

Hygiene & Infection Control

Design Considerations for Aged Care Environments







Introduction

Infection control is one of the primary concerns when designing aged care facilities, the focus on which has only been heightened by the onset of the COVID-19 pandemic. Between April 2020 and April 2021, people in residential aged care facilities made up 75% of COVID-19 deaths in Australia, despite making up only 7% of total cases.¹ This grim reality forced the industry to review infection prevention and control practices at aged care facilities across the country, identifying a range of issues and shortcomings.

COVID-19 is not the only threat when it comes to infectious diseases. Aged care facilities have seen incidences of waterborne pathogens, such as Legionnaires' disease, spread to residents from contaminated water sources or via inhalation of aerosols.² Infectious bacteria such as *Staphylococcus aureus* ("Staph") and *Escherichia coli* ("E Coli") pose an even greater threat given the emergence of antibiotic-resistant strains. The common cold and influenza outbreaks are also not uncommon, both of which can lead to more serious cases of pneumonia.

The built environment of aged care facilities, wherein potentially immunocompromised people live in close proximity, can make outbreaks difficult to control. As they focus on providing long-term care in a residential setting, aged care facilities are characterised by specific living conditions, models of care and operational concerns that are quite distinct from health care facilities. Tailored design strategies and architectural solutions are required to address the unique challenges faced by this sector.

In this whitepaper, we examine the challenges faced by aged care homes in infection prevention and control, and how architects, designers and specifiers can utilise a range of design solutions to make it easier for care providers to create a safer environment for aged care residents.

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Challenges in Aged Care

The risks associated with infectious disease are heightened in the aged care sector for one main reason – aged care residents are particularly vulnerable due to co-morbidities and advanced age. For older Australians, even common diseases such as influenza or gastroenteritis can be life threatening, as their immune systems have a harder time fighting off infections than younger adults. In addition, they may have existing conditions, such as heart disease, diabetes or cancer, that make them susceptible to health complications.

It is not just the susceptibility of residents that is of concern – the environmental design of aged care facilities is also conducive to the spread of infectious disease. Aged care facilities are characterised by close living quarters, shared rooms and communal areas. Staff frequently assist multiple residents, becoming a vector of disease between them. Physical distancing can be difficult, and activities that are essential to health and wellbeing, such as receiving visitors or participating in group activities, are also opportunities for transmission.

Hospital patients are typically admitted for short stays whereas aged care residents generally reside in the same room over a significantly longer time span. Aged care providers try to avoid moving residents

to other rooms as it can cause disruption and stress for both the resident and their families. This slower turnover of occupants in aged care environments presents different types of risks in relation to shared living spaces and amenities.

Unlike most hospitals, aged care facilities are designed to resemble domestic home environments. Consequently, in aged care spaces, carpet is often used, and there are soft furnishings, such as lounges, cushions and armchairs, that you would not necessarily see in more sterile hospital environments. While they can make an aged care residence more homely and comfortable, these soft and porous surfaces are difficult to keep clean and thus provide reservoirs for germs to persist.

While COVID-19 has had a devastating impact on the aged care community, it has brought to light many of the unique challenges faced by the sector. The 2020 Royal Commission into Aged Care Quality and Safety found that across many facilities, infection control practices were poor. Aged care workers, many of whom are not qualified registered nurses (RNs), were not adequately trained in infection control and prevention procedures. They were also not provided with sufficient supplies of personal protective equipment (PPE).³

A key challenge is balancing the requirements of health and hygiene with residents social and emotional needs such as space for interaction, visitor access and opportunities for activities outside the facility.

Designing for Infection Control

KEY CONSIDERATIONS

Incorporating infection control principles in the design of new and refurbished aged care facilities will make it easier for care providers to maintain high levels of hygiene and prevent transmission. In health care environments, these principles focus on ease of cleaning, ventilation and air filtration, the ability to safely isolate infectious patients, appropriate workplace design, access to hand hygiene facilities, accessible storage of PPE and adequate waste management procedures.⁴

In aged care, a key challenge is balancing the requirements of health and hygiene with residents' social and emotional needs such as space for interaction, visitor access and opportunities for activities outside the facility. Designs should also meet accessibility requirements, especially in bathrooms or handwashing stations, not only to make such spaces safe and comfortable for the elderly, but also to encourage hand-hygiene compliance.

