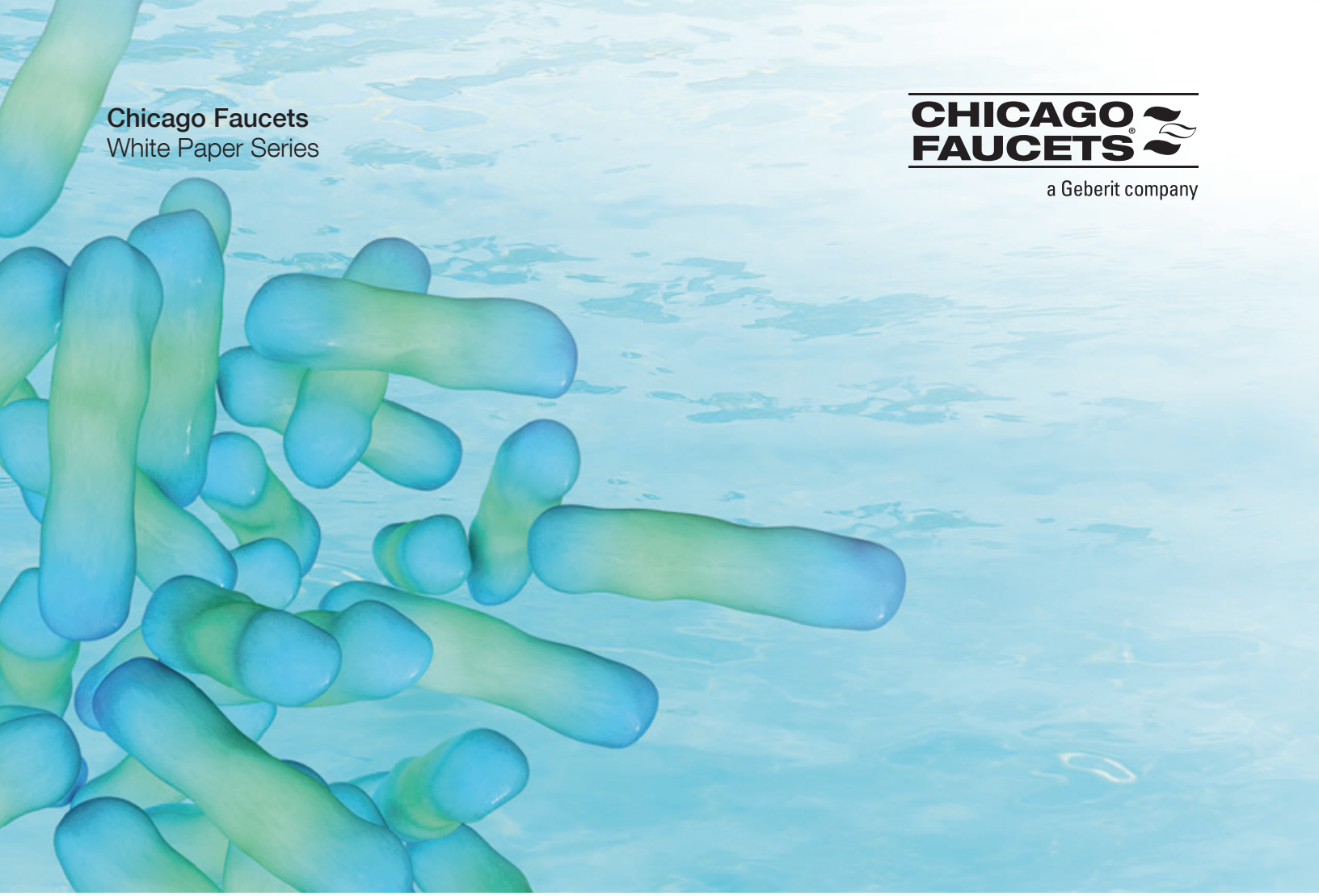

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Reducing the Risk of HAIs
in Healthcare Facilities

It's an ongoing challenge. But it doesn't have to be difficult, because there are products designed specifically to assist in reducing the transmission of bacteria by both hands and water.

Healthcare professionals are diligent about reducing the spread of bacteria. And well they should be. Just take a look at these statistics: "When people go to the hospital, they should not contract a preventable healthcare-associated infection (HAI). Unfortunately, **HAIs affect 5 to 10 percent of hospitalized patients in the U.S. per year.** Approximately 1.7 million HAIs occur in U.S. hospitals each year, resulting in 99,000 deaths and an estimated $20 billion in healthcare costs."[1]

In addition, a strong financial incentive to reduce the spread of bacteria comes from the Affordable Care Act, which requires hospitals to reduce complications from HAIs or absorb the expenses associated with additional medical procedures.

