



Keeping it Clean:

WATER, SANITATION
AND HYGIENE
IN HEALTHCARE
AND AGED-CARE
ENVIRONMENTS



INTRODUCTION

Australia's ageing population poses a major challenge for the healthcare and aged-care sector. According to 2017 statistics, 15% of Australians (approximately 3.8 million people) were aged 65 and over – a proportion that is projected to grow steadily into the future.¹ In 2016-17, this demographic accounted for 2.8 million same-day hospitalisations and 1.8 million overnight hospitalisations.² In 2017-2018, approximately 1.2 million Australians received aged-care services.³ These trends present an opportunity for designers and specifiers as demand for high quality healthcare and aged-care facilities is set to rise.

Healthcare and aged-care facilities present a unique set of design considerations and challenges. The highest priority is meeting the healthcare requirements of individuals with compromised immune systems. These individuals are more vulnerable to infection via waterborne pathogens like Legionnaire's disease, cross-contamination and a variety of other health and safety issues.

Environmental design impacts the cleanliness and hygiene levels within healthcare and aged-care facilities. Specification of advanced water filtration systems with effective water disinfection systems minimises the risk of infection by waterborne pathogens while providing a reliable and healthy source of drinking water for patients, residents and staff.

Safe access to drinking water is a critical component for delivering elevated health and wellbeing outcomes in these settings. Staying hydrated is important for patients undergoing medical treatment as it contributes to faster recovery times, helps regulate body temperature, cycles out toxins and assists in maintaining proper bodily functions.

In this whitepaper, we discuss the health risks associated with water, sanitation and hygiene and highlight the key design considerations when specifying tapware and water filtration systems for healthcare and aged-care environments.

HEALTH RISKS IN HEALTHCARE AND AGED-CARE ENVIRONMENTS

Waterborne Pathogens

Waterborne organisms such as Legionella, mycobacteria, pseudomonas are a common problem in healthcare and aged-care facilities.⁴ Several environmental factors contribute to the spread of waterborne pathogens in these environments including the size and complexity of their water systems and such systems being predisposed to stagnation due to low water flow. Experts have also noted that the water temperatures that are ideal for healthcare use may also be ideal for bacterial growth.⁵

The risk of infection is heightened in healthcare and aged-care environment due to patients and residents with underlying conditions, immunosuppression and the presence of invasive medical devices. Hospital drinking water is a common mode of transmission of waterborne bacteria and viruses. Infection from these pathogens result in significant morbidity and mortality.

Take for example Legionnaire's disease, which is a particular concern for the Australian healthcare and aged-care sector. Legionnaire's disease is characterised as a severe pneumonia that can become fatal, especially for people who have compromised immune systems.

In healthcare and aged-care environments, the mortality rate from Legionnaire's disease is as high as 40%. In 2018, studies conducted by Queensland Health found deadly strains of the bacteria in 170 out of approximately 270 hospitals and aged-care facilities.⁶

Surface Hygiene

Environmental surfaces in healthcare and aged-care environments – including floors, walls, furniture, fixtures, appliances and other high-touch surfaces – can become contaminated with pathogens.⁷ Common strains found in these environments include Methicillin-resistant Staphylococcus aureus (MSRA), Vancomycin-resistant enterococci and Acinetobacter calcoaceticus.

Contaminated surfaces increase the risk of healthcare-associated infections. For example, MSRA – a bacterium that can cause infection in different parts of the body and is difficult to treat due to its resistance to common antibiotics – can survive on a variety of surfaces for hours, days or weeks⁸ and is easily spread via hand contact. Poor cleaning and maintenance procedures provide further opportunities for bacteria to grow, especially in hard-to-reach cracks and crevices.

Hand Hygiene

The hands of healthcare workers and patients can become contaminated by environmental surfaces, increasing the risk of transmission of disease by hand contact.⁹ Proper hand and surface hygiene are key to minimising the risk of infection.¹⁰

Several design features can influence hand hygiene behaviours in healthcare and aged-care settings including the type, number, location and ease-of-use of hand hygiene facilities, and environmental cues.¹¹ Sensor taps are available on the Australian market that enable touch-free operation, a feature that is specially designed to prevent the spread of bacteria by eliminating hand and surface contact when using water dispensers.



INFECTION PREVENTION BY DESIGN

Guaranteeing the safety of drinking water and environmental surfaces in healthcare and aged-care environments, particularly for vulnerable patients, is a difficult task. However, informed choices during the design and specification process can significantly reduce the risk of infection. This is particularly true for water filtration systems and dispensers.

Water Disinfection Systems

Chlorination is the most common method for disinfecting drinking water.¹² While proven to be highly effective, the addition of chlorine to drinking water supplies can become an issue if chlorine levels become excessive.¹³ If excessive chlorine is added, the water supply needs additional treatment to reduce chlorine levels to a safe standard.

