li>• Ease of disposal of sharps devices at the point of care</li> <li>• Availability and use of hand hygiene products</li> </ul>
<b>Substitution</b>	Substitute the infection hazard with a safer alternative <ul style="list-style-type: none"> <li>• Use of isolation or negative pressure and negative airflow rooms</li> <li>• Re-design sink areas to reduce risks from splash zones</li> <li>• Replace reusable medical devices with single-use equipment</li> <li>• Use and availability of sharps safety devices</li> </ul>
<b>Isolation</b>	Physically separating people from the infection hazard <ul style="list-style-type: none"> <li>• Single-room placement</li> <li>• Re-design of bed space to increase distance between beds</li> <li>• Use of physical barriers, e.g. privacy screens</li> </ul>
<b>Engineering controls</b>	Reduce the infection risk through engineering controls <ul style="list-style-type: none"> <li>• Optimal ventilation and air quality (temperature, humidity, air exchange rates, air flow and filtration)</li> <li>• Re-design of sink and plumbing to remove environmental risks</li> <li>• Re-design of workstations to limit the number of workers</li> <li>• Re-design of waste management to minimise exposure</li> <li>• Use of sharps safety devices</li> </ul>
<b>Administrative controls</b>	Practices or policies that reduce or prevent exposure to infection hazards <ul style="list-style-type: none"> <li>• IPC organisational lead and support</li> <li>• Policy and procedures consistent with the Australian Guidelines for the Prevention and Control of infection in healthcare</li> <li>• Training and education of the workforce</li> <li>• Environmental cleaning and auditing programs, supported by policy</li> </ul>
<b>PPE</b>	Access to appropriate PPE and correct use to compliment substitution, administrative and engineering controls <ul style="list-style-type: none"> <li>• Accessible range of sizes and types of PPE relevant to the infection risk</li> </ul>

	<ul style="list-style-type: none"> <li>• Training, education and competency assessment in the application, removal and disposal of PPE</li> <li>• Fit checking and fit testing of P2/N95 particulate respirators</li> </ul>
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Adapted from: ACHS Factsheet Using the hierarchy of controls in conjunction with infection prevention and control systems to identify and manage infection risks.

## Infection Prevention and Control Risk Assessment (IPCRA)

A risk assessment is the consideration of what can happen if someone is exposed to a risk or hazard, and provides an evaluation of the likelihood of the exposure occurring<sup>5</sup>. Workplace hazards are generally identified to occur from<sup>5</sup>:

- The physical environment
- Equipment materials and substances used
- The work undertaken
- Work design and management

The purpose of an Infection Control Risk Assessment (IPCRA) is to identify the impact of construction and renovation activities on the environment, air and water quality. It provides a systematic framework to determine the level of risk to patients, residents, consumers and HCWs and defines the controls to reduce risk. The IPCRA should be incorporated into all construction and renovation projects within the healthcare setting.

The interdisciplinary team involved in the planning and design phases should consider the following elements of an IPCRA:

- Identification of hazards and potential contaminants
- Identification of at-risk populations
- Implementation of risk mitigation strategies
- Evaluation of plans and designs, including HVAC, water and plumbing systems, selection of materials and furnishings, and construction workflows
- Review of patient/resident placement and relocation plans
- IPC induction of building contractors and engineering staff

A formal risk management approach must be considered a part of all construction and renovation activities and include the specific assessment of infection prevention risks<sup>2</sup>. The IPCRA should be performed during the design, planning and construction phases to identify risks and advise on risk-mitigation strategies.

The IPCRA is completed by undertaking 4 steps:

1. Determine the scope of work for the project
2. Identify the area being affected and patient/resident groups at risk
3. Identify and determine the class of precautions
4. Determine the type of precautions required during the project

## Pre-design Planning and Consultation

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The design of a healthcare facility can greatly influence the transmission of healthcare associated infections, and the application of IPC principles during the planning and design phase are central to provide a safe setting that minimises transmission risks for consumers and HCWs and to identify and prepare for risks during the demolition, construction and renovation phases.

