

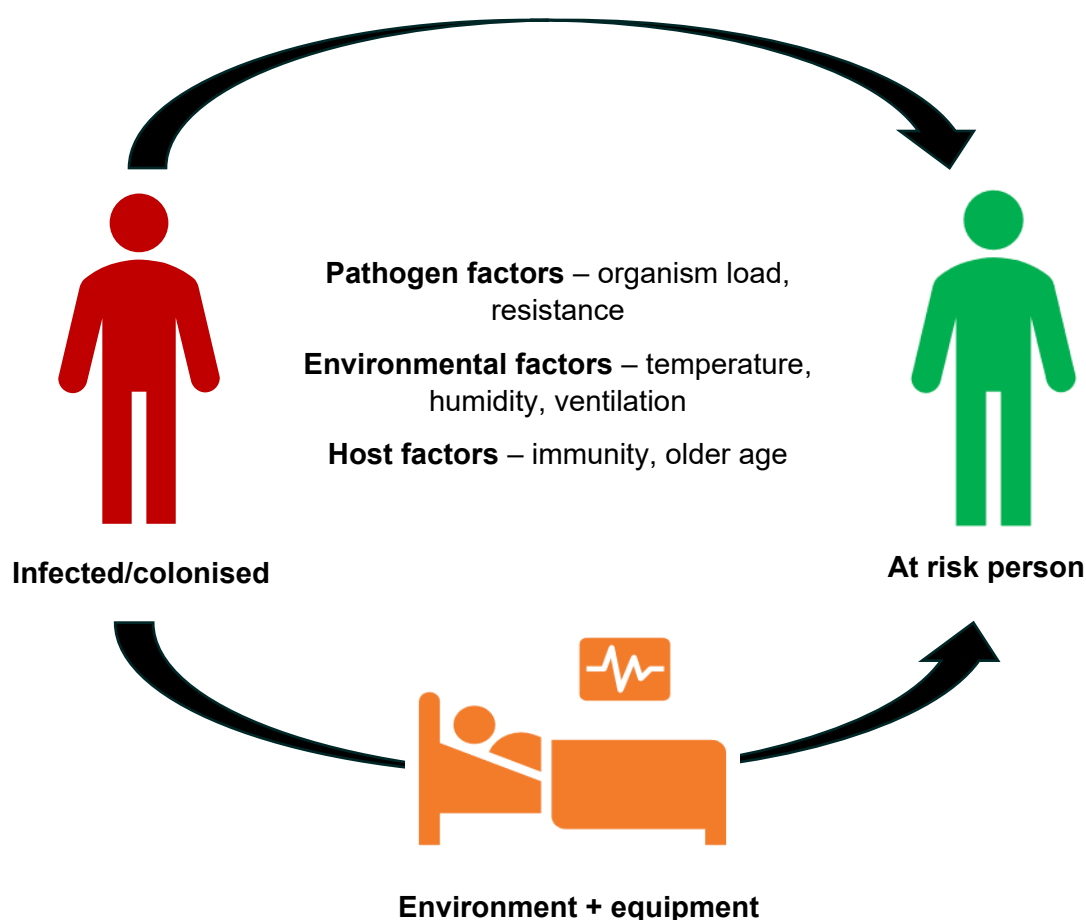
Chapter 6 Transmission-based precautions

6.1 Introduction

Transmission-based precautions are used when standard precautions alone are insufficient to prevent microorganism transmission. Standard precautions are required in all situations as the minimum requirement. These principles aim to reduce the risk of healthcare associated infection (HAI) and protect patients and health workers. The mode of transmission depends on both microorganism factors and patient risk factors. Therefore, understanding the mode of transmission is an important factor in deciding the type of precaution required for each situation and episode of care (National Health and Medical Research Council, 2019a). Whether a transmission occurs is determined by microorganism, environmental and host factors at the time of the event (Figure 16 Microorganism transmission).

Transmission-based precautions are applied based on risk assessment when a patient is confirmed or suspected of having transmissible and/or epidemiologically significant microorganisms. Risk assessment involves identifying the types of risk exposure within an organisation, measuring those potential risks and proposing means to mitigate them. To support the requirements of standard and transmission-based precautions, a Health Organisation is responsible for providing health workers, patients, participants in care and visitors with recommended resources including personal protective equipment (PPE), hand hygiene products, tissues and waste receptacles (Australian Commission on Safety and Quality in Health Care, 2021c). The Health Organisation should also provide suitable accommodation /bed placement, dedicated patient care equipment where possible and ensure that health workers are trained in the application of standard and transmission-based precautions.

Figure 16 Microorganism transmission



When assessing the need for transmission-based precautions there are several factors to consider: the patient, the environment, and the health worker.

The patient factors include:

- the type of microorganism
- mode or route of transmission
- factors that increase the risk of transmission such as respiratory symptoms, or other “wet” symptoms, for example, diarrhoea and/or vomiting,
- susceptibility, such as, the presence of wounds, indwelling device(s), or whether they are immunodeficient/ compromised
- age of patient (paediatric, children, young persons with autism spectrum disorder - and the potential for increase AGBs, mobility).

Environmental factors include:

- patient placement location such as extreme or high-risk unit, dialysis, or outpatients
- available infrastructure such as single room availability, shared bathrooms
- what patient care equipment needed
- shared equipment or amenities.

Health worker factors include:

- the type, frequency, duration, and intensity of contact or interaction with the patient.

The primary reason to implement transmission-based precaution is to reduce the risk of transmission of the microorganism or pathogen to other patient and less commonly to health workers and visitors/participants in care.

Transmission-based precautions require the use of PPE, cleaning and disinfection of shared equipment, additional cleaning and disinfection of patient care area, hand hygiene and appropriate patient placement. The type and components of PPE required will depend on risk of transmission and interaction required.

If a transmissible infection or microorganism is suspected, health workers should apply appropriate transmission-based precautions as soon as possible. Precautions are to remain until a definitive diagnosis (including pathology results) has ruled out the possibility of an infectious disease or symptoms have resolved (for example, no diarrhoea for last 48 hours, ARI symptoms started more than 5 days ago) or until effective treatment has been commenced and continued for the appropriate period. Health workers should be aware that it may not be possible to identify all patients for whom contact, droplet and/or airborne precautions are required (Figure 17 Transmission pathway).

For example, the risk of transmission may be present before symptomatic illness is observed or a definitive diagnosis made (National Health and Medical Research Council, 2019a).

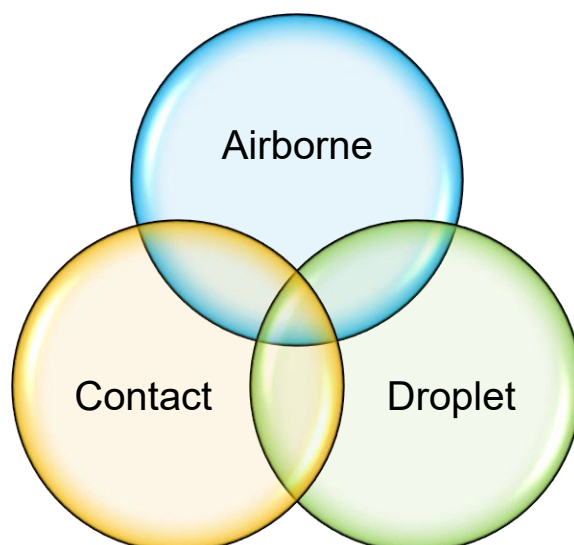
Transmission-based precautions are tailored to the different forms of transmission:

- contact precautions
- respiratory precautions
 - droplet precautions
 - airborne precautions.

Some microorganisms can be transmitted by more than one transmission route, and more than one type of transmission-based precaution may be employed.

Implementation of transmission-based precautions are to include an education program on how to risk assess for type of precautions, patient placement and selection of PPE.

Figure 17 Transmission pathway



Transmission-based precautions key principles

Triaging of patients suspected or confirmed to have transmissible microorganisms or infections should occur in a manner that prevents contamination of the environment and transmission in waiting rooms.