Due to advancements in Ultraviolet (UV) technology, UV water disinfection systems have emerged as an alternative approach to water sanitation. Dispensers with UV treatment systems can be installed onto existing water filtration systems and work by exposing bacteria, viruses and cysts to a germicidal UV wavelength as water enters the system – this is typically achieved with a UV bulb encased within a UV treatment device. UV rays have strong germicidal qualities that inactivate bacteria and viruses.¹⁴

Disinfection systems that utilise UV technology have been proven effective against Legionella and other bacteria and viruses, and can be effective against protozoans (e.g. Giardia lamblia cysts or Cryptosporidium oocysts).¹⁵ This new approach to water treatment offers several advantages over traditional chlorination including:¹⁶

- systems designed for continuous operation;
- enables immediate water disinfection;
- does not require the addition of chemicals to drinking water; and
- environmentally-friendly due to the lack of disinfection by-products.

Accessibility

Easy and reliable access to potable water is important in healthcare and aged-care environments to meet hydration needs. Dehydration leads to impaired physiological and cognitive responses and health issues such as changes to kidney and heart function, and headaches.¹⁷ Dehydration is the most common fluid and electrolyte problem among elderly people¹⁸ and can seriously compromise healthcare outcomes and post-operative recovery.¹⁹

Designers and specifiers should anticipate a variety of users with differing physical and health characteristics. Tapware and water systems should be easy-to-use, with features that enable operation by users with reduced mobility or physical ability. The design of hospital and aged-care environments should allow for a sufficient number of water sources that are situated in locations that are easily visible and accessible.

Antimicrobial Surfaces

Antimicrobial materials or coatings contain antibacterial ingredients, such as silver or copper, that protect against the spread and growth of bacteria, mould and fungi. Studies have demonstrated the effectiveness of antimicrobial materials and coatings in reducing bacterial growth on surfaces.²⁰ Environmental factors may impact the effectiveness of antimicrobial coatings such as humidity, the cleanliness of the surface itself and how the coating has been applied.²¹

Cleaning and Maintenance

Ease-of-cleaning should be a key consideration when specifying design solutions for healthcare and aged-care environments. Anodised, varnished, or stainless-steel products should be used where possible as they contribute to a sterile environment. Surfaces that are easy to wipe and wear resistant are preferable. In relation to water filtration systems, easy-to-remove drip trays assist with cleaning procedures and enable enhanced levels of hygiene.

Testing and Certification

Designers and specifiers must verify that the selected water filtration system, dispenser and water disinfection system have been proven to effectively eliminate bacteria. Check for independent testing and certification over a wide sample and conclusive results showing zero microbiological contamination of treated drinking water.



SOLUTIONS FOR SAFE DRINKING WATER AND HYGIENIC SURFACES

Waterlogic's Firewall® and BioCote® technologies are two key innovations which Billi now brings to the healthcare and aged-care markets with the new **Firewall® Tower Dispenser**.

Ideal for healthcare and aged-care environments, the Firewall® Tower Dispenser is compatible with Billi's existing Eco and Quadra range, delivering the latest in UV water disinfection technology alongside the convenience of instant boiling and chilled water. Featuring a unique above-the-bench tower design, the Firewall® Tower guarantees 99.99% pure water, 100% of the time. The system utilises a UV lamp placed at the point of dispense, rendering waterborne bacteria incapable of reproduction, just before water reaches the glass.

Recent studies conducted by Australian Laboratory Services demonstrated Firewall® technology's effectiveness against Legionella. An untreated dosing tank was measured to 59 CFU (Colony Forming Unit) per 100ml of water. In a series of tests,

water passed through the Firewall® system reduced this count to zero CFU per 100ml. This internationally-patented technology has been proven up to 99.99% effective in over 5,000 independent tests.

The Firewall® Tower Dispenser also features BioCote® technology that protects surfaces against bacteria, mould and fungi. Utilising the antimicrobial properties of silver, BioCote® prevents the growth of microorganisms by providing surface protection from microbes which may degrade the surface of the unit.

Billi also offer washroom sensor taps and soap dispensers that enable touch-free operation and prevent the spread of pathogens via hand contact. Billi sensor taps and soap dispensers have a unique electronic sensor built into the spout that automatically detects hand movement, enhancing ease-of-use while reducing the risk of cross-contamination

BILLI

For almost three decades, Billi has led the global market with innovative tapware and instant boiling and chilled water filtration systems. Proudly Australian-made and designed, Billi products are celebrated for their combination of functionality, performance and contemporary aesthetics.

Driven by a strong research and development team and a commitment to improving user health and quality of life, Billi supplies a range of instant boiling and chilled water dispensers

that meet the strict health and hygiene requirements of healthcare and aged-care environments. Billi products enable architects and specifiers to deliver safe drinking water to patients and elderly users, addressing their hydration needs while protecting against the spread of bacteria and disease.

All Billi products are fully compliant with the relevant Australian Standards and deliver extended ease of use, efficiency and a sleek contemporary aesthetic regardless of their installation context.



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All information provided correct as of May 2020

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