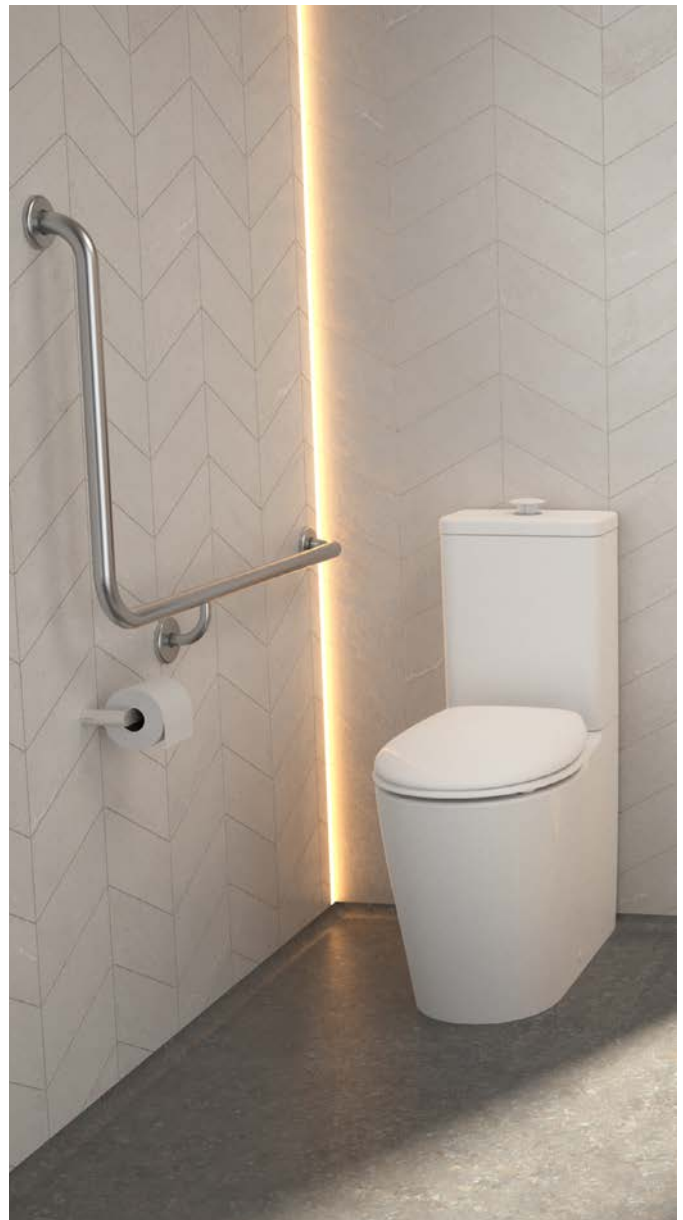
Experts advise an integrated approach to environment design is needed to address the various modes of transmission while also meeting residents' everyday needs. During this pandemic, small incremental improvements in infection control are critical to address obvious risks within existing aged care environments. This will need to be supported by broader policy changes to ensure the sector is better placed to handle deadly outbreaks, including improved tracking and monitoring of health data, and better education and training.

COMMON MODES OF TRANSMISSION

It is important to understand the different modes of transmission to evaluate risks within an aged care environment and formulate the appropriate design solutions. Common modes of transmission are discussed below:

- **Contact.** Infectious agents can be transmitted via direct contact with infected bodily fluids, or indirectly by touching a contaminated surface and then another person. High-touch surfaces such as doorknobs, toilets and taps as well as hard-to-clean surfaces, shared items and soft furnishings present high risks of contamination. Contact between aged care staff, residents and visitors can also unknowingly spread disease across a facility.
- **Droplet.** Droplets made by the coughs or sneezes of an infected person can transfer to another person's eyes, nose or mouth where they can enter the body. Droplets can also settle on surfaces and spread via hand contact.

- **Airborne.** Tiny particles of bacteria or viruses can travel through air currents and be inhaled by a person. Infected people can release respiratory fluids into the air during exhalation, which can transmit infection to others. This is the primary mode of transmission of COVID-19, particularly in poorly ventilated and/or crowded indoor settings.⁵ Studies have also found that flushing a toilet can generate large quantities of microbe-containing aerosols, providing another route for COVID-19 transmission.⁶ Contaminated aerosols can also come from other sources such as air conditioning units, hot and cold water systems, and humidifiers.⁷
- **Waterborne.** Waterborne organisms, such as Legionella, mycobacteria, and pseudomonas, are a common problem in aged care facilities and can be spread via contaminated water supplies. Infectious particles can also become airborne via aerosol-generating devices such as aerated taps and showers.



OPPORTUNITIES IN AGED CARE DESIGN

Models of care

- Some of the issues that make aged care facilities prone to infection include number of residents, staff and visitors in a single building, staff and resident movement between rooms, and high-traffic communal areas.⁸ Facility operators may want to consider alternative models of care, such as smaller autonomous residences with dedicated staff to reduce infection risks across single or multiple facilities.

Physical distancing

- Increasing space for social distancing will be a priority. Comfortable private rooms with ensuite bathrooms limit shared spaces and touchpoints and provide a safe space for infectious cases to isolate. Facility layouts will need to change to enable social distancing in communal areas and busy thoroughfares, with an emphasis on exterior social areas to allow occupants to safely meet visitors and outdoor areas for exercise. Separate bathroom facilities for staff and visitors can also help reduce the risk of contact transmission.

Personal protective equipment

- Adequate supply of PPE is essential to managing resident and staff safety, including masks, gowns, gloves and protective eye wear. The design of aged care facilities should include the appropriate amount of space to safely store and access PPE. Staff should also receive the proper training in the correct use of PPE.