Patients suspected of having an infectious disease should be moved from shared waiting area to a single patient area or cohort area while awaiting further assessment and management. Where this may not be physically possible at the time all strategies to minimise the risk of transmission to other patients, health workers and visitors must be considered whilst keeping the patient safe. As per the local process infection prevention and control professionals, as subject matter experts, should be consulted to assist managers and health workers with workable operational strategies as reasonable.

If transfer or transport of the patient is required, the transferring/transport agency should be informed of the required transmission-based precautions on booking and as part of patient handover communication (communicating for safety) patient condition/diagnosis information remains confidential unless directly relevant to their clinical management.

Transmission based precautions:

- are used when the route(s) of transmission are not completely interrupted by using standard precautions alone
- apply precautions based on routes of transmission. A microorganism may have several routes of transmission
- may change as understanding of transmission and immunity to infection evolve over time
- use multiple layers of interventions (screening, PPE, single room, ventilation).

As per local process Public Health Unit (PHU) may need to be notified during an outbreaks or significant cases of notifiable conditions.

Patient isolation may also impact patients with anxiety, falls risk and reduced health worker visits and therefore education and communication are needed to ensure patients are well informed of the rationale and any requirements of transmission-based precautions.

The environment must be physically cleaned with a neutral detergent followed by a disinfectant, either a 2-step process where a detergent is used, followed by a disinfectant, or as a 2-1 step process, where a TGA approved detergent and disinfectant is used. Patient movements (bed and/or ward) and transfers during transmission-based precautions should be minimised based on a risk assessment and needs approach to reduce cross contamination and transmission risks.

Visitors, carers, and participants in care

Prior to entering the patient's room, the health worker caring for the patient is to explain any transmission risk and educate the visitor, carers, and participants in care on ways to prevent transmission of microorganisms, for example, wearing a mask for respiratory precautions when entering the room. At a minimum:

- visitors are encouraged to practise hand hygiene
- visitors usually do not need PPE such as gloves and gowns, unless exposure to body substance is anticipated. Surgical mask should be worn when visiting patients under droplet or airborne precautions
- any visitors attending a patient in transmission-based precautions need to understand that they should not subsequently visit any other patient in the hospital during the same visit
- parents should be advised to refrain from taking infants in to visit patients who are being cared for under transmission-based precautions. However, an exemption should be granted for situations such as an infant's mother is in hospital and visitation may be required.

If variations to the above are requested, consult the local infection prevention and control unit prior to the visit.

Visitors to patients with high consequence infectious diseases (HCID) should be limited and each Health Organisation should address the need for visitor restrictions on a case-by-case basis.

Signage - when specific environment cleaning is required keep signage displayed after the patient leaves the room (discharged or transferred out) so that environmental services know what precautions are required for cleaning/disinfection.

Specialist areas

Specialist areas such as mental health (both community and inpatient) settings, dementia and cognitive impaired units, a risk assessment-based approach to appropriate infection prevention and control strategies should be implemented to reduce the risk of cross transmission. These areas should have a documented process on how to manage communicable or infectious cases (sporadic or an outbreak situation) including process to minimise transmission risks when consumers therapeutically socialising with one another.

Maternity and Neonatology Units

Neonates, especially premature neonates, are extremely vulnerable to infection. Health workers need to be aware of appropriate interventions to minimise the possibility of cross transmission and infections. The process detailed throughout this document applies to these settings. Neonatal units should comply with restrictions and exclusions based on the disease and cross transmission/communicability risk. The care provision of newborns and mums and participant in care who stay in with them should be based on a risk assessment and clinical need.

Refer to the infectious disease table in Chapter 8 Outbreak and cluster management.

6.2 Contact precautions

Contact precautions are used when there is a known or suspected risk of direct or indirect contact transmission of infectious agents that are not effectively contained by standard precautions alone.

Direct transmission occurs when microorganisms are transferred from one person to another person without a contaminated intermediate object or person. For example, blood or other body substances from an infectious person may have contact with a mucous membrane or breaks in the skin of another person.

Indirect transmission involves the transfer of an infectious agent through a contaminated intermediate object (fomite) or person. Contaminated hands of health workers have been shown to be important contributors to indirect contact transmission. Hand hygiene, and cleaning and disinfection of shared patient care equipment are acknowledged as some of the strategies to reduce indirect transmission of microorganisms.

Where there is significant patient and/or environmental contact, health workers are to implement contact precautions for patients with known or suspected infections with either an increased risk for contact transmission or significant consequences (for example, high risk of organism dispersal with MROs, *Clostridioides difficile*, acute gastroenteritis or herpes zoster).

Contact precautions consist of:

- appropriate patient placement based on risk assessment. If the patient has “wet” signs or symptoms (include vomiting, diarrhoea, bleeding, coughing with sputum production, uncontained wounds) single room is preferred*
- hand hygiene
- appropriate PPE selection and use, based on risk assessment:
 - below neck PPE if patient has “wet” signs or symptoms
 - gloves as per standard precautions, don immediately before patient contact and change between different tasks on same patient and must be changed between patients
- where practical, single use/ disposable, or dedicated patient care equipment based on local epidemiology and procedure or if shared equipment is used, it must be cleaned appropriately in line with manufacturers instruction between patient use each time
- enhanced cleaning of patient care areas
- communication - inform the patient and relevant family/caregivers. Ensure relevant agencies are notified, for example, ward or hospital transfer, transport providers. Risk assessed transport and movement of patients.

Risk assessment – patient factor

Perform a risk assessment based on patients' communicability or risk of organism dispersal. Conditions that potentially increase the risk of organism dispersal include diarrhoea, incontinence, or uncontained wounds (wet patients). These patients may need contact precautions in a single room with a dedicated toilet. Where single rooms are not available, appropriate PPE based on the type of care being provided.

Conditions with a low risk of organism dispersal include continent, contained wounds (dry patients) where standard precautions may be appropriate.

Risk assessment – patient placement

Patient placement should be determined based on risk assessment, single room patient placement priority guide, availability and local bed management priority matrix (if available). Preferably patients with wet symptoms such as symptoms of acute infective diarrhoea should be placed in a single room with ensuite bathroom. If this is not possible, patients can be cohorted with patients infected or colonised with the same microorganism with access to a designated bathroom. Any decision to cohort patients should be in conjunction with the local infection prevention and control team.

Risk assessment – PPE

Health workers are to conduct a risk assessment if (below neck or above neck) PPE is required based on the episode of care, anticipated exposure to blood or body substance and level of contact with the patient and patient zone. The following are to be considered as part of the risk assessment:

- If the care involves body substance contact, below neck PPE (a gown/apron and gloves) should be donned to protect health workers' uniform/personal clothing and hands
- Facial and eye protection (above neck PPE) should be selected according to standard precautions (risk of splash or spray or aerosolisation of body substance).

Health workers must perform hand hygiene prior to donning an impervious gown/apron on entering the patient zone based on anticipated contact with a body substance. When implementing contact precautions, the following practices should be followed to ensure effective infection prevention and control:

- Gloves are always the last PPE item to apply. They are put on inside the room directly before patient contact where exposure to body substances is anticipated and after hand hygiene is performed
- Compliance with hand hygiene inside the patient care zone must continue regardless of glove use. It may be necessary to remove gloves and perform hand hygiene between procedures (especially moving from dirty to clean site) while attending to a patient on contact precautions
- The duration of contact precautions will vary and ceasing contact precautions should be based on either guidelines or advice from local infection prevention and control
- Depending on the microorganism, terminal cleaning with a TGA approved disinfectant may be required
- Use contact precautions signage at entrance of patient's care zone to alert/inform health workers such as environmental services on patient status, (refer to figure 18 Example of contact precautions signage)
- Reusable shared patient equipment must be cleaned and disinfected in between use regardless of patient's status
- Computers on Wheels and Workstations on Wheels must only be used by individuals with clean hands. These devices are to be thoroughly cleaned and disinfected between each use. When taken into isolation rooms, a defined work process must be in place to manage their use and reduce the risk of contamination. If such a process cannot be implemented, these items should not be brought into isolation environments. However, any decision to restrict their use must be carefully weighed to ensure that patient care is not adversely affected.

