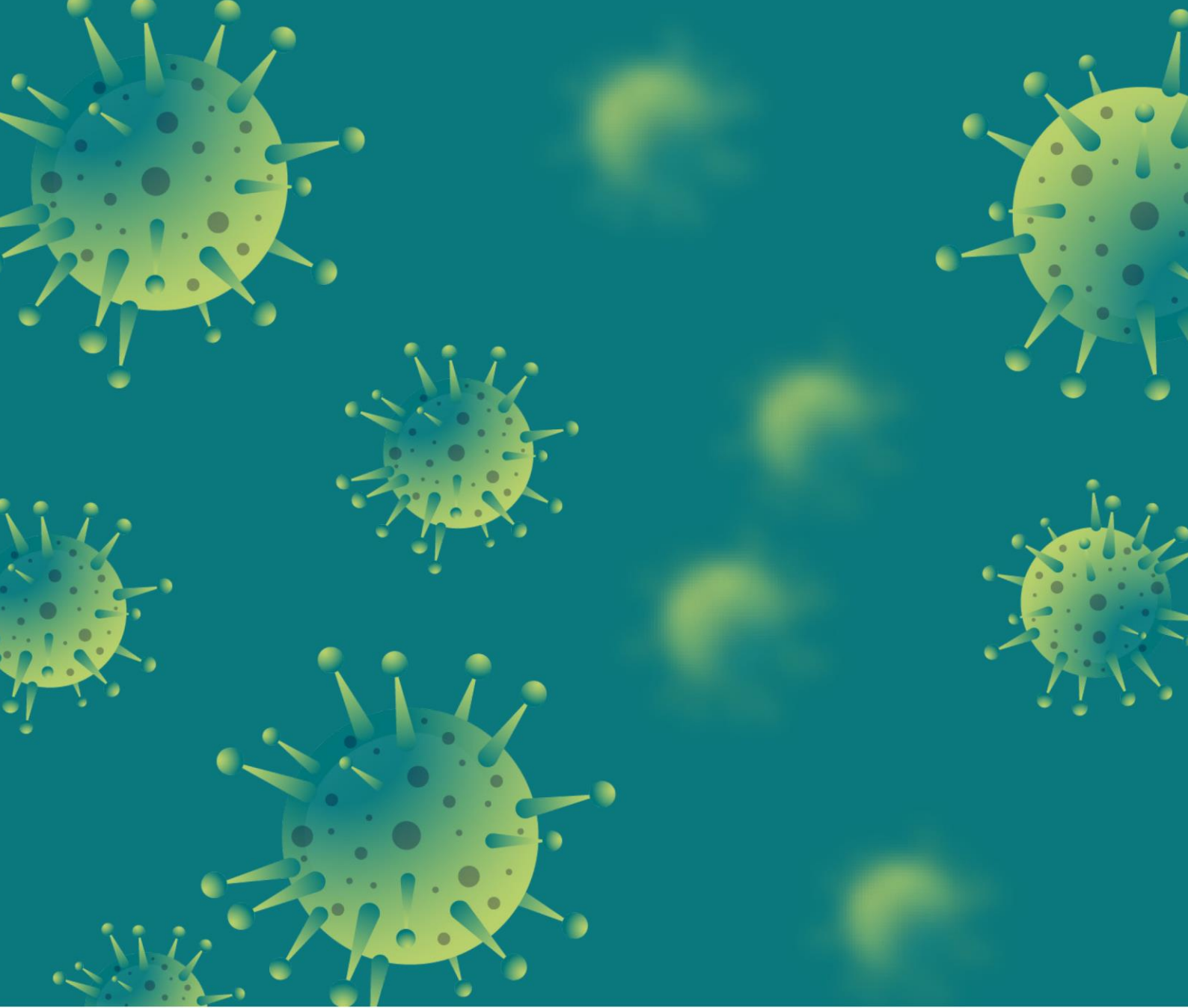




ACIPC

Australasian College
for Infection Prevention and Control

Guide for managing transmission of pathogens through the air in aged care settings

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Executive Summary

The hierarchy of controls is a recognised framework that can be applied to manage the transmission of pathogens through the air. This systematic approach provides a structured method to implement multiple controls to protect individuals, visitors and healthcare workers (HCW) from the transmission of infection.