Key design features to minimise infectious transmission risks include:

- Ventilation, cooling, water and plumbing systems, selection of materials and furnishings, that meet cleaning and disinfection processes and standards
- Single rooms with ensuite bathrooms
- Negative pressure and negative airflow rooms
- Hand wash basin placement
- Sink and sluice placement
- Point of care accessibility of hand hygiene and PPE products

Pre-construction risk management strategies to minimise transmission include:

- Identification of hazards and potential contaminants and their locations
- Identification of at-risk populations in relation to the site and construction
- Implementation of risk mitigation strategies
- Review of consumer placement and relocation plans during construction with consideration to risks to immunosuppressed consumers

- Determination of air monitoring requirements, minimising exposure to construction associated contaminants
- Consideration to work site access points for removal of construction waste
- IPC induction of building contractors and engineering staff

Health services should use local information including baseline surveillance data, local disease epidemiology and infection risks to review and assess the organisation needs during facility planning and design, and measure the effectiveness of IPC strategies to minimise infection risks to ensure health and safety is maintained without disrupting service delivery<sup>4</sup>.

## Heating, Ventilation and Cooling (HVAC)

Heating, Ventilation and Cooling (HVAC) systems control the concentration of airborne particles in high risk areas, and minimise the risk of infection through means of air pressure, flow and filtration<sup>2</sup>. HVAC systems must be in line with local guidelines for healthcare facilities and based on Australian and International standards<sup>6</sup>.

Considerations for HVAC parameters include<sup>6</sup>.

- Room air exchanges per hour (ventilation rates)
- The proportion of outside fresh air, to reduce the number of particles recirculating, and the ability to achieve 100% outside air provision
- Air pathways within a room, unit/department and building including direction and airflow
- HVAC filtration requirements

During the planning and design phase consideration must be given to operational functionality of negative pressure/negative airflow systems including:

- Air flow patterns within the room, and how these are impacted based on furniture and fixture design and placement and high-level disinfection methods
- The location of the air pressure display, and ability to operate

For more information on HVAC and air quality requirements refer to:

- Australian Health Facility Design Guidelines (AusHFG): Part D (2016)  
<https://healthfacilityguidelines.com.au/part/part-d-infection-prevention-and-control-0>
- AusHFG Pandemic Preparedness – Health Infrastructure Planning and Design Guidance (2023): <https://aushfg-prod->

[comau.s3.amazonaws.com/AusHFG%20Pandemic%20Preparedness%20Guideline%20September%202023.pdf](https://comau.s3.amazonaws.com/AusHFG%20Pandemic%20Preparedness%20Guideline%20September%202023.pdf)

- ANSI/ASHRAE/ASHE Standard 170-2017 Ventilation of Health Care Facilities  
[https://ashrae.iwrapper.com/ASHRAE\\_PREVIEW\\_ONLY STANDARDS/STD\\_170\\_2017\\_86529](https://ashrae.iwrapper.com/ASHRAE_PREVIEW_ONLY STANDARDS/STD_170_2017_86529)
- ASHRAE Standard 241-2023 Control of infectious aerosols  
[https://ashrae.iwrapper.com/ASHRAE\\_PREVIEW\\_ONLY STANDARDS/STD\\_241\\_2023](https://ashrae.iwrapper.com/ASHRAE_PREVIEW_ONLY STANDARDS/STD_241_2023)
- National Aged Care Design Principles and Guidelines  
<https://www.health.gov.au/sites/default/files/2024-07/national-aged-care-design-principles-and-guidelines.pdf>

## Water and Plumbing systems

Water supply systems should be designed and maintained with temperature, pressure and flow parameters to reduce stagnation, back flow and prevention of dead-end pipes that are consistent with National and State guidelines<sup>2</sup>.

Water fixtures identified as pathogenic reservoirs include sinks/basins (including sink grates, faucets, taps, aerators and traps), sluice, showers and toilets. These items can disperse microbes through the generation of aerosols and harbor moulds and biofilms<sup>2</sup>. Regular cleaning, disinfection and preventative maintenance programs should be in place, including consideration to flushing of minimally used outlets and chemical disinfection. There are no current recommendations on the methodology to disinfect water fixtures<sup>2</sup>.