Hand hygiene

Hand hygiene is an important aspect of contact precautions. Hand hygiene must be performed before donning and between each step of doffing PPE, in between any glove changes and before

donning clean gloves. If a patient is suspected or known to have *Clostridioides difficile* or a non-enveloped virus (for example, norovirus), hand hygiene using soap and water should be performed on exit or after care finished. ABHR can be used for hand hygiene when in the room attending to patient and between tasks on the same patient.

Equipment

Single use or dedicated equipment should be used where possible and practical. If shared equipment is used, it must be cleaned between use as per the manufacturer's instructions.

Environmental cleaning

Enhanced cleaning should be employed to ensure patient and healthcare zones are free of contamination.

Use ARTG-listed disinfectants

Clean and disinfect surfaces and equipment using disinfectants listed on the Australian Register of Therapeutic Goods (ARTG) with specific claims.

Apply appropriate cleaning methods

Use either:

- A two-step process: first clean with a detergent, then disinfect
- A 2-in-1 cleaner/disinfectant: ensure it has efficacy claims against the pathogen of interest.

Target high-risk areas

Focus cleaning efforts on surfaces that may be contaminated with microorganisms, especially those:

- In close proximity to the patient. For example, bed rails, over-bed tables
- Frequently touched in the patient care environment. For example, doorknobs, toilet surfaces in patient rooms.

Adjust cleaning frequency

Adjust cleaning frequency based on surface type and frequency of access:

- Clean high-touch surfaces more frequently
- Clean minimal-touch surfaces on a less frequent schedule. For example, horizontal surfaces in waiting rooms.

Appropriate PPE should be used when conducting the cleaning, and hand hygiene performed after doffing PPE.

Signage

Signage is an important reminder that improves adherence to precaution requirements for health workers and visitors. Signage needs to provide clear instructions on the specified transmission-based precautions, requirements for entering and exiting the room, required PPE and advice for visitors on the importance of checking with health workers on any specific requirement before entry to patient zone (refer to figure 18 Example of contact precautions signage).

Patient movement or transfer

If a patient on contact precautions needs to be moved, cover or contain the infected areas of the patient's body (for example, open wound or lesion) or clean patient if they are soiled or have body substance leakages if relevant. Remove and dispose of contaminated PPE and perform hand hygiene prior to transporting patients. Don clean PPE to handle the patient at the transport location.

Patient transport

A risk assessment should be performed on the decision to transport patients on their own with a specific infectious disease. If not possible, cohort with patients suspected or infected with the same microorganism. If that is not possible either, ensure that physical separation of patients can be achieved in the transport vehicle. Physical separation is ensured when patients can neither touch each other nor are there common environmental surfaces. Educate patients on the importance of hand hygiene (Jain et al., 2019). Where there may be uncertainty on risks, contact local infection prevention and control for advice.

Figure 18 Example of contact precautions signage

Contact Precautions
Before entering room: - perform hand hygiene. - perform a risk assessment on the need for apron or gown, for example, type of patient contact or contact with body substance, type of MRO (new or emerging), patient status (wet or dry).
After entering room: - perform hand hygiene. - perform a risk assessment on the need for gloves, for example, contact with body substances. - change or remove gloves (if worn) and perform hand hygiene in between dirty and clean tasks.
On leaving room: - remove and dispose of gloves (if worn). - perform hand hygiene. - dispose of apron or gown (if worn). - perform hand hygiene. - clean reusable shared equipment (if used) and perform hand hygiene.
Remember: - When transporting patient outside of the room remove PPE and perform hand hygiene, as above, after placing patient on trolley/stretchers/wheelchair. - Use patient-dedicated or single-use non-critical patient-care equipment where reusable equipment is not available. - Use a single-patient room or, if unavailable, cohort patients with the same strain of MRO in designated patient-care areas (upon approval from the healthcare facility's infection prevention and control team). - Ensure consistent cleaning and disinfection of frequently touched surfaces near the patient and those likely to be touched by the patient and health workers.

Discontinuation of contact precautions

Duration of contact precautions will vary depending on the organism and patient factors such as the presence of wounds or indwelling devices. For patients who are colonised or have infection with an MRO, local processes should be followed on decolonisation protocols and clearance or removal of alerts. Decisions on ceasing contact precautions for some viral infections are to follow local guidelines or be discussed with infection prevention and control.

For most MRO colonisation, it may be appropriate to assume lifelong colonisation and manage accordingly. However, it might be possible after a prolonged interval free of hospitalisations, antimicrobial therapy and invasive devices (for example, 6 or 12 months) to re-culture patients for clearance (Werner and Shaban, 2018). For more information refer to Chapter 7 Management of MROs.

6.2.1 Contact precautions in specific settings

Community-based settings

Contact precautions in the community should be directed according to the individual patient condition, risk assessment and any ongoing sequence of care.

Lower-risk settings

Conduct a risk assessment

In lower risk areas such as rehabilitation units, long term care settings, outpatient day treatment settings or patient transport services, a risk assessment should be undertaken in collaboration with Infection Prevention and Control to determine:

- The level of risk to patients and health workers
- The potential benefit or impact on patient treatment if contact precautions are implemented.

Hand hygiene

All health workers must perform hand hygiene after contact with the patient or their immediate environment by using:

- Soap and water for patients with norovirus or CDI
- Health workers are to encourage patients/clients to perform hand hygiene when attending outpatient clinics to reduce environmental contamination.

Cleaning of equipment and surfaces

Reusable or shared clinical equipment must be cleaned between patients/clients using a neutral detergent.

Frequently touched surfaces should also be cleaned between patient/client interactions to prevent cross-contamination.

Medium and high-risk community settings

In medium and high-risk community settings, reusable or shared clinical equipment and frequently touched surfaces that have contact with patients/clients known to carry MROs must be:

Cleaned with a neutral detergent and disinfected

Use either:

A two-step process: first clean with a detergent, then disinfect.

A 2-in-1 cleaner/disinfectant: ensure it has efficacy claims against the pathogen of interest.

6.3 Respiratory precautions (droplet and airborne)

Respiratory particles can transmit via droplet or airborne route, over short or long distances, through direct deposition or spray or via inhalation. Aerosols are suspension of particles or droplets in the air, ranging from larger particles (droplets) to very small particles (aerosols) which would be considered airborne. The definition of droplets continues to be debated and defining the size is problematic. For more information refer to [WHO 2024 Global technical consultation report on proposed terminology for pathogens that transmit through the air](#).

Respiratory precautions are required for organisms that are usually transmitted via the droplet or airborne route, or when particles have been artificially created, such as, from aerosol generating behaviour (AGB) or an aerosol generating procedure (AGP).

Patients with cystic fibrosis (CF) are at risk of both acquiring and transmitting respiratory infections. Respiratory infection in patients with CF can be more significant than for other individuals and is associated with deterioration of lung function. It is important that units that care for patients with CF (respiratory wards, non-CF respiratory wards and hospitals without CF clinics) partner with local infection prevention and control units to implement the additional measures described in Chapter 10 infection prevention and control in specialised settings for more information.

6.3.1 Droplet precautions

Droplet transmission is the spread of an infectious agent caused by the dissemination of droplets. Droplets are primarily generated from an infected (source) person during coughing, sneezing and/or talking. Transmission occurs when microorganism containing droplets are propelled through the air and deposited on the conjunctivae, mouth, nasal, throat or pharynx of another person. Most of the volume of expired air or a cough or sneeze comprises of large droplets that travel short distances and do not remain suspended in the air. Thus, special air handling and ventilation are not routinely required to prevent droplet transmission. Certain procedures or interactions however may increase the volume of expelled droplets where additional controls will be warranted such as optimising ventilation and ensuring that air conditioning systems are maintained to minimise the risk of microorganism transmission between individuals.

