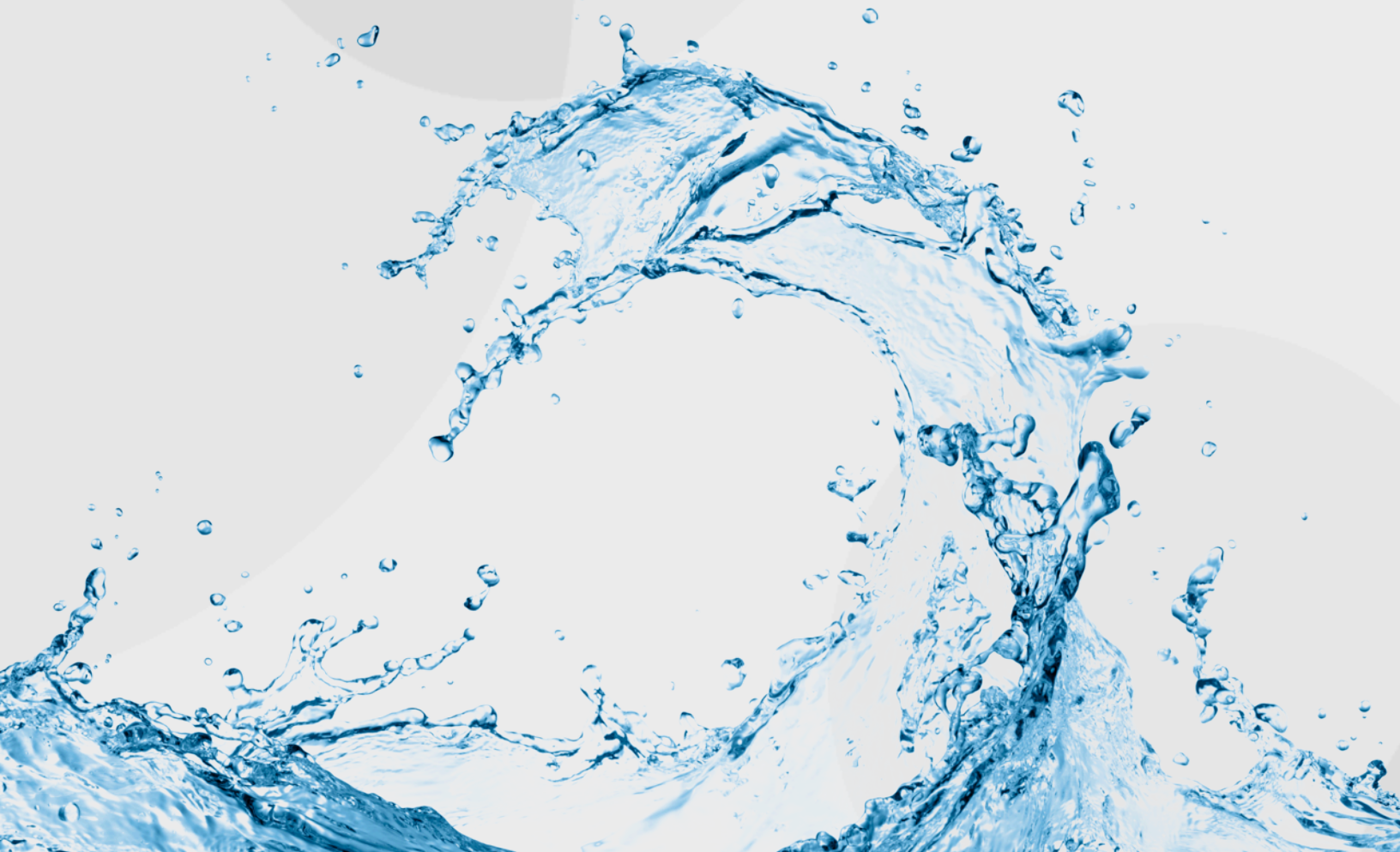


WATERBORNE PATHOGENS

HIDING IN
PLAIN SIGHT



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INTRODUCTION

While we can't live without water, lurking within and around it are opportunistic pathogens that pose significant risk to patients, especially those with co-morbidities or compromised immune systems. Typical culprits such as Legionella saw fairly stable rates from prior to 2002, but began to creep up steadily in 2003, with the largest increase in cases from 2016 - 2019 (9%).¹ It's a challenge to identify the portion of cases that are healthcare-associated, but outbreaks can cause real harm and consume significant resources to mitigate. Generally, waterborne diseases impact more than 7 million people each year and account for 118,000 hospitalizations and 6,630 deaths.² Adding to the clinical burden is the financial impact on already-strained hospitals with the cost per hospital stay for Legionella and Pseudomonas tallying north of \$37,000.³ These aren't the only waterborne pathogens of concern: Burkholderia cepacian, Ralstonia pickettii, Acinetobacter, Enterobacter, CROs, MDROs, and various fungi are all common types linked to health care facility outbreaks.⁴

We see water everywhere in today's hospital. Its use is foundational to a wide and complex range of activities, functions and procedures, literally touching the environment of care, HVAC and plumbing systems, medical devices, food service, even ice machines and water features.

