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Brief Report

Microbial contamination in reusable health care bath basins:
An observational descriptive studyBarbara J. Quinn DNP, RN, ACNS-BC, FCNS*,
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The relationship between pathogens in the health care environment and health care-associated infection has been well-documented in the literature. No study has been published since 2012 regarding the contamination of reusable bath basins. This brief report aims to determine if basin contamination remains a reservoir for bacteria that may contribute to the risk of spreading microorganisms to vulnerable patients. We address this question with data from multiple sites over 10 years.

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BACKGROUND

Health care-associated infections (HAIs) are a common complication of institutional care, whether it be acute care hospital or other health care facility, and prevention is a priority in the United States. One strategy to prevent HAIs is recognizing that contamination in the hospital environment poses a risk of transmitting infectious agents to vulnerable patients.^{1,2} Items used for routine care, such as bath basins, toothbrushes, nebulizers, and stethoscopes, serve as reservoirs and vectors in the transmission of multidrug-resistant organisms (MDROs) in acute care facilities.^{3,4} To protect patients and prevent health care-associated infections, organizations must recognize environmental risks and implement patient care processes to prevent cross-contamination and infection.

Studies have found that reusable basins in health care facilities are often contaminated with bacteria. One study published in 2009 found that 98% of 92 basins grew bacteria, with the highest rates for enterococci, gram-negative bacilli, *Staphylococcus aureus*, and Vancomycin-resistant enterococci (VRE).⁵ Another multicenter study (2011) in 88 hospitals found that 62.2% of 1,103 basin samples were contaminated, with the highest gram-negative bacilli and VRE rates.⁶

By synthesizing data from 2012 to 2022, this study aims to determine if basin contamination remains a reservoir for bacteria and contributes to the risk of spreading microorganisms in health care environments.

METHODS

This observational, descriptive study was conducted to determine the prevalence of microbial growth in bath basins found in patient rooms in hospitals, long-term acute care, and nursing homes. Sampling was conducted in 345 individual sites from January 2012 to October 2022. Inclusion criteria for patient or resident rooms sampled were general adult medical surgical and critical care units, long-term care units, nursing home resident rooms, and rooms occupied by adults 18 years or older with bath basins used for patient bathing. This study was designed to examine current practice. Institutional review was not applicable because it focused on the bath basin and did not involve research on human subjects. No patient identifiers were included in the collection or analysis of basins and cultures. Stryker Sage identified health care facilities and obtained consent and funding for microbial sample processing but did not participate in sample collection, data interpretation, or manuscript writing.

Hospital staff obtained culture specimens from the basins of all patients in a particular unit or ward (convenience sample) using a uniform standardized sampling method. All basins were for single patient use only. Data were collected on the date sampling was performed, the type of unit, and the number of basins sampled for each unit or area. Each unit or area used soap and tap water bathing and had no process for cleaning the basins with an antiseptic in between uses.

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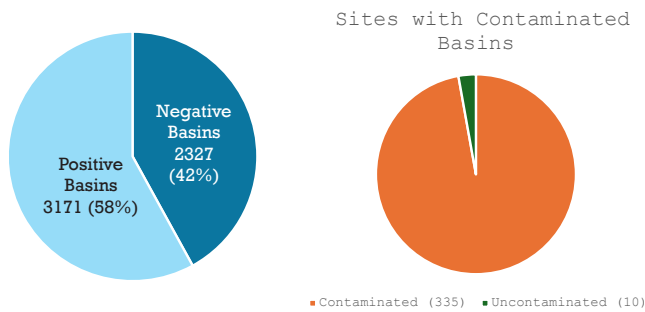


Fig. 1. 5,498 basins sampled, 345 health care sites.

Table 1
Percent active cultures per basin

# of active cultures	% Cultures
1 Active culture	19%
2 Active cultures	18%
3+ Active cultures	20%

An external central laboratory (Advanced Testing Laboratory) provided the sponges for culturing and all microbiological processing. The sponges were shipped overnight to the lab in sterile bags and processed within 24 to 36 hours. They were manipulated to release organisms, then incubated and streaked onto agar plates to isolate specific bacteria. Basic screening techniques like gram stain, catalase, latex, and coagulase tests were used for identification. Results were not used for clinical diagnosis or patient care planning.

RESULTS

During the study period, 5,498 basins were sampled from 345 unique sites, including 324 hospitals, 13 long term acute care health care providers (LTACs), and 8 nursing homes in 43 US states, Washington DC, and 9 Canadian providences. The mean number of basins sampled at each site averaged 2 to 109. As shown in Figure 1, 3,171 (58%) basins were contaminated with 1 or more of the study microorganisms. At least 1 MDRO contaminated the basins of 335 sites (97%). Gram-negative bacilli were the most prevalent pathogen at 38%, followed by *Enterococcus* (34%) with VRE at 33%. MRSA was present 6% of the time, and *S aureus* was identified 8% of the time. As many as 38% of contaminated basins had 2 or more pathogen types (Table 1).

DISCUSSION

This research analyzed bath basins and confirmed that reusable basins are frequently contaminated with microbes, including MDROs that can cause HAIs, supported by previous studies.^{5,6} In a study of basin contamination when used for liquid chlorhexidine bathing by Powers (2012), basin contamination was reduced but still showed breakthrough contamination.⁷ Basins showed up to 3 different microbial cultures, all common culprits of health care-associated infections such as catheter-associated urinary tract infection, central line-associated bloodstream infection, and surgical site infection. Despite previous studies, disposable basins remain used nationwide, and there is no standard for cleaning between uses. The traditional bed bathing process demonstrates wide variation across caregivers and organizations. In a descriptive study by Sturgeon et al, 344 professional infection preventionists across the United States reported using disposable basins in 51% of health care facilities. There

was no standard procedure for cleaning before reuse in 75% of facilities.⁸ In addition, using basins for the bed bath involves tap water from sinks, which may contain bacteria biofilm, putting patients at risk of waterborne pathogens, especially for immune-compromised patients.⁹ Bathroom sinks and drains pose a risk when a basin is filled with tap water.¹⁰

Limitations

It is important to note some limitations of this study. First, there was no standardized process for determining the units and beds for basins to be evaluated at a given facility. This lack of standardization could introduce bias, although it would not affect whether organisms were present in the basins. Additionally, the study did not collect patient-specific data on how often the basin was used before testing, whether bathing products were used, or whether there was a cleaning process between uses. However, the large sample size likely helped to mitigate any other biases.

Implications for practice

Our study revealed that reusable bath basins are frequently contaminated with common pathogens that cause health care-associated infections. The combination of contaminated bath basins, tap water, and hospital sinks and drains exposes vulnerable patients to avoidable sources of infection. Health care professionals (HCPs) must protect patients from avoidable harm. Future research is recommended to identify bathing processes that mitigate contamination risk to dependent patients.

CONCLUSIONS

When evaluating the bed bathing process, HCPs should consider methods to reduce contamination risks to patients by using a process that does not require a basin and tap water. Experts should closely monitor quality outcomes such as catheter-associated urinary tract infection, central line-associated bloodstream infection, and skin integrity postprocess change.

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