For more information refer to [Engineering Services Guide](#) and 6.12 Recirculating air filtration device use.

Droplet precautions are to be employed in addition to standard precautions when caring for any patient known or suspected of being infected with a microorganism that can be transmitted by the respiratory droplet transmission route.

Droplet precautions consist of:

- appropriate patient placement (single room or cohorting)
- hand hygiene
- appropriate PPE selection (above neck - surgical mask and eye protection) and below neck-based on risk assessment, for example, gown/apron if “wet” signs or symptoms
- where practical, use disposable or dedicated patient care equipment
- clean and disinfect reusable shared equipment in between use
- enhanced cleaning of patient care areas
- Communication - inform the patient and relevant family/caregivers. Ensure relevant agencies are notified, for example, ward or hospital transfer, transport providers

- risk assessed transport and movement of patients.

Patient placement

Place patients who require droplet precautions in a single-patient room when available. Prioritising single rooms should use the following principles:

- prioritise patients who have excessive cough and sputum production for single-patient room placement
- cohort patients who are infected with the same pathogen and are suitable roommates, with access to a designated bathroom
- In shared or cohorted rooms where the space cannot be contained, such as, open bays or poor ventilation, consider source control for the patient when moving around the room if patients' physical health allows
- Avoid aerosol generating procedure (AGPs) and risk assess patient for aerosol generating behaviours (AGBs) when cohorting in a shared room
- Maintain a spatial separation of greater than 2.4m between beds in cohorted areas or draw privacy curtains between patients (if possible, based on risk assessment) to impede the direct spread of droplets and space beds at least 2.4m apart. For more information refer to [Australasian Health Facility Guidelines Part B Health Facility Briefing and Planning 0340 - Inpatient Accommodation Unit](#)
- Use droplet precautions signage at entrance of patient's zone.

Avoid placing patients in droplet precautions in the same room with patients who have conditions that may increase the risk of an adverse outcome from infection or that may facilitate transmission (for example, those who are immunocompromised, have or have anticipated prolonged lengths of stay).

Hand hygiene

Hand hygiene is an important aspect of droplet precautions. Hand hygiene must be performed before donning and after doffing PPE, between glove changes and before donning clean gloves.

Personal protective equipment

Health workers are to wear a disposable fluid repellent level 1 or level 2 surgical mask (see Table 30 AS 4381:2015 Single use facemask standard).

In transmission-based precautions the surgical mask is used to:

- protect the wearer against transmission of microorganisms
- protect others (source control) in the environment from infection. The patient under droplet or airborne precautions should wear a surgical mask outside of their patient zone, if able
- If oxygen therapy is required (if the medical condition allows), nasal prongs should be used, and a surgical mask should be worn over the top of the nasal prongs during any patient transport.

Protective eyewear (goggles or face shield) is to be worn as part of droplet precautions if working within 1.5 metres of the patient and as part of standard precautions if there is an anticipated risk to exposure to blood or body substance (National Health and Medical Research Council, 2019a).

Below neck PPE (gown/apron and gloves) to be used as per standard precautions and risk assessment.

After the care provision:

- Health workers wearing above neck PPE (masks and eye protection) should remove and dispose PPE outside patient zone (for example, at the door, curtain, or the anteroom) and perform hand hygiene
- Change PPE and perform hand hygiene between contact with patients in the same room, regardless of whether one patient or both patients are on droplet precautions
- In an outbreak situation, or when alert level has been raised from foundational, based on risk assessment, keep above neck PPE (mask and eye protection) until completion of an episode of care in the same bay/room.

Patient transfer

A patient should be transferred or transported on their own or with patients infected or colonised with same microorganism.

If clinically able, patient should wear surgical mask when outside of the usual patient zone (including outpatient and emergency settings).

Signage

Signage is an important reminder that improves adherence to precaution requirements for health workers and visitors. The signage needs to provide clear instructions on the specified transmission-based precautions, requirements for entering and exiting the room, required PPE and advice for visitors on the importance of checking with health workers on any specific requirement before entry to patient zone.

Other considerations

Health workers are to consider the following points when providing care to patients under droplet precautions:

- Depending on the microorganism, disinfection is required in addition to cleaning of patient care areas
- Visitors are recommended to practice hand hygiene and wear a surgical mask if within 1.5m of patient
- Droplets generally do not remain suspended in the air; baseline ventilation should optimise air exchange however special air handling and ventilation is not routinely required under droplet precautions
- If a patient who is being cared for under droplet precautions requires an aerosol generating procedure (AGP), the level of precautions should be increased to airborne for the duration of the procedure. If a negative pressure room is not available, this procedure should be undertaken in a dedicated single or clinic room away from other patients. If AGPs are anticipated, a P2/N95 respirator should be worn by attending health workers. Eye protection should be worn as part of standard precautions.

Table 30 AS 4381:2015 Single use facemask standard

Characteristics	Level 1	Level 2	Level 3
Application	For general purpose medical procedures, where the wearer is not at risk of blood or fluid splash or to protect staff and/or the patient from droplet exposure to microorganisms (for example, patient with upper respiratory tract infection visits GP).	For use in emergency departments, dentistry, changing dressings on small or healing wounds where minimal blood droplet exposure may possibly occur (for example, endoscopy procedures).	For all surgical procedures, major trauma first aid or in any area where the health worker is at risk of blood or bodily fluid splash (for example, orthopaedic, cardiovascular procedures).
	Evaluated for resistance to penetration by synthetic blood at the minimum velocity specified below in bacterial filtration efficiency and differential pressure.	Evaluated for resistance to penetration by synthetic blood at the middle velocity specified below in bacterial filtration efficiency and differential pressure.	Evaluated for resistance to penetration by synthetic blood at the maximum velocity specified below in bacterial filtration efficiency and differential pressure.
Bacterial Filtration Efficiency (BFE) %	≥ 95%	≥ 98%	≥ 98%
Particulate Filtration Efficiency (PFE) % (0.1µm)	< 4.0	< 5.0	< 5.0
Resistance to penetration by synthetic blood (fluid resistance) min pressure in mm Hg for pass result	80mm Hg	120mm Hg	160mm Hg

Source: AS 4381:2015 Single use surgical face mask standard.

6.3.2 Airborne precautions

Airborne transmission or inhalation can occur when infectious respiratory particles (IRPs) are expelled into the air and inhaled by another person. Airborne transmission or inhalation can occur at a short or long distance from the infectious person and distance depends on various factors (for example, airflow, humidity, temperature, and ventilation). IRPs can theoretically enter the body at any point along the human respiratory tract, but preferred sites of entry may be pathogen specific. Direct deposition can also occur when IRPs are expelled into the air from an infectious person, and are then directly deposited on the exposed mouth, nose or eyes of another person nearby, then

entering the human respiratory system and potentially causing infection (World Health Organization, 2024a).

Airborne precautions are implemented in addition to standard precautions for patients known or suspected to be infected with infectious agents transmitted person-to-person by the airborne route.

Airborne precautions consist of:

- use of single rooms with ensuite preferred and specific ventilation requirements
- hand hygiene
- use of above neck PPE (P2/N95 respirator and eye protection) and below neck- based on risk assessment for example, gown/apron if “wet” signs or symptoms
- enhanced cleaning of patient care areas and shared equipment
- communication- inform the patient and relevant family/caregivers. Ensure relevant agencies are notified, for example, ward or hospital transfer, transport providers
- risk assessed transport and movement of patients (internal or between facilities).

Patient placement

Place patients who require airborne precautions in a negative pressure room (class N room) with anteroom (preferable) and ensuite bathroom that has been constructed in accordance with the [Australasian Health Facility Guidelines](#). For more information refer to AusHFG [Isolation Rooms - Engineering and Design Requirements](#) and AusHFG [Pandemic Preparedness - Health Infrastructure Planning & Design Guidance](#).