Since John Snow identified the Broad Street pump as the source of Cholera outbreaks in mid-1800s London, we've understood the role of water distribution in outbreaks of waterborne disease. Yet water hygiene in hospitals is often taken for granted. Perhaps because waterborne pathogens are not as common as C. Diff or MRSA. Or that the sheer complexity of today's hospital plumbing systems makes prevention an enormous challenge, requiring a deep understanding of the pathogen sources and transmission, and a multi-disciplinary approach.



HOW WATER IS DISTRIBUTED

Public water incoming water supply is typically treated with disinfectants, but this can vary depending on the region. Regardless, understanding what disinfectants are used in your community, combined with periodic sampling may head off issues down the line.

More critically, on-premise water distribution systems can create hospitable environments for pathogens that compromise patient safety. The combination of water temperature, the level of residual disinfectant and stagnation can promote the growth of biofilm, microbial communities that protect and nourish pathogens such as Legionella and NTM (nontuberculous mycobacteria). Biofilm poses significant challenges to infection control due to its structure and resistance to disinfectants, as well as difficulties in the identification and remediation of such biofilms.

The sheer number of locations that water touches in hospitals adds to the complexity of prevention and control. Some key areas that are of concern or pose transmission risks can include:

- Aerosolizing water systems (Air conditioning, toilets, humidifiers, cooling towers, decorative water features)
- Areas with potential for stagnant water (infrequently used sinks/showers, for example)
- Plumbing related to water used in food, patient care/bathing, tap water, medical device reprocessing and linen laundering.
- Medical devices with water reservoirs (e.g., infusion pumps, ventilators, dialysis equipment, humidifiers)
- Wound/surgical site irrigation systems/equipment
- Ice machines and water dispensers

COMMON, BUT OFTEN OVERLOOKED AREAS

Sink and shower drains have been increasingly noted as an area of concern and have been implicated as reservoirs for resistant organisms.⁵ Biofilm buildup between p-trap and top of drain creates a hospitable environment for pathogens. Running faucets can cause pathogens to splash up into sinks/showers, or onto faucet aerators and handles to contaminate surfaces or hands or facilitating indirect contact, inhalation or even ingestion. Lime and scale buildup on the underside of faucets can also harbor biofilm-containing pathogens. Poor design (such as situating a faucet so water dispenses directly on top of the drain, or even no-touch faucets) have contributed to transmission.⁶

CREATING A CULTURE OF SAFETY AND PREVENTION

While preventing waterborne pathogen transmission is tricky business, understanding and identifying areas of risk are key first steps.

Perform risk assessments, with special attention to water system design, operation and maintenance.

- CDC's WICRA model (Water Infection Control Risk Assessment) is a valuable resource for assessing patient risk and prioritizing actions. The Joint Commission, CMS, ASHRAE and FGI provide regulatory guidance and standards related to water systems as well.⁷

Review and revamp training and education.

- Does your staff understand the role of water in pathogen transmission? How is it transmitted? And what strategies and protocols to employ on an everyday basis and for outbreak preparation? Transmission risk can be mitigated with proper water management techniques, including clear actions in a water management plan, water quality monitoring and elimination of plumbing dead legs.

Foster a culture of communication and collaboration.

- External: Safe water management in hospitals requires collaborative relationships between providers, local utilities and public health agencies. Clear channels and transparency will help stem outbreaks and improve responsiveness.
- Internal: In addition to proper training, help facilities and EVS teams, food service and clinical staff understand how waterborne pathogens affect patients and others. Promote the importance of their roles to patient safety and your hospital's overall mission of care.

SUMMARY

Waterborne pathogen safety can often be overlooked due to the infrequency of incidences in relation to other HAIs, yet they can be deadly. At best, the impact to patient experience and safety is significant, resulting in longer length of stay, additional procedures and burden on staff. Having a strategy at the ready is necessary to avoid unnecessary harm.

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