Increased ventilation

- Increasing air flow through natural and mechanical ventilation within buildings may help dilute and remove virus and bacteria from indoor air. Ideally, each resident's room and all major interior spaces will have its own supply of ventilation. There also needs to be no recycling of air in aged care buildings.

Staff spaces

- Facilities must include adequate changing and hygiene facilities to enable staff to effectively implement infection control protocols. Handwashing and hand sanitiser stations should be included at key locations throughout the facilities and easily accessible to ensure staff can prevent transmission between residents.

Protecting water supplies

- Water disinfection systems can remove infectious agents from a facility's water supply. The method of disinfection is important as some methods are more effective than others in removing bacteria or viruses from water. Chlorination and ultraviolet light exposure are commonly used for this purpose.

- The thermostat of your hot water system must be set to high temperatures to prevent the growth of harmful bacteria such as Legionella. Tempered water lines must be regularly flushed to prevent the growth of bacteria within.
- Laminar flow aerators can be specified for tapware to remove air from the water stream, reducing the risk of airborne Legionella. For added protection, aerators can include antimicrobial protection to kill bacteria, which can build in the spout.

Incorporating smart technology

- In response to COVID-19, modern building designs are incorporating sensor-operated technology on shared touchpoints, such as doors, elevators, taps, hand dryers and so on, to prevent surface contamination.
- Other technological advancements include integrated bathroom systems that provide real-time data on the usage of bathroom fixtures. This data can be leveraged by facility managers to identify the hygiene levels of a bathroom at any given time through cross referencing sanitaryware activations with tapware usage.

Easy-to-clean surfaces

- Surfaces in aged care environments should be designed to support a fast and effective cleaning disinfection procedure by cleaning staff. Pay close attention to areas with many shared touchpoints, such as bathrooms, and ensure there are minimal cracks, crevices and hard-to-reach surfaces that can make cleaning difficult.
- It is also important to ensure durable materials are selected to reduce the risk of cracks and scratches from forming, which can become inaccessible locations for germs and bacteria to flourish. Antimicrobial additives can be infused into materials during the manufacturing process to provide a higher level of protection.
- Flooring can be installed using coving which provides a large, rounded surface between floor and wall. This avoids hard to mop corners, reduces cleaning times and improves hygiene

Design Solutions for Aged Care

CAROMA

Caroma LiveWell specialises in providing beautiful bathroom fixtures, which enhance the wellbeing of all Australians. Working closely with health and aged care specialists, Caroma delivers innovative solutions that surpass current industry standards, with features that can help control the spread of infection.

ANTIMICROBIAL PROTECTION

The latest in antimicrobial defense technology, **Caroma GermGard®** is an antimicrobial additive that helps control the spread of infection by killing 99% of bacteria. Integrated into the material the products are made from (such as ceramic glaze, moulded plastic and nitrile rubber seals), GermGard will not wash or wear off, providing lasting protection.

GermGard protection is available on **Caroma Care** toilets and basins, with full coverage provided on all touchpoints and throughout the Caroma toilet seat range. GermGard is also integrated into the specially-designed nitrile rubber seals on Caroma Care Support Grab Rails. These seals eliminate the gap between rail and wall flange making cleaning easier and preventing bacterial build up.

AGED CARE BATHROOMS

The **Caroma Opal Collection** includes tapware, basins, rails, showers, and toilets that are designed to reduce challenges for the elderly, while ensuring easy cleaning. Opal mixer taps incorporate key features that protect our most vulnerable such as an antibacterial aerator with Agion® silver protection, and laminar flow that does not introduce air into the water stream, reducing the risk of creating airborne Legionella. Match this tapware with Opal basins that are designed to reduce splashing and pooling, and prevent water flows from coming into direct contact with basin waste.

Support rails, support showers and toilets from this collection can further enhance independence by providing additional support inside the bathroom. Opal toilets feature **Caroma Cleanflush®**, a hygienic rimless bowl design combined with innovative flush and flow technology that provides a superior clean, an easy height pan, and the option for custom coving to match the edging and achieve a snug installation up to the wall.

STAFF HANDWASHING STATIONS

Ideal for staff handwashing stations, the **Caroma Care Basin** has been specifically designed for handwashing in areas where accessibility and management of infection and hygiene are vital design considerations. It is compatible with a range of care and hospital specific tapware and features an advanced design that reduces splashing and water retention for increased hygiene. With minimal crevices and smooth, contoured lines, it is also easy to clean.

To further improve staff hygiene practices, the **Caroma G Series** electronic tapware and soap dispensers can be selected. The G Series offers a total handwashing solution with innovative hands-free operation that ensures optimal hygiene and performance.

FACILITY MANAGEMENT

Caroma Smart Command® is an ecosystem of intelligent products that enable building managers to monitor water use in real-time and make smarter decisions that reduce maintenance costs, while improving hygiene and up time. An innovative range of tapware, urinals and toilets have been developed to not only enable touch-free operation but also seamlessly integrate with Caroma's Smart Command technology.

Smart Command enables facility managers or carers to track how bathroom fixtures are used in real-time, allowing them to make informed decisions, driving efficiencies such as cleaning and maintenance resourcing as part of an infection control program.



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