The class N room should provide at least 12 air changes per hour with direct exhaust of air to the outside. If it is not possible to exhaust air from a negative pressure room directly to the outside, the air may be returned to the air-handling system or adjacent spaces if all air is directed through HEPA filters. The following measures should be implemented to ensure appropriate use and management of negative pressure (Class N) rooms and to maintain airborne precautions:

- Keep the negative pressure room door closed when not required for entry and exit
- Negatively pressured rooms should have a pressure gauge and alarm system to advise when pressurisation has not been achieved. Display monitors with audible alarms connected to the building management system should be outside the room.
- If a class N room is not available, place the patient in a single room with the door always closed. In this instance, the patient should have access to an ensuite or designated bathroom
- Signage should be placed outside the room that advises airborne precautions are in place. Notify environmental services staff on the required environmental cleaning requirements.

Class N rooms

A Class N (negative pressure) isolation room is a single-occupancy room with an ensuite that is not shared, designed to prevent the spread of airborne infectious agents.

The room maintains a negative pressure gradient, ensuring that air flows into the room from adjacent areas, such as corridors.

This airflow design prevents contaminated air from escaping the room, thereby minimising the risk of transmission to others.

The patient room is strongly negatively pressured relative to the corridor. When the door is opened, air from the corridor is drawn into the room, ensuring that no airborne organisms escape into surrounding areas.

Use and operation of Class N (negative pressure) isolation rooms

Class N isolation rooms are used for patients who require airborne infection isolation, such as those with varicella (chickenpox), measles, or pulmonary/laryngeal tuberculosis.

These rooms operate with a negative pressure air handling system, meaning the air pressure inside the room is lower than in adjacent areas (for example, anterooms and corridors). This ensures that air flows into the room, preventing the escape of airborne pathogens.

For new facilities, Class N rooms should be designed with a single-pass ventilation system, where air is not recirculated through other parts of the building.

Exhaust air should be discharged to the outside, away from air intakes and areas occupied by people.

In existing facilities where external exhaust is not feasible, recirculated air must pass through high-efficiency particulate air (HEPA) filters to remove airborne contaminants.

To maintain the integrity of the negative pressure environment, the door to the isolation room must always remain closed.

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

Table 31 Reference guide - Air changes per hour (ACH) and time required for removal efficiencies of 99.9% of airborne contaminants

Air changes per hour (ACH)	Minutes required for removal 99% efficiency	Minutes required for removal 99.9% efficiency
2	138	207
4	69	104
6	46	69
8	35	52
10	28	41
12	23	35
15	18	28
20	14	21
50	6	8

Source: [CDC Guidelines for Environmental Infection Control in Health-Care Facilities \(2003\)](#).

Hand hygiene

Hand hygiene is an important aspect of airborne precautions. Hand hygiene must be performed before donning PPE, after doffing PPE, between glove changes and before donning clean gloves.

Personal protective equipment (PPE)

The recommended respirator for routine care of patients requiring airborne precautions is a particulate filter respirator (also known as a P2 or N95 mask). In the healthcare setting, this most commonly relates to the disposable filtering half-face respirator. Disposable P2/N95 respirators can filter out very fine particles (less than 0.5 microns) from the air when worn correctly. The P2 respirator must have a filter efficiency of at least 94% when tested for particles at 0.2 to 2 microns. Eye protection is also recommended for patients on airborne precautions. The need for below neck PPE (apron/gown and gloves) should be risk assessed by Health workers, for example, a health workers' potential for exposure to blood or body substances, contamination of clothing or level of contact with the patient.

Particulate filters are classified and marked as P1, P2 or P3, with P3 providing the highest level of protection. However, P3 protection can only be achieved if the P3 filter is used in a full-face respirator. The filtration efficiency is calculated as follows:

- P1 = 80% filter efficiency
- P2 = 94% filter efficiency
- P3 = 99% filter efficiency.

Surgical and standard P2/N95 respirators

There are two types of P2/N95 respirators, surgical and standard:

- Surgical P2/N95 respirators are fluid resistant (check manufacturer instructions on fluid resistance on the package)
- Standard or non-surgical P2/N95 respirators are not fluid resistant.

Use a surgical P2/N95 respirator when:

- Performing tasks such as surgery where health workers may be exposed to high pressure streams that produce particles of blood or body fluid
- Providing care for patients in airborne precautions.

Standard P2/N95 respirators can be used for dry airborne situations such as caring for patients with suspected or confirmed tuberculosis, measles, or chickenpox. Standard P2/N95 respirators can be used together with a face shield, surgical mask, or a visor (these additions must be approved by the product manufacturer) if fluid resistance is required. For more information refer to the [TGA Guidance on Personal Protective Equipment for Health Professionals](#).

Reusable respirators (respirators that can be used multiple times after appropriate reprocessing in-between use) are an alternative to disposable respirators for some clinicians who require respiratory protection in select situations. For more information refer to the [Respiratory Protection Program Manual](#).

When providing care for patients requiring airborne precautions health workers are to wear a P2/N95 respirator and eye protection on entering the patient's zone. P2/N95 respirator requires a proper face seal, and all health workers are to be instructed on how to fit check a P2/N95 respirator. Health workers are to fit check (user seal check) at point of use every time a respirator is used. Refer to the donning and fit checking of P2/N95 respirators in NSW healthcare settings video series available through HETI [My Health Learning](#) (course code: 319438161) for more information.

Fit testing is a validated process of determining the type and size of a respirator that achieves an adequate seal on an individual's face. Health Organisations are required to implement respirator fit testing in their facilities for health workers routinely providing clinical care to patients in airborne

precautions (for example, for pulmonary or laryngeal tuberculosis) or patients with respiratory communicable diseases including COVID-19. For more information refer to the CEC [Respiratory protection program](#).

Application of PPE

Health workers are to conduct a risk assessment:

- Before entering a room or patient zone where a patient is in airborne precautions - perform hand hygiene and a risk assessment on the need for below neck PPE (apron/gown and gloves). For example, duration and type of patient contact or contact with blood or body substance (as per standard precautions)
- The choice of wearing a fluid resistant apron or gown is based on a risk assessment around the level of contact to blood and body substance exposure
- Whether an apron or gown is worn, it should be changed between contact with patients or their environment
- Select appropriate P2/N95 respirator based on your fit test and fit check prior to entering the patient zone
- Apply eye protection prior to entering the patient zone
- After entering room or patient zone, perform hand hygiene and risk assess the need for gloves, for example, contact with blood or body substance. Change or remove gloves (if worn) and perform hand hygiene in-between dirty and clean tasks
- The use of gloves is recommended as part of standard precautions to reduce the risk of contamination of health workers hands when exposure to blood and body substance is expected
- Below neck PPE (apron/gown and gloves if worn) to be removed prior to exiting the room or at the exit
- Above neck PPE (P2/N95 respirator and eye protection) are to be removed and disposed of in the anteroom or outside the patient's room with door closed and perform hand hygiene
- P2/N95 respirator is not recommended for patient use. Place a surgical mask on the patient (if tolerated) when outside of the isolation. P2/N95 respirators are not recommended for patients due to:
 - Fit and seal requirements: P2/N95 respirators are only effective when properly fitted, which is not feasible for most patients
 - Comfort and tolerance: These respirators are less comfortable and harder to tolerate, especially for patients with respiratory distress or cognitive impairment.
 - Clinical prioritisation: P2/N95 respirators are prioritised for healthcare workers performing aerosol-generating procedures or working in high-risk environments

Patient transfer

When transferring patients under airborne precautions:

- Transport patients on their own when transferred in patient transport vehicles
- If the patient can tolerate wearing a surgical mask, this should be worn when outside of the isolation zone (including transport, outpatient and emergency settings) (117-120)

- If patients require oxygen therapy and the medical condition allows this, change to nasal oxygen for the transport or transfer period with a surgical mask over the nasal prongs.

Signage

Signage is an important reminder that improves adherence to precaution requirements for patients, health workers and visitors. The signage needs to provide clear instructions on the specified transmission-based precaution, requirements for entering and exiting the room, required PPE and advice for visitors on the importance of checking with health workers on any specific requirement before entry to patient zone.

