

# Bugs Be Gone: Identify Potential Source of HAIs, the Basin

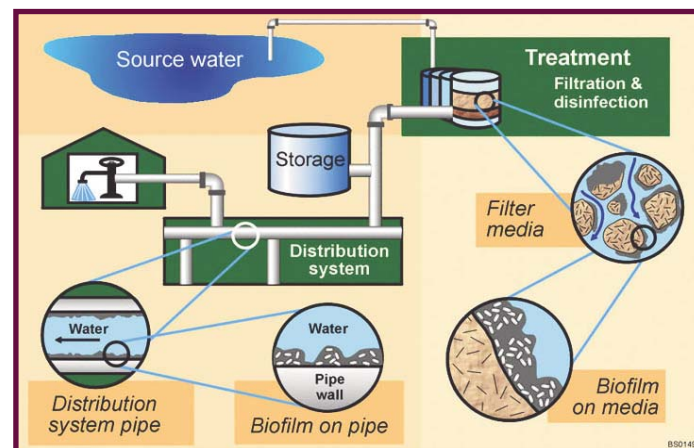
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## Overview

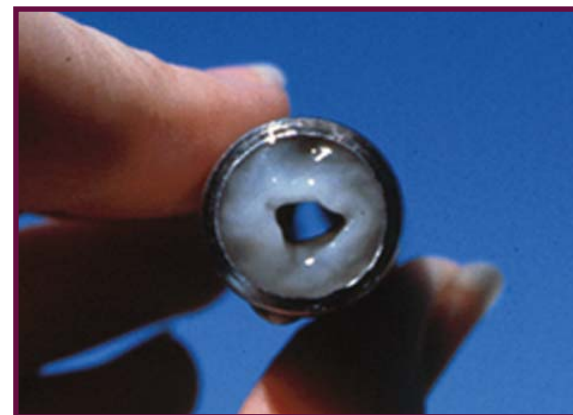
Healthcare associated infections (HAIs) in the U.S. are a growing problem. They affect an estimated 1.75 to 3.5 million U.S. patients (5-10%) annually, resulting in 90,000 annual deaths and a significant financial burden to our health care systems.<sup>1-4</sup> Researchers have identified hospital water supplies as likely sources for many HAIs, such as pneumonia, bacteremia, and urinary tract infections. One facility after going back to the basin from a pre-package disposable bathing product experienced a significant increase in the number of UTIs.<sup>5</sup> Biofilm-forming pathogens can create potent biofilms in hospital pipes, hot water tanks, sinks, and even touchless faucets, contaminating water upon contact.<sup>1,6-7</sup>

Hospital staff can also transmit pathogens both into and via water. Mechanical friction during bathing releases skin flora into water; therefore, basins can become a source for cross-contamination, and serve as a potential reservoir for the transmission of HAIs.<sup>1,10-12</sup> To date there has been only one published study on actual pathogen counts in the water in basins used by hospitalized patients. Shannon et al sampled patient bath water and found all samples (n=23) to be positive for bacterial growth.<sup>13</sup>

## Biofilm colonization in a water source.<sup>8</sup>



## Biofilm colonization on pipe.<sup>9</sup>



## Aim

Identify potential sources of bacterial colonization that may contribute to healthcare acquired infections through examining a routine nursing care activity, the basin bed bath.

## Measure

This project looked at microbial colonization of bath basins for patients in the hospital for > 48 hours. The sampling is part of a larger project that examined over 92 patient basins in 3 ICU's in different parts of the country. All basins were sampled by a registered nurse utilizing a culture sponge. The culture sponge was sent to an outside laboratory where qualitative and quantitative microbial tests were conducted. We also cultured medical-surgical floors but their samples are not included below.

## Typical examples of contaminated basins with used patient care items.



# Results

## Microorganisms within the Basin after at least 48 hours of use.

Table 1. Basin sampling qualitative and quantitative results: N=32* (CCU & Telemetry)				
Bacteria	Plate counts	% of sample	Enrichments	% of sample
Gram-negative rods	5	15.6%	12	37.5%
E. coli	2	6.3%	0	0
P. aeruginosa	0	0	0	0
S. aureus	1	3.1%	8	25%
MRSA	0	0	1	3.1%
Enterococcus	7	21.9%	22	68.8%
VRE	1	3.1%	4	12.5%
C. albicans	0	0	1	3.1%

Majority of samples yielded bacteria levels between 10 and 99,000 CFU/sponge (90.6%), with the most common count falling between 100 and 990 CFU/sponge (31.3 %). Two of the thirty-two samples exceeded 1,000,000 CFU/sponge.

- A total of 68.8% (12) of samples grew Enterococcus during enrichment and 21.9% (7) of samples found Enterococcus on plate counts.
- Vancomycin-resistant Enterococcus was present in 12.5% (4) of samples during enrichment, and found on 3.1% (1) of samples on plate count. These were from patients with bath basins that were not previously diagnosis with VRE or MRSA. Two positive samples came from patients in a semi-private room.
- One sample found MRSA on enrichment, and it should be noted the patient utilizing this basin contracted a sternal wound infection colonized with MRSA and subsequently died from complications.

Based on these findings, a larger study should be conducted targeted to examine the connection between bath basins as potential reservoirs for harmful bacteria and the spread of hospital-acquired infections.

# Changes

- **Presbyterian Hospital is evaluating alternative bathing methods** that do not require water/basin and continues to examine additional sources of bacterial colonization associated with traditional nursing care activities.
- **Presentations**, including data, made to the Education/Research council, Critical Care councils and Infectious Disease will be shared.
- **Policies and procedures** are being developed to complement the change in bathing practices.
- **Examining other potential environmental sources** that may contribute to the development of HAIs in at-risk populations.

# Lessons Learned

- **In light of new CMS regulations and National Patient Safety Campaigns**, all patient care activities and nursing care processes should be examined and studied to improve patient care.
- **Basins are contaminated**, become storage bins of used patient care items, are used for multiple activities like emesis and incontinence clean-up, and come in contact with the patient via water from head to toe.
- **Effective communication between team members**, getting the frontline staff involved and excited made it easier to conduct the study and evaluate a prepackaged bathing alternative.
- **Having a consultant to help guide the process** is most helpful if a mentor is not available in your institution.

# Team Contact

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# References

1. Exner M, Kramer A, Lajoie L, et al. Prevention and control of health care associated waterborne infections in health care facilities. *Am J Infect Control.* 2005;33:S26-S40. Philadelphia, PA. Presented at the American Professional Wound Care Association National Conference, Philadelphia, PA, April 2007.
2. Anaissie EJ, Penzak SR, Dignani MC. The hospital water supply as a