This guide should be read in conjunction with ACIPC Position Statement:

- Terminology for pathogens that transmit through the air.

ACIPC recommends:

- The hierarchy of controls risk management framework is applied in healthcare settings to reduce the risk of transmission of pathogens through the air.
- The risk management approach is incorporated into the health services Infection Prevention and Control (IPC) program.

Introduction

Within the healthcare settings, individuals are often in close proximity, to each other and members of the workforce, creating opportunity for the spread of infection^{1,2,3}. The transmission of infectious diseases, multi-resistant organisms, and the emergence of novel infectious diseases can cause considerable harm, increase the burden on the health system, and place greater demands on the workforce¹.

Infection prevention and control (IPC) within healthcare settings aims to minimise the risk of transmission of infection, and requires an effective risk management system for the identification of hazards and controls for individuals, visitors and the workforce^{1,2,3}. The use of the hierarchy of controls aligns infection prevention and control practices with risk mitigation strategies and compliance with occupational health and safety guidelines.

Definitions

Healthcare facility	The building and facilities in which care is provided – includes visits, short stay or permanent.
Healthcare setting	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.
Healthcare worker (HCW)	Anyone who works in a healthcare or social care setting, e.g., medical practitioners, nurses, midwives, carers, dentists, allied health, students and contractors; as well as executives, managers, and administration.
Individual	Is an older person who lives in a residential care home or their own home and receives ongoing support with daily living and health care needs.

IPC	Infection Prevention and Control
Infectious respiratory particles (IRPs):	A pathogen contained within a particle that travels through the air, which can enter the respiratory tract through airborne/inhalation or direct deposition (droplet) on the mucosa.
Particulate filter respirator (PFR):	A respirator which forms a tight seal around the face, has higher filtration and is recommended for protection against particles such as fine dust vapours, smoke and aerosolising or airborne infectious diseases. The most common PFRs are P2 or N95 respirators.
PPE	Personal protective equipment
Residential Care Home	A facility that provides 24/7 personal care, accommodation, and health support for individuals who can no longer live independently at home.
Transmission through the air:	The term used to characterise an infectious disease where the mode of transmission involves the IRP travelling through or being suspended in the air.

The Hierarchy of Controls

The hierarchy of controls identifies step by step actions to control hazards in a preferred order based on their effectiveness⁶. The levels of actions to reduce or remove hazards can be implemented following on from each other or at the same time (Figure 1)⁶.

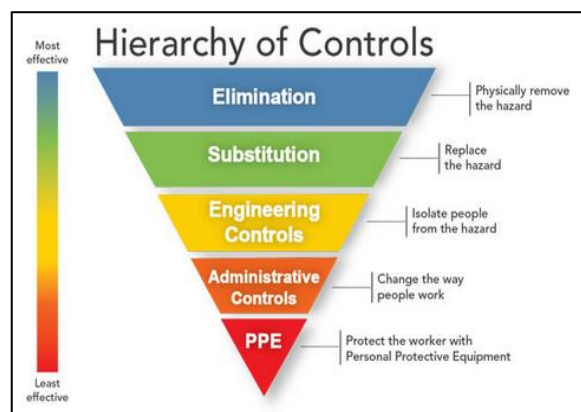


Figure 1. The Hierarchy of Controls.

The hierarchy of controls lists risk avoidance or mitigation strategies in decreasing order of effectiveness, multiple strategies can be implemented at the same time or following on from each other⁵. In Aged Care settings risk management occurs on many levels, for example organisation wide, within a wing or section or part of a community day centre or at the individual level³.