Visitation

Prior to entering the patient's room, the health worker caring for the patient is to explain the transmission risk and educate the visitor, carers, and participants in care on ways to prevent transmission of microorganisms, for example, wearing a mask or respirator for respiratory precautions when entering the room.

When visiting patients under airborne precautions:

- Visitors are recommended to wear a surgical mask
- P2/N95 respirators may be an alternative but must be accompanied with training and fit checking with the assistance of a health worker. P2/N95 respirators require a proper seal to the face and instruction should be given on how to perform a fit check. This should include a demonstration of donning, removing, and disposing of PPE in addition to hand hygiene
- Visitors with chronic respiratory, cardiac, or other medical conditions that make breathing difficult should check with their healthcare provider before using P2/N95 respirator because the P2/N95 respirator can make it more difficult for the wearer to breathe
- Consideration should be given to limit visitation by providing alternatives such as virtual visits where possible and practical for those visitors requiring high levels of protection (also immunocompromised).

Other considerations

Depending on the microorganism, disinfection may be required in addition to cleaning of patient care areas. There is a required time for removal efficiencies of 99.9% of airborne contaminants between room occupancy depending on the air exchange within the room (refer table 31, the standard minimum air changes per hour for a negative pressure room ≥ 12). P2/N95 respirator should be worn by all health workers entering these rooms until terminal cleaning is completed and until the time period has elapsed (Ijaz et al., 2016).

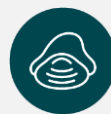
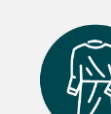
Use of split system air-conditioning units should be avoided in patient care areas. If use of such units is unavoidable, the effects on air flow into or within common spaces (for example, shared rooms or corridors) should be considered, and a schedule for maintenance and filter changes should be in place. For more information optimising ventilation and ensuring that air conditioning systems are maintained to minimise the risk of microorganism transmission refer to [Engineering Services Guide](#) and [Safety Information 009/21 Recirculating air filtration device use in NSW hospitals](#).

6.3.3 Combined transmission-based precautions

In some instances, patients may require a combination of precautions in addition to standard precautions when individual precautions are not enough to reduce the risk of transmission of some communicable diseases such as high consequence infectious diseases (HCID) viral gastroenteritis or chickenpox. For more information refer to [NSW Health Infectious Diseases](#).

Refer to My Health Learning (course code: 294450660) for PPE donning and doffing videos.

Table 32 PPE selection guide

Precautions	 Hand hygiene	 Surgical mask	 P2/95 respirator	 Eye protection	 Gown/apron	 Gloves
Standard		Risk assessment				
Contact		Risk assessment				
Droplet					Risk assessment	
Airborne					Risk assessment	
Combined D+C					Risk assessment	
Combined A+C						
For HCID refer to High Consequence Infectious Diseases – Infection Prevention and Control Principles Guideline .						

6.3.4 Airborne precautions during sputum-inducing procedure

Sputum induction is a procedure used for patients who have trouble producing sputum spontaneously. The patient inhales nebulised hypertonic saline solution, which liquifies airway secretions, promotes coughing, and allows expectoration of respiratory secretions.

If a sputum-inducing procedure is being performed, such as sputum induction, chest physiotherapy or bronchoscopy on a patient suspected or confirmed to have pulmonary tuberculosis, then all health workers in the room should don a P2/N95 respirator and eye protection, including standard precautions.

Sputum inducing procedures should be performed in a Class N (negative pressure) room (or sputum induction booth). The patient should remain in the Class N room or booth until coughing subsides. Other patients and health workers not wearing P2/N95 respirators should not enter the Class N room or booth until enough time has passed for a sufficient number of air exchanges to occur for adequate removal of contaminated air (refer to table 31 for ACH). Consult with facility engineers to determine the air changes per hour for each room/booth. For more information on refer to the [Thoracic Society of Australia and New Zealand position statement: The safe clinical use of](#)

6.4 Transmission-based precautions in community and oral health settings

Patients presenting with an acute transmissible infection to community or oral health clinics can place health workers and other visitors at risk. As the ability to isolate the patient may be challenging, perform a risk assessment to determine alternative measures to mitigate the risk such as risk assessment of patient presenting for non-urgent treatment with acute respiratory infection, rescheduling of non-acute patients or visiting the patient in their home.

If patients are to attend oral health settings as an emergency, ensure health workers are competent in donning and doffing PPE and transmission-based precautions for the suspected/ confirmed infectious diseases.

Compliance with standard and transmission-based precautions, including hand hygiene, cleaning of shared equipment and the patient zone after each patient, and disposal or reprocessing of instruments after each procedure, will reduce the transmission of infections and multi-drug resistant organisms. The Health Organisation should ensure that patients and carers have access to hand hygiene resources and are enabled to clean their hands before and after appointments. For more information refer to [NSQHS Standards Guide for Private Dental Practices](#).

6.5 Supporting bed allocation and patient flow

Bed allocation or patient flow for patients with a known or suspected communicable disease or a multi-drug resistant organism (for example, COVID-19, influenza, tuberculosis, varicella zoster or carbapenemase-producing *Enterobacteriales*) can be complex, requiring careful planning to ensure the most suitable ward and bed placement. To ensure the safe and timely placement of a patient, decisions should be made in conjunction with the patient flow team and local Infection prevention and control service wherever possible in business hours, with local procedures for after hours.

Reducing unnecessary movement of patients within a hospital can help to reduce:

- the number of high-risk contacts if a patient has a communicable disease or infection.
- the risk of patient disorientation and adverse outcomes.

6.5.1 Risk assessment and risk mitigation process

Patient placement needs to consider the principles of [infection prevention and control hierarchy of controls](#) as part of any risk mitigation process. Prioritisation of single rooms for isolation or for other important uses beyond the management of infectious diseases, such as providing end-of-life care, falls risk, patient vulnerability to communicable diseases (for example, immunocompromised) or ensuring appropriate patient security and safety should be embedded in the decision-making process. Where possible, patient rooms including isolation rooms need to be allocated to minimise any additional unnecessary movement of patients during their admission.

Patients must be promptly assessed for infection risk on arrival at the care area (if possible, prior to accepting a patient from another care area) and this should be continuously reviewed throughout their stay. Patient placement decisions should be based on risk assessment which should consider the route of transmission of the organism or infection, alongside patient factors and symptoms that increase the risk of transmission. These principles should be applied in the emergency department (ED) and ward areas, including outpatient areas. Assessment should include the potential infection,

route of infection transmission and potential spread of infection, risk factors associated with exposure to blood and body substances, and spatial considerations.

On arrival, patients must be promptly assessed for infection risk at the care area (if possible, prior to accepting a patient from another care area) and this should be continuously reviewed throughout their stay. Refer to Table 33.

Any 'yes' responses should warrant patient placement consideration for isolation/single room or appropriate cohorting.

Table 33 Risk assessment guide for patient placement (example)

Risk	Yes	No	Comment
Are there new symptoms of cough, unexplained fever, rash and/or diarrhoea?	☐	☐	
Has there been any travel in the past 21 days outside their usual environment? If yes, review risks of infection.	☐	☐	
Has there been overseas hospitalisation (including day procedures such as dialysis) in the past 12 months	☐	☐	
Are there additional precautions (droplet, contact, airborne) in place?	☐	☐	
Is there known colonisation or infection with an MRO with wet symptoms?	☐	☐	
Is there known contact with someone with CPE or <i>Candidozyma auris</i> ?	☐	☐	
Is there known contact with ARI or COVID-19 in the past 10 days.	☐	☐	
Is the patient mobile/ambulatory and are they capable and willing to perform hand hygiene and practice respiratory etiquette?	☐	☐	
Does the patient present as vulnerable?	☐	☐	

6.5.2 Prioritisation of single rooms or isolation rooms

Patients with an acute respiratory infection (ARI) should be managed with transmission-based precautions (either airborne or droplet) and standard precautions. The absence of results should not delay the implementation of transmission-based precautions or bed movement. Risk assessment and local procedure should determine the bed allocation.