Reducing the Risk of HAIs
in Healthcare Facilities

Most HAIs result from two forms of bacterial transmission.

1. Hand transmission: Hand hygiene is so important that hospitals place antibacterial hand sanitizers throughout their facilities. It's so important that healthcare professionals are trained to use disposable gloves when working with patients. It's so important that, via training and signage, healthcare managers stress hand washing to patients, visitors, and employees. It's so important that hospital rooms have two sinks: one in the room and one in the restroom attached to the room. As the CDC indicates, "Hand washing is a win for everyone, except the germs."[2] In spite of all these efforts, sometimes procedures aren't followed, and bacteria is spread.

2. Waterborne transmission: The second form of bacterial transmission is through Legionella bacteria in water. "Legionella can colonize water distribution lines and building plumbing, contaminating water supplies after it has been centrally treated," says Steve Hubbs, PE, in "Addressing Legionella: Public Health Enemy #1 in US Water Systems," an article published on Water Quality and Health Council's website[3]. "The bacteria may be harbored in slimy coatings known as biofilms on pipe interiors, where it is protected from sufficient contact with disinfectants. All that is needed to colonize a pipeline is a few Legionella bacteria. These may enter the pipeline as 'escapees' from the water treatment process, 'intruders' at water main breaks, or 'stowaways' at the time of pipe installation." And they like to grow in angles, crevices, and older plumbing.

Mitigating Waterborne Transmission of Bacteria

Reducing hand transmission of bacteria is fairly straightforward: healthcare administrators must ensure supplies, such as antibacterial soap, are well stocked and keep educating staff, patients, and visitors. The greater question is **how to mitigate the waterborne transmission of bacteria. There are four options.**

1. Flow: Legionella thrives in stagnant or slow-moving water. Therefore, the more water that flows through the pipe, the better, as it flushes out Legionella. One challenge to this step is that water conservation is becoming more and more important in the United States, and aerators are being used more and more to limit the amount of flow, giving Legionella the upper hand.

2. Water temperature: According to Hubbs, "Legionella thrive in the temperature range of 77 to 130ºF, a range that includes hot water systems, shower heads, and even cold water systems in warm climates." This means that the energy-saving step of reducing hot water heater temperatures to less than 120ºF has the unintended consequence of favoring Legionella growth. On the other hand, Legionella starts to die at temperatures between 148ºF and 150ºF, although it takes a long time. At 180ºF, it is killed instantly. So a high-temperature flush of the plumbing is an effective mitigating step.

Mitigating Waterborne Transmission of Bacteria *(continued)*

3. Chemical treatment: Legionella is often killed by treating water in the main water system with chlorine. While hyper-chlorination is effective, it has a downside in that it's harsh on plumbing systems. This can result in the need for expensive plumbing repairs, especially over the long term.

4. Antimicrobial treatment: "Ultraviolet light (254 nm) kills bacteria by producing thymine dimers in DNA which subsequently hampers DNA replication," according to Lin, et.al., in "Disinfection of Water Distribution Systems."[4] The paper also indicates that ultraviolet light is effective if disinfection can be localized to a specific area, such as intensive care units, and placed near the point-of-use, such as faucets. It is unsuitable as a treatment in and of itself in a hospital environment because Legionella persists within biofilms in the plumbing system's dead-end and stagnant sections.

Product Options to Strengthen Your Efforts

No matter what option or options you employ, **there are products designed specifically to assist in reducing the transmission of bacteria by both hands and water.**

1. Flow: To conserve water, faucets are often chosen for their ability to reduce the flow of water. In fact, low flow volume is mandated by plumbing codes and laws in certain areas. Yet, in healthcare, high flow volumes are desirable, as they help rid the system of unwanted bacteria in the water lines and improve rinsing efficiency when hand washing occurs frequently. In your healthcare facility, you may prefer low flow volumes in some areas and high flow volumes in other areas. In both cases, there are reliable faucets designed to meet your needs.

Another flow consideration is the ability to conduct a periodic hygiene flush to rid the system of stagnant water, especially when a faucet hasn't been used in a while, to ensure there's fresh water in the pipes. If your facility maintenance team schedules periodic flushes, choose faucets that can be programmed to accommodate them.

2. Water temperature: Healthcare facilities often run thermal flushes of their plumbing systems to keep them clear of bacteria. This has an unintended consequence of causing some plumbing components, such as those made of plastic, to degrade. When reviewing faucet options, be sure to ask if internal components have been tested to withstand exposure to high temperatures.

Also regarding water temperature, unit items, such as faucets, often have thermostatic mixing valves on them that automatically shut faucets off to prevent scalding when the water temperature reaches 110ºF to 115ºF. These valves are required under standard ASSE 1070 and, while not a bad thing, it does create a challenge when it comes to performing a thermal flush. One solution is to route a dedicated hot water supply around the thermostatic mixing valves, effectively bypassing the valves during thermal flush. Unfortunately, this means that the valves themselves are not being flushed, and a risk of bacteria in the plumbing remains.