Consideration for planning and design should include sink and hand wash basin placement to reduce environmental contamination, including hand basin location, off-set drains, aerator and tap design to reduce contaminant risks.

## Single rooms

The provision of single rooms has been identified as the single most effective IPC strategy to reduce exposure and transmission of infection risks. Considerations for increasing the number of single rooms must be given to projections of healthcare associated infections (HAI) and antimicrobial resistance (AMR), with estimates of one in five HAIs being caused by a multi-resistant organism by 2030<sup>7</sup>. There is currently no standardised solution for calculating the preferred number of single rooms within a healthcare facility, however recommendations are for at least 60-80% of a new

builds room to be single rooms, with specialized areas (intensive care units (ICU), infectious disease, mental health and maternity units) requiring 100% single rooms<sup>6</sup>.

The Australian Health Facility Design Guidelines (AusHFG) – Part D and Australian Guidelines for the Prevention and Control of Infection in Healthcare<sup>2</sup> recommend consideration is given to incidence data to project the required number of single rooms<sup>3</sup>. Collation of data over one year or longer will provide more reliable estimates and assist in determining seasonal variations and speciality needs<sup>3</sup>. Data to assess includes:

- Trends in infections within the health service (including suspected and confirmed infections, type of infection, transmission route, speciality, ward location).
- Demographic trends in the population
- Specialities of the healthcare facility
- Projected changes in future clinical activities
- Data from comparable facilities (if available)

## Negative pressure and negative airflow rooms

Negative pressure rooms and single rooms with negative airflow are recommended in clinical areas based on the risk profile, and include: bronchoscopy procedure rooms, EDs, acute inpatient units, ICU (adult, paediatric and neonatal), paediatric and maternity units, and respiratory and infectious disease units<sup>6,8</sup>.

Considerations for negative airflow rooms should be given to departments and facilities considered to be high-risk areas based on local risk assessments, and includes birth rooms in maternity units, emergency departments (ED) resuscitation rooms, and a proportion of ICU rooms<sup>6</sup>.

The number of recommended negative pressure rooms is a minimum of 1 per inpatient unit for general medical and surgical units, with speciality areas e.g., respiratory/infectious diseases requiring a higher number. Actual requirements for the number of negative pressure rooms will depend on an assessment of incidence data, baseline infection rates and trends, as well as clinical specialities<sup>6</sup>.

Isolation rooms should be clustered together and located in an area that will facilitate isolation from the rest of the unit and away from the main entrance to the unit. The exception to this is the ED, where the isolation rooms should be located near the entrance to avoid the spread of infection throughout the unit<sup>6</sup>. The design and placement of isolation rooms requires consideration to areas for PPE storage and access and donning and doffing locations.

For more information on HVAC and air quality requirements refer to the Australian Health Facility Guidelines (2016)<sup>8</sup> and the AusHFG Pandemic Preparedness – Health Infrastructure Planning and Design Guidance (2023)<sup>6</sup> and ANSI/ASHRAE/ASHE Standard 170-2017 Ventilation of Health Care Facilities<sup>9</sup>.

## **Sinks, hand wash basins and hand hygiene product placement**

Locations of hand hygiene products should be convenient and accessible to HCWs, to facilitate compliance with hand hygiene<sup>2</sup>.

Design implications related to hand washing activities require consideration of the risks associated with hand wash basins and transmission of multi-resistant organisms (MROs) and waterborne diseases<sup>10,11</sup>. Healthcare associated infections from water-borne organisms have been linked to environmental contamination and the hands of HCWs<sup>12</sup>. Hand wash basins refer to clinical hand basins that are reserved for hand washing activity only, and all other basins are referred to as sinks.

Opportunities to reduce waterborne infection exposure risks are present in the design phase. Risks associated with transmission of infections related to waterborne diseases and hand wash basins include contamination from splashes within a two-meter zone, contaminated drains and traps, outlets and basins. Hand wash basins should be designed to prevent splashing with adequate basin depth, offset faucets that do not pour directly into the drain, placement of hand wash basins with easy access to hand cleaning supplies and provide a safe splash zone. Standards Australia's AS1071:2015 Placement and presentation of hand hygiene materials in healthcare settings<sup>13</sup>, provides guidance on the requirements and placement, presentation, design, maintenance and installation of hand hygiene products for use in healthcare settings.