Appropriate infection prevention and control strategies can be implemented in ward areas, including the emergency department. Test results are primarily used for patient management, such as commencing or ceasing antimicrobial therapy, but may also inform the most appropriate infection prevention and control strategies.

A single-bed room with ensuite should be considered as a minimum for patients on airborne precautions and is preferred for patients on droplet and contact precautions. The ongoing need for isolation should be reassessed based on transmission or infectious period and patients' clinical signs and symptoms.

Local risk assessment should determine the appropriate room placement considering any other patient safety risks (for example, falls risk, other co-morbidities or mental health).

When single-bed rooms are limited, prioritisation should be for patients who have conditions that increase the risk of infection transmission to other patients (for example, draining wounds, stool incontinence or uncontained secretions) and those who are at increased risk of acquisition and adverse outcomes resulting from a healthcare associated infection (HAI) (for example, immunosuppression, open wounds, invasive devices, anticipated prolonged length of stay, total dependence on health workers for activities of daily living and new or emerging organism of significance).

Placing a patient in isolation may increase the risk of stress, depression, or anxiety. Where isolation is required, the reason for isolation should be clearly explained to the patient and their carers to minimise these risks.

A decision to isolate the patient should be made carefully after consultation with treating clinicians and the infection prevention and control service and/or an infectious diseases (ID) team and be regularly reviewed. The reason for isolation must be documented in the patient's healthcare records and reviewed by the infection prevention and control service.

Where a patient's presentation involves acute gastrointestinal symptoms/infection (vomiting, diarrhoea); acute respiratory infection, acute skin infection or infestation, a single room with own bathroom is the preferred room allocation for these patients, if available.

The following order of prioritisation should be considered with all patient allocations:

1. airborne precautions – priority access to negative pressure room with or without anteroom, followed by isolation rooms that may be 100% exhaust or negative airflow. Where these category of isolation rooms are not available use a single room with door closed and dedicated bathroom facilities
2. droplet precautions – single room where available (for example, acute respiratory infections)
3. contact precautions – transmission risk assessment to be conducted (for example, wet contact – diarrhoea, vomiting, open wound).

Table 34 Patient placement priority guide

Priority	Disease or presentation	Precautions including standard precautions	Isolation management
FIRST	High consequence infectious disease (HCID)*	Airborne + Contact	Negative pressure room
	Respiratory viruses of concern, for example, Middle East respiratory syndrome coronavirus (MERS-CoV)	Airborne + Contact	
	Measles	Airborne	
	Pulmonary/ laryngeal tuberculosis	Airborne	

	Chickenpox/disseminated varicella zoster virus	Airborne + Contact	
	Disseminated herpes zoster	Airborne	
	<i>Candidoizyma auris</i>	Contact	Single room with own bathroom
	Respiratory AGPs on patients with ARIs	Airborne	Single room with doors closed (negative pressure if available). Own bathroom
	COVID-19 suspected or confirmed	Airborne	
	Neutropenia and transplant recipients	Protective precautions and isolation	Place in single room with own bathroom** Note: neutropenic patients usually placed in Class P (positive pressure) rooms: assess infectious status
SECOND	Influenza	Droplet	Single room
	Pertussis	Droplet	
	Meningococcal disease (first 24 hours of antibiotics)	Droplet	
	Mumps	Droplet	
	Norovirus	Droplet + Contact	
	ARIs including human metapneumovirus, parainfluenza, RSV	Droplet	Single room where available
THIRD	<i>Clostridioides difficile</i> infection (with active diarrhoea)	Contact	Single room with own bathroom where available or dedicated bathroom facility
	Infectious diarrhoea [†] , vomiting including norovirus	Contact + Droplet	
	Carbapenem-resistant organisms (for example, carbapenem-resistant Enterobacterales)	Contact	
FOURTH	Other multi-resistant organisms as designated by your facility (for example, MRSA, VRE)	Contact	Single room where available with own bathroom. For cohorting: dedicated bathroom or designated commode. Cohorting can occur in this category (VRE, MRSA).
	Scabies	Contact	

	Herpes Zoster (localised & uncovered)	Contact	Single room where available with own bathroom
--	---------------------------------------	---------	---

*For more information, refer to NSW Health [Guidelines for management of specific high consequence infectious diseases](#).

**May consider cohorting with same transplant patients based on local risk assessment

† Some types of infectious diarrhoea only require contact precautions.

Note: protective precautions may apply to vulnerable patients.

6.5.3 Patient placement in a cohort or mixed inpatient area

Where single rooms are not available or where the demand for single rooms for management of patients with same communicable or infectious microorganisms is unable to be met, cohorting patients with the same confirmed microorganism may need to occur. This includes settings such as ED.

A cohort area is a bay, 2-4 bedded room or a ward in which a group of patients (cohort) with the same infection are placed together. Cohorting areas are created based on clinical diagnosis, microbiological confirmation when available, epidemiology, and mode of transmission of the infectious microorganism.

A decision to cohort patients should be made based on infection prevention and control principles and where possible in consultation with treating clinicians and the infection prevention and control service and/or an ID physician. If placement in mixed gender accommodation is being considered, refer to the NSW Health [Same Gender Accommodation](#) policy directive.

In lower risk areas such as rehabilitation units, long term care settings, outpatient day treatment settings or patient transport services, a risk assessment should be undertaken to establish the level of risk and benefit to patient treatment.

Where awaiting pathology results, patients should be cohorted based on the symptomatology and risk assessment. However, patients not yet confirmed (suspected) should not be cohorted together with confirmed infections.

Patients screened for respiratory viruses, viral/infective gastroenteritis, or airborne diseases (based on symptomatology and period of infectivity for the causative organism) need to be isolated immediately until negative test results are available. When allocating beds the following are to be considered:

- Patients who are identified as close contacts of positive COVID-19/ acute respiratory infection (ARI) should not be cohorted with unexposed patients
- Patients who are identified as close contacts of positive COVID-19/ARI should be risk assessed for differing exposure times/dates before being cohorted together as their infection risk period may vary.

Patients screened for multi-resistant organisms (except *C. auris*) can remain in their allocated bed with appropriate precautions applied at the patient bedspace until results are available.

When single rooms with dedicated toilets are not available, a dedicated commode (where practical and feasible) should be assigned. Cleaning and disinfection of patient care items and surfaces is essential where shared equipment or environments are used.

Key considerations when allocating a bed space or moving a patient with suspected or confirmed communicable or infectious microorganisms:

- Refer to local guidelines or procedure when allocating beds

- Isolation should not compromise care provision including any clinical or diagnostic procedures. Consider the patient acuity and care needs including wandering, cognitive impairment, or other risk factors (falls risk) for patients requiring isolation
- Risk assessments should consider patient factors and bed availability and done in consultation with the patient flow team and local infection prevention and control/ID
- Does the patient move create additional bed capacity or reduce capacity temporarily “closing” beds
- The decision needs to consider other important uses beyond the management of infectious diseases, such as falls risk, providing end-of-life care, or ensuring appropriate patient security and safety
- Conversations with patients, families and carers about the risks and benefits of the bed move should be ongoing. Placement into an isolation or cohorting area should occur early and documented in the clinical record.

6.5.4 Patient placement during an outbreak

During an ARI (including COVID-19) or any other communicable/infectious microorganism outbreak or pandemic, designated areas or zones may be considered and are divided into different patient zones. Refer to Table 35 as an example of what you may include when managing an ARI outbreak in a health facility.

Table 35 Example of patient zoning

Zone	Description
Red	For patients with a confirmed diagnosis, for example, COVID-19, MRO
Amber	For patients with a suspected ARI/MRO or high-risk contacts
Green	For patients who are cleared of relevant ARI/MRO nor are a contact
Blue	For staff only

The organisation of zones depends on factors such as:

- Physical building space
- Availability of single or shared rooms in a specific area
- Ability of patients to be relocated
- Staffing capacity
- Number of suspected or confirmed ARI or other infectious cases
- Acuity of positive cases
- Number of contacts
- Clinical condition and vulnerability of patients
- Access to bathrooms, toilets, and utility rooms.

6.6 Staffing

Risk assessment should consider the appropriate allocation of health workers. This may involve dedicating health workers to specific patients or cohort groups.

Where this is not possible, adherence to hand hygiene, standard and transmission-based precautions is essential to reduce the risk of transmission of infection.

All health workers need to be vigilant for symptoms suggestive of ARI including COVID-19 or other transmissible infections. If symptoms occur, staff need to notify their manager as soon as practicable and follow local procedures.

Health workers are to be provided with necessary resources, time to practice correct precautions and donning and doffing of PPE to enable adherence to transmission-based precautions.

6.7 Discontinuing isolation

Individual patient risk factors should be considered (for example, there may be prolonged shedding of certain microorganisms in immunocompromised patients) along with clinical judgement before discontinuing isolation. Clinical and molecular tests to show the clearance of microorganisms may also be considered in consultation with health workers involved in the patient care and infection prevention and control team before making the decision regarding isolation discontinuation.

6.8 Vulnerable patients, protective precautions and isolation

Vulnerable patients requiring protective precautions are a priority for isolation.

There are specific patient groups for whom isolation may provide protection from infection. The following groups of patients would be considered as vulnerable and may require protective isolation:

- Any patient whose blood neutrophil count falls below or is expected to fall below $0.5 \times 10^9/L$ as a result of chemotherapy
- Patients receiving haematopoietic stem cell transplant, particularly allogeneic transplants
- Patients with extensive skin loss due to burns or trauma
- Patients within 6 months of a solid organ transplant
- Preterm babies.

Also refer to [Infection prevention and control Guidelines for Management and Assessment of Acute Respiratory Infection \(Flow chart\)](#) for further information.

6.9 Novel respiratory viruses

Ongoing surveillance in non-human species for novel respiratory viruses such as highly pathogenic avian influenza will provide an early warning of a potential threat to humans. If there are cases of highly pathogenic avian influenza (HPAI) in humans, these patients should be managed under airborne precautions until the risks of transmission are further detailed.

6.10 Health worker education

Health workers are to be provided with regular and ongoing education, based on local needs, on transmission-based precautions risk assessment, implementation, and explanation on the importance of why specific processes are followed. Providing justification on the risk associated with transmission of infection will improve compliance, retain information on infection prevention strategies including PPE donning and doffing, thus reduces any potential errors. Additionally,

education on HAIs will better inform health workers on appropriate precautions to adopt, enable them to provide accurate information to patients, and further reduce their own anxiety around self-protection. Education resources are available via the [My Health Learning](#) platform.

6.11 Transmission-based precautions and patient experience

Transmission-based precautions may potentially negatively impact on the patient's journey. As part of transmission-based precautions patients may be isolated in a single room, this may be an uncomfortable experience for some patients. Single room accommodation has been linked to adverse events such as patient falls, medication errors, batching of care and reduction in the frequency from health workers attendance (Uchmanowicz et al., 2024, Purssell et al., 2020). In some cases, patients may have experienced stigmatisation, increased negative feelings and anxiety (Fregonese et al., 2023).

When providing care to patients on transmission-based precautions health workers are to:

- discuss with patients the need for isolation in preparation and ideally prior to moving and be available to answer their concerns
- reconsider the need for isolation on a regular basis
- provide written information (fact sheet) on their infectious disease
- regularly check on patients' clinical condition
- treat patients with a positive and supportive attitude
- ensure the food and beverage needs are met
- refer to support services such as chaplaincy, cultural or religious leaders as required
- ensure the physical environment supports the mental health needs of the patient
- educate family and visitors about appropriate behaviour and what is expected of them when visiting, such as, do not visit if they are unwell, not to visit other patients and if using shared amenities ensure to perform hand hygiene before and after.

6.12 Recirculating air filtration device use

Portable air filtration devices, also known as air cleaners and often equipped with HEPA filters, are increasingly promoted for enhancing indoor air quality in hospitals and reducing the spread of airborne respiratory infections, including COVID-19. These units do not provide fresh air; instead, they recirculate existing indoor air while removing particulate matter. The responsibility for supplying fresh air continues to lie with mechanical or natural ventilation systems ([ACSQHC Optimising ventilation for infection prevention and control in healthcare settings](#)).

Evidence Summary

Current research on the routine use of portable air filtration devices remains inconclusive. While laboratory and environmental studies have demonstrated that these devices can reduce airborne particle concentrations, including aerosols, there is no direct evidence from randomized controlled trials (RCTs) showing a reduction in human-to-human transmission of COVID-19 or other respiratory viruses (Landry et al., 2021, Alvarenga et al., 2023, Kek et al., 2023).

A recent scoping review of their use in healthcare settings found that, although portable air cleaners can lower aerosol levels, there is limited evidence linking this to decreased transmission of infectious diseases. The review highlights the need for more rigorous studies to establish a definitive

connection between environmental virus removal and clinical infection prevention (Alvarenga et al., 2023).

Filtration is an effective technology for reducing airborne pathogens within room air, however this reflects an absence of environmental contamination and not necessarily a clinical benefit in preventing infection (Thottiyil Sultanmuhammed Abdul Khadar et al., 2023, Obitková et al., 2024).

Most existing studies are observational in nature, depend on surrogate outcomes such as air quality or particle counts, and often lack rigorous control conditions. Due to these limitations, the evidence does not currently support recommending the widespread use of portable air cleaners in well-ventilated clinical settings (Alvarenga et al., 2023).

The (World Health Organization, 2021) recommends the use of these devices only in settings where mechanical ventilation is inadequate and not as a supplement to environments with effective ventilation.

Guidance from international bodies

The [World Health Organization \(WHO\)](#) recommends portable air filtration only when:

- A minimum of six air changes per hour (ACH) cannot be met, and
- Other ventilation improvements are not possible or optimal.

The [U.S. Environmental Protection Agency \(EPA\)](#) emphasises that:

Air cleaning may be useful when used along with source control and ventilation, but it is not a substitute for either method.

Context in modern healthcare facilities

Most contemporary hospital environments meet or exceed six ACH ([NSW Health GL2023_009 Engineering Services](#)), aligning with WHO guidance.

Many older facilities may rely on natural ventilation and may require assessment for adequacy.

Recommendations

1. Evidence-informed use

Portable filtration devices should only be considered if expert assessment of ventilation performance shows it does not meet current standards.

2. Technical specification and implementation

Devices should be equipped with both a dust filter and a HEPA filter and must not emit ozone or other chemical pollutants. Ideally, they should also include a pre-filter to help extend the lifespan of the main filters. Selected models should feature filters with a minimum lifespan of 12 months and be fitted with alarms for both the pre-filter and HEPA filter, indicating when replacement or maintenance is needed.

Other considerations include:

- Where the device is to be placed for optimal air circulation
- Consumables and maintenance with device verification and service level agreement at installation and at each filter change
- Noise levels (devices should operate at a sound level of < 50 dB at 3m)
- Availability of spare parts
- Electrical safety.

While portable air filtration devices may offer supplemental benefits, they are not a substitute for adequate ventilation. Their use should be strategically justified, technically assessed, and embedded within a broader infection prevention strategy.

Multidisciplinary consultation

Prior to purchasing or deploying air filtration devices, consultation is strongly recommended with:

- Facility engineers/ maintenance team
- Work Health and Safety (WHS) advisors
- Infection prevention and control team

This collaborative approach ensures that all considerations are outlined are fully addressed.

Operational considerations

When introducing recirculating air filtration devices, Health Organisations are to address practical and safety-related operational issues, including:

- Ensuring that filter changes are not performed in clinical areas
- Implementing a 'safe change' procedure, in line with existing protocols for routine filter replacement, to prevent contamination risks during maintenance and cleaning.

There is no current high-level evidence that recirculating air filtration devices reduce transmission of respiratory infections including COVID-19 in healthcare settings. Their use should be limited to environments with inadequate ventilation, and decisions to deploy them must be supported by technical assessments, operational planning, and interdisciplinary consultation.