A more thorough thermal flush is possible via a thermostatic mixing valve with a bypass integrated into it. Simply turn a dial to bypass the thermostatic element, allowing the valve to remain open for the thermal flush. The result is a more complete thermal flushing of the entire system leading up to the faucet and, therefore, greater confidence that bacteria has been reduced. This solution makes great sense for new construction.

3. Chemical treatment: As a chemical treatment to kill bacteria, chlorine is effective. But it is also harsh and, through time, eats away plumbing components such as brass and copper. When making a faucet purchasing decision, ask if the product has been tested to meet or exceed industry standards for withstanding chlorine exposure.

4. Antimicrobial treatment: Inside plumbing, bacterial colonization starts with the formation of biofilm, which is a community of microbes that attach to surfaces. After initial colonization, the biofilm creates a "barrier" to protect the bacteria's environment, thus allowing microbes

Product Options to Strengthen Your Efforts *(continued)*

to thrive and multiply. Various factors can increase the risk of colonization and bacterial growth: warm water, water stagnation, and nutrients (scale, sediment).

Because spout-end devices have all those factors — they trap water droplets, keep trapped water droplets warm, and allow for sediment and scale build-up — many healthcare facilities choose to not use them. But not using them has drawbacks, too. For example, with unrestricted water flow, both water and energy are wasted, the stream splashes and spreads contamination when washing hands or equipment, and the inside of the spout is open to direct contamination by splashes when fluids are poured into the sink. If this is your situation, antimicrobial spout-end devices are available and offer a win-win in solving all of the above challenges.

Interestingly, in the healthcare industry, there is no code driving antimicrobial solutions. Plus, there have been no outside tests to validate if, in fact, antimicrobial coatings work. Yet, in some situations, healthcare officials prefer them as one more weapon in their bacteria mitigation arsenals.

5. Touch vs. touch-free: Manual faucets require touching to turn them on and off. Even if proper hand-washing technique is used — the last line of defense against the spread of bacteria — the hand washer touches the faucet to turn it off, risking recontamination. The solution in this case is electronic, sensor-operated, touch-free faucets.

A study conducted by Johns Hopkins University of newly installed, touch-free faucets at The Johns Hopkins Hospital indicated that they were more likely to be contaminated with Legionella than were manual faucets with separate handles for hot and cold water[5]. However, another study, conducted by a third party on behalf of Chicago Faucets, identified eight Chicago Faucets electronic faucets that were able to limit the tested microbial contamination to a level statistically similar to standards set by a conventional manual faucet. This counter study clearly indicates that, while manual faucets are accepted from a cost perspective and because they've been around for a long time, there are some touch-free faucets that do not increase the amount of bacteria in faucets and offer the added benefit of touch-free washing as a means of eradicating bacteria. If electronic, sensor-operated faucets are the preferred choice for your health-care facility, before purchasing be sure that they have been independently tested to confirm that they don't harbor more bacteria than manual faucets.

Between the availability of touch-free faucets and ongoing education in proper hand-washing technique, you would think that hand transmission of germs would be sufficiently eradicated. Unfortunately, this is not so, because sometimes people do not follow directions. To help, healthcare facilities may install an automated, touch-free system that uses a simple, three-step hand-washing process: water and soap, a timed scrub period, and rinse. The end result is a repeat-able, consistent hand-washing procedure that supports your efforts to improve hand hygiene.

Reducing the risk of HAIs is a continual struggle for health-care administrators. Fortunately, in addition to ongoing education of patients, employees, and visitors, there are a number of products available to assist you in your efforts to keep everyone healthy, thereby reducing risk to patients and staff, as well as the expenses associated with additional medical procedures.

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2. "Handwashing: Clean Hands Save Lives." Centers for Disease Control. Web. Accessed 5/9/2016. <http://www.cdc.gov/hand-washing/>

3. Hubbs, Steve, PE. "Addressing Legionella: Public Health Enemy #1 in US Water Systems." August 29, 2014. Web. Accessed 5/9/2016. <http://www.waterandhealth.org/addressing-Legionel-la-public-health-enemy-1-water-systems/>

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5. "Latest Hands-Free Electronic Water Faucets Found To Be Hindrance, Not Help, In Hospital Infection Control". News and Publications. Johns Hopkins Medicine. Web. Accessed 5/9/2016. <http://www.hopkinsmedicine.org/news/media/releases/latest_hands_free_electronic_water_faucets_found_to_be_hindrance_not_help_in_hospital_infection_control>