Emerging research into contamination from hand wash basins has identified splashing from basins will disperse water and contaminate a two-meter zone around a basin<sup>14,15</sup>. From this research two topics for consideration are emerging, maintaining a splash free zone around a hand basin or sink, and water-free patient care areas.

Challenges with space in clinical areas can lead to items being stored or used near hand wash basins and places these items at risk of splash contamination. Recommendations for the placement and frequency of hand wash basins requires consideration due to the increased use of alcohol-based hand rub (ABHR) in clinical settings for hand hygiene. And the risk of contamination of items within the splash zone including ABHR, PPE, paper towels, and equipment. These items should be stored outside the splash zone and in a manner that is protected from contamination. If items cannot be stored outside a splash zone and there is risk of contamination, methods to reduce splashing should

be considered, examples include the use of a splash guard to provide a physical barrier between the sink and the area to be protected, reviewing water flow and pressure, and increasing cleaning of the hand basin area.

Water-free patient care areas are an emerging concept, arising due to the risk of healthcare associated infections from buildings and wastewater systems being identified as a source of antimicrobial resistance within healthcare facilities<sup>16</sup>. Traditional hand basin or sink placement designs can potentially lead to issues of oversupply and subsequent infrequent use, and inappropriate placement within a 2 meter radius of vulnerable patients, residents or medical equipment<sup>17</sup>. When considering water-free patient care areas, the concept can be trialled prior to the removal of existing services, including:

- Monitoring of hand basin and sink usage to evaluate the frequency of use.
- Identification of hazardous basins and sinks where the risk to vulnerable populations is high.
- Trial of select strategically placed hand basins and sinks to monitor efficiency and practicalities within the clinical area.
- Monitoring frequency of hand washing compared to application of ABHR.
- Evaluation of the impact on patient care activities.
- Review and identification of safe wastewater disposal locations within the unit.

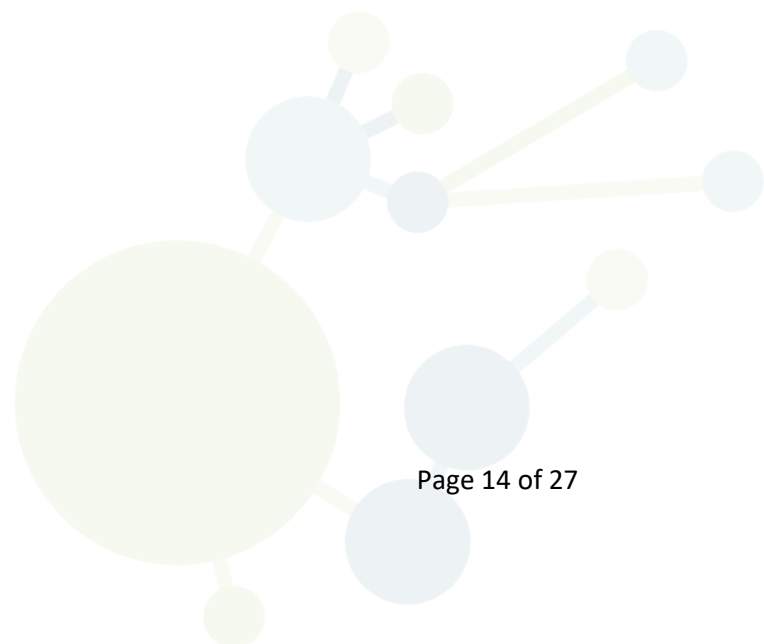
Guidance on healthcare facility design requires further review to include water-free solutions for critical areas.

Hand wash basins must be designated as hand washing only to reduce the risks of increased contamination. Washing of equipment and disposal of fluids should be in areas and sinks designated for that purpose. Placement of a sluice also requires consideration to the splash zone, and it should be located in an area that flows from dirty to clean, with appropriate storage of items outside the splash zone<sup>15</sup>. Provisions must be made for this during the design phase.

Regular audits of hand hygiene product placement and availability should be undertaken to ensure sink and product placement meets the needs of and is accessible to HCWs and provide useful information in planning and design of clinical areas. Audits include:

- The NHHI Hand hygiene product availability audit tool, <https://www.safetyandquality.gov.au/publications-and-resources/resource-library/product-availability-audit>
- The sink splash zone audit tool





## Design stage

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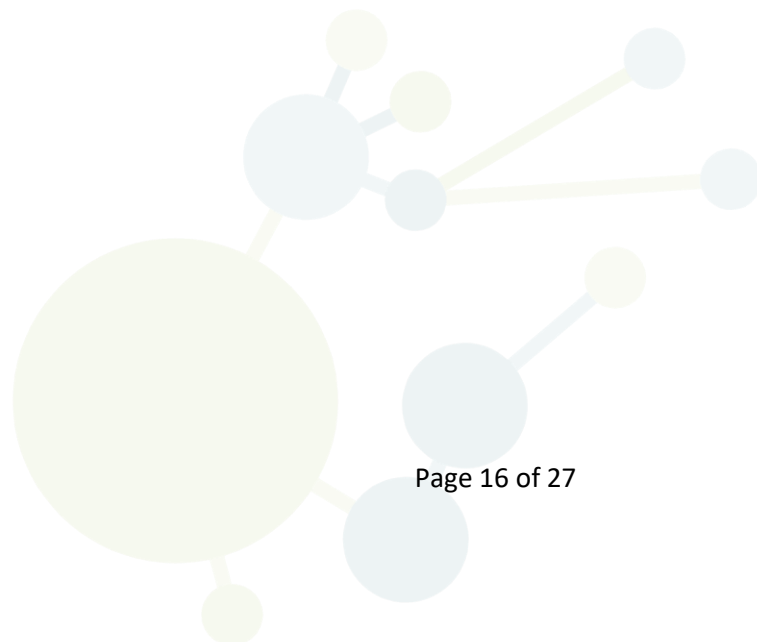
The design stage of a project takes place during the initial planning meetings, prior to construction and renovation activity commencing, and is an opportunity for IPC principles to be integrated into the project development<sup>18</sup>.

During this stage the following items must be identified and documented<sup>18</sup>:

- Locations for dust barriers and hoarding
- Materials to be used for barriers and hoarding, depending on risk assessment
- Identify airflows, and establish flows from clean to dirty, including:
  - Areas surrounding the worksite
  - Use of extractor fans to control dust and airflow
- Develop and document a demolition strategy that includes:
  - Methods to safely remove debris
  - Entry and exit points to the work site
  - Construction personnel traffic routes
- Document location, storage and transport of building materials
- Develop and document strategies for escalation of identified IPC risks and non-conformance process
- Nominate representatives to undertake routine inspections, and identify and document reporting process, including:
  - IPCRA
  - Negative pressure and HEPA filter alarms, filters and maintenance
  - Airflow assessments
- Identify and document environmental cleaning requirements during the project and upon completion, including:
  - Cleaning within the worksite
  - Cleaning requirements and frequency outside work zone
  - Builders clean at end of project

- Cleaning requirements before and after hoarding removal
- Air sampling, if required
- Establish the multi-disciplinary operational commissioning team and identify the team lead.
  
- Develop a commissioning plan, that considers furniture fixtures and equipment (FF&E), risk assessment and elimination or management strategies, training and education requirements, management and preparation to sign off the commissioning procedures<sup>19</sup>.
- Plan the occupation activities, including cleaning and testing requirements prior to occupation taking place
- Prepare a risk management strategy to escalate potential risks, action corrections and minimise disruption

During this stage, external contractors and construction personnel must undergo training and education of IPC risks through a site induction.



## Construction stage

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The role of IPC during construction/renovation activities is to review and monitor the IPC risks and mitigation strategies identified in the design stage.

Activities include:

- Undertake site inspections and risk assessments and escalate identified risks.
- Undertake regular audits of compliance with dust mitigation activities.
- Provide education to staff as required.
- Intervene when construction and renovation activities present infection risks to consumers, including halting building and construction activities<sup>20</sup>.
- Monitor and undertake surveillance of patients for healthcare-associated infections and potential outbreaks through IPC surveillance programs, including legionella water sampling, and air sampling activities.

To help reduce the risk of infection, an Infection Control Risk Assessment (IPCRA) should be performed during the planning, design and construction phases to identify risks and advise on risk-mitigation strategies.

### Maintaining air quality during construction and renovation

Construction and renovation activities have been implicated in outbreaks of airborne infections in healthcare facilities<sup>2</sup>. Key strategies to eliminate airborne infections is through the prevention of the infiltration of dust into patient/resident care areas<sup>2</sup>. This can be achieved through:

- Installation of impermeable barriers (e.g., hoarding) between patient/resident care areas and construction/renovation areas.
- Creating negative air pressure for construction/renovation areas relative to patient/resident care areas where needed
- Sealing windows
- Use of portable HEPA filters
- Review the need for recirculated air, or sealing external air intakes if near or within construction sites
- Provide designated entrances, exits, corridors and elevators for construction crews, when practical.

## Dust control

Dust generated by construction and renovation activities can potentially include infectious particles including fungal spores, and other non-infectious particles<sup>21</sup>. All dust generated during construction and renovation activities must be controlled. Factors to consider include, the location of the work, the scope of work, and the likelihood of microbial contamination<sup>21</sup>. Strategies to control dust include:

- Clean work zones daily
- Wet wipe tools and equipment before removal from the work zone
- Wet mopping to clean dust and debris
- Place sticky mats inside the entrance to work zones, with scheduled changes
- Lightly mist debris before handling and disposal
- Securely cover debris before removing from the work zone
- Provide designated entrances, exits, corridors and elevators for construction crews, when practical
- Inspect barriers and construction areas prior to works commencing, and regularly throughout the work, to assess the integrity of the barriers.
- Use of HEPA filtered vacuum to clean dust contamination
- HCWs entering a contained area may need to don protective coveralls and respiratory protection, and remove before leaving
- Prior to removal of hoarding, cleaning and disinfection of the work area, including the internal hoarding walls

## Water damage or flooding

Water damage can occur due to flooding, leaking roofs, plumbing, equipment, point of use fixtures or excess condensate from HVAC systems. All flood water should be considered contaminated, and items that come in contact with flood water need to be assessed for damage prior to use.

In the event of water damage or flooding, plasterboard and flooded materials will need to be evaluated for the level of damage. This can be achieved through visual inspection and testing with a moisture meter. Qualified personnel (e.g., occupational hygienists) should undertake this testing and report on the outcomes to the site supervisor and leadership team, including an IPC representative. Porous materials such as plasterboard, carpets, tiles and flooring, should have moisture levels

consistent with the manufacturer's moisture content within 72hrs of the flood occurring, if this has not occurred they should be removed and replaced<sup>18</sup>.

Remediation strategies for water damage include<sup>12</sup>:

- Move patients and residents out of the area
- Redirect traffic and restrict access
- Isolate the area with closed doors, signage or hoarding
- Clean hard surfaces with a detergent and disinfectant
- Carpets, tiles and buckled flooring should be removed, and support surfaces allowed to dry before replacement.
- Remove and replace walls and porous structural materials if they cannot be cleaned and dried within 72 hours of damage occurring
- Hard surface furniture should be cleaned and allowed to dry
- Wood furniture should be allowed to dry, and sanded and re-varnished/painted
- Cloth furniture should be replaced

## Handover and commissioning stage

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Building commissioning is the process to ensure the building project has been completed and meets all building and engineering requirements prior to handover. It is usually undertaken by a Health Service representative of the project team and the contractor, to review physical structures and defects, and functionality of plants and equipment.

Operational commissioning is the process that takes place prior to handover and occupation and includes preparation of the clinical space or service area for occupation and assessments of design, resource and product placement and processes. It is required to take place once the project has been completed, when barriers have been removed and cleaned, but prior to handover and occupation. This stage includes an IPC assessment of compliance and may include air and water sampling assessment and review of results obtained in the commissioning process.

The operational commissioning team should be established and identified during the design and planning phase of the project, with an identified lead who will coordinate the process with the Project Team<sup>19</sup>.

During the establishment of the operational commissioning team consideration should be given to risk assessment and management strategies, including processes to escalate identified risks and implement corrective actions with minimal disruption. During this stage the occupation activities, including cleaning requirements, air and water testing, and relevant timeframes should be established and planned for.

An IPC operational commissioning assessment should be completed and documented.

## Documentation, audit and compliance

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Keeping records of documentation will ensure the requirements of the NSQHS Preventing and Controlling Infections standard, Aged Care Quality Standards and the Work Safe act and regulations have been met and can be demonstrated.

Records to be maintained and documented include:

- Meeting minutes
- Planning and design documents
- IPCRA
- Audits
- Action logs

- Outcomes
- Education and training records
- Non-conformance reporting

## Standards, code of practice and industry guidelines

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Australian Guidelines for the prevention and control of infection in healthcare. (2019) Australian commission on safety and quality in healthcare. Australian government, NHMRC.

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ANSI/ASHRAE/ASHE Standard 170-2017 Ventilation of Health Care Facilities  
[https://ashrae.iwrapper.com/ASHRAE\\_PREVIEW\\_ONLY\\_STANDARDS/STD\\_170\\_2017\\_86529](https://ashrae.iwrapper.com/ASHRAE_PREVIEW_ONLY_STANDARDS/STD_170_2017_86529)

ASHRAE Standard 241-2023 Control of infectious aerosols  
[https://ashrae.iwrapper.com/ASHRAE\\_PREVIEW\\_ONLY\\_STANDARDS/STD\\_241\\_2023](https://ashrae.iwrapper.com/ASHRAE_PREVIEW_ONLY_STANDARDS/STD_241_2023)

National Aged Care Design Principles and Guidelines  
<https://www.health.gov.au/sites/default/files/2024-07/national-aged-care-design-principles-and-guidelines.pdf>



## Definitions

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<b>Control measure</b>	An action taken to minimise or eliminate an identified risk, as reasonably practicable.
<b>Commissioning</b>	The term used to describe the preparation of a building for operational and occupational use.
<b>FF&amp;E</b>	Furniture, Fixtures and Equipment
<b>Hand basins</b>	A clinical hand basin that is reserved for hand washing only
<b>Hazard</b>	An item/situation that has the potential to harm a person.
<b>Healthcare facility</b>	The building and facilities in which care is provided, including visits, short stay or permanent.
<b>Healthcare setting</b>	Places and services where healthcare occurs, including acute care hospitals, urgent care centres, rehabilitation centres, aged and disability residential care, specialised outpatient services (e.g., haemodialysis, dentistry, and office-based services), and community care.
<b>Healthcare worker</b>	Anyone who works in a healthcare or social care setting, e.g., medical practitioners, nurses, midwives, carers, dentists, allied health, students on placement, as well as executives, managers and administration personnel.
<b>HVAC</b>	Heating, Ventilation and Air conditioning systems
<b>IPCRA</b>	Infection Prevention and Control Risk Assessment
<b>IPC</b>	Infection Prevention and Control
<b>PPE</b>	Personal protective equipment
<b>Risk</b>	The possibility of harm, injury, illness or death that might occur when exposed to a hazard
<b>High risk patient</b>	Patients who are at greatest risk of infection by airborne or waterborne organisms, including, immunocompromised, transplant, chemotherapy, very old and very young patients.
<b>Patient/resident care area</b>	An area used to provide clinical care to patients/residents, including monitoring, treatment and evaluation.
<b>Procedure room</b>	A designated room for procedures that are not required to be performed in an operating room.
<b>Operating theatre</b>	A room within the operating suite that is designated for performing surgical or invasive procedures.

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## Version

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Version	Date	Addition/Amendments	Author	Review By
1.0	August 2024	New document	IPC Consultant	PGC