Control level	Action
Elimination	Remove the hazard at the source Elimination and substitution can be the most difficult to adopt into existing infrastructure and processes ⁶ . Prevention through design is a proactive approach to include elimination and substitution controls ⁶ .
Substitution	Replace the risk to minimise infections Use a safer alternative

Engineering controls	The use of physical or mechanical controls to reduce the risk Reduce or prevent hazards from coming into contact with HCW ⁶ . Engineering controls can incur increased upfront costs than administrative controls or PPE, however these can be lower in the long term, especially when protecting multiple people. Includes modifying equipment, workspaces, using protective barriers and ventilation systems ⁶ .
Administrative controls	Develop work processes, guidelines or educational programs to reduce risk Controls that establish a work practice that can reduce the duration, frequency or intensify of exposure to a hazard. Includes training and appropriate rest breaks
Personal protective equipment (PPE)	Provide workers with protective equipment when other controls are insufficient PPE includes clothing and devices to protect HCW. It requires constant effort and attention from workers including proper use and training.

Using the hierarchy of controls in infection prevention and control

To effectively manage risk, the four steps of risk management provide a structured approach to identify and mitigate risks in a health service. The four steps are:

Identify hazards	Identification of potential risks early
Assess risks	Evaluate the severity of the identified risks, based on the impact to patient and HCW safety
Control risks	The implementation of measures to reduce harm
Review controls	Regular monitoring and updating control measures to ensure they remain effective and adapt to evolving circumstances

The Aged Care Strengthened Standards (used by registered aged care providers) and the National Safety and Quality Health Service (NSQHS) Standards (used by multi-purpose services) require health service organisations to implement systems to prevent, control and manage the risk of infections to individuals, consumers and HCW^{2, 4}. The use of the hierarchy of controls in conjunction with IPC systems and risk management strategies provides a tiered risk management approach to prevent infections⁴.

In the context of IPC, a hazard may be an infectious agent that can contaminate an environment and lead to colonisation or infection of individuals or HCW⁴. Risks include healthcare associated infections and occupational exposure injuries, and controls include strategies to minimise risk including standard and transmission-based precautions and the use of safety devices^{3, 4}.

The hierarchy of controls for pathogens that are transmitted through the air

The application of the hierarchy of controls can reduce the risk of transmission of pathogens that are transmitted through the air and create a comprehensive strategy to protect people from respiratory illness. The following table provides examples of the control strategies that can be implemented.

Table 1: The hierarchy of controls for the transmission of particles through the air.

Control	Action
Elimination	Physically remove the hazard
Reduce opportunity for IRPs to be introduced into the setting	Manage care in home or another location if possible
	Screen HCW, volunteers, students and visitors prior to entry into the healthcare setting
	Exclude unwell HCW, volunteers, students with symptomatic IRP from the workplace
	Exclude entry of visitors (except in special circumstance and where transmission precautions can be applied) with symptomatic IRP entering a residential care home or care environment.
	Monitor visitor and HCW movement
	Reduce the number of entry points into the facility
	Consider furlough for identified contacts of infectious people
	Minimise individuals, visitors and HCW movements in residential care home
	Exclude individual attendance to day community services with symptomatic IRP
	Minimise inter-hospital transfers or specialist appointments unless individual management will be compromised
Substitution	Replace the hazard
Find alternative ways to provide care that reduces potential for transmission	Substitute in-person appointments with telehealth services, where appropriate
	Promote tele-links for visitors where possible and appropriate
	Administer aerosolised medicines with spacers instead of nebulisers
	Plan for alternatives for aerosol generating procedures, including high flow oxygen and continuous/bilevel positive airway pressure where possible and appropriate
	Consider conducting group sessions and activity outdoors
	Use retractable safety needles and pens
	Use disposable items, where appropriate – BP cuff, kidney dish, scissors
Engineering	Isolate people from the hazard
Isolation	Use a single room with private bathroom, as appropriate. Where there is a shared room, distancing between beds and individuals' personal area – curtains drawn, as possible - physical re-design, creation of isolation areas
	During outbreak situations create zones and group individuals in dedicated areas separate to uninfected people, as appropriate.
	Ensure appropriate waste management for clinical and related waste
Use physical barriers for hazard reduction	Review and optimise ventilation and air quality including, air exchange rates, air flow and air filtration systems, temperature and ambient humidity
	Encourage outdoor visits where possible
	Optimise air exchanges in rooms

	Minimise air from the room of an infected individual to adjacent corridors
	Redesign work areas to limit number of health care workers at workstations
	Consider physical barriers (e.g., glass or plastic screens) reception areas where physical distancing is difficult to maintain.
	Ensure optimal vaccination promotion and coverage of HCW, volunteers, visitors and individuals
Administrative controls	Change the way people work
Effective and consistent implementation of policies and protocols	Organisational lines for governance and reporting must be in place for: - Task analysis and risk assessment - Ventilation assessments and monitoring of indoor air quality - Promoting and facilitating hand hygiene, respiratory etiquette and vaccination uptake
	Evidence based IPC policy and procedure are in line with guidelines
	Ensure HCW training in standard and transmission-based precautions is provided
	Provide IPC education to HCW, individuals and visitors
	Provide regular updates to individuals, visitors, HCWs and service providers
	Provide clear risk assessed guidance on environmental cleaning and disinfection
	Provide clear risk assessed guidance on linen and waste management
	Complete environmental cleaning/disinfection, line and waste management checks regularly
	Develop a vaccination and screening program for HCWs and individuals when required
	Use signage at entrances, to alert visitors and service providers to not attend while unwell, as well as zoned areas and rooms with isolated individuals to provide avoidance direction
	Contractor agreements all have IPC requirement clauses, including training, knowledge and capability
Minimise opportunity for infection transmission	Separate care of infectious and unaffected individuals
	During outbreaks encourage individuals to remain in their allocated room/zone
	Assign HCW to wings or sections
	Implement standard and transmission precautions
	Promote hand hygiene and PPE compliance
	Implement measures to reduce contact spread, including hand hygiene product placement, increase cleaning and disinfection in shared areas, ensure cleaning/disinfection of reusable shared equipment after use, linen and waste management

	Ensure TGA approved for purpose supplies, such as, hand hygiene products, PPE, cleaning/disinfection products and equipment, laundering products and equipment, waste management products/removal processes
	Provide surgical masks to individuals with symptoms to use when interacting with others, or outside of their room
	Educate individuals on safe mask use and disposal, as appropriate
	Reduce opportunity for transmission between HCW by using technology for team meetings
	Manage workspaces to reduce transmission risks through adoption of physical distancing strategies (floor markings, spaced seating, maximum room occupancy notices)
	Use standardised signage for directions and standard and transmission-based precautions
	Ensure organisation/home outbreak plans are in place and stakeholders are aware of roles and responsibilities
	Surveillance, monitoring and reporting: infections, antimicrobials, IPC practices
Maintain HCW wellbeing	Where possible roster appropriate number of HCW to avoid excessive workloads and ensure HCW can take regular breaks
	Redeploy vulnerable HCW (immunocompromised, pregnant), or those who can not wear appropriate PPE or follow IPC requirements for cultural reasons
	Have a policy in place to manage HCW who become unwell in the workplace
	Promote, provide and encourage HCW to be up to date for Influenza and COVID-19 vaccinations
	Provide access to employee assistance programs for psychological support and promote physical well being
	Offer and provide training and career development
PPE	Protect the worker
Review PPE policies and guidelines	Risk assess PPE recommendations for HCW roles and activities
	Supply of PPE and related equipment is available at point of use
	Education on appropriate PPE use for standard and transmission-based precautions is provided and recorded
	PPE competency assessments for donning and doffing are conducted
	PPE supply chain is managed across the health service
	Anticipate PPE supply needs during outbreaks
	Ensure appropriate disposal of PPE
Respiratory protection program	Fit test HCW who may require a particulate filter respirator (PFR)
	Train HCW to undertake a fit check every time a PFR is used
	Implement spotters to observe HCW donning and doffing PPE to reduce potential lapses

Adapted from: Infection Prevention and Control Expert Group. (2022, September 27). The hierarchy of controls for minimising the risk of COVID-19 transmission. Australian Government.

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4. **Australian Commission on Safety and Quality in Health Care.** (2022). *Use of the hierarchy of controls in infection prevention and control: Factsheet for health service organisations*.
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Version

Version	Date	Addition/Amendments	Author	Review By
1.0	April 2025	New guide	IPC Clinical Nurse Consultant	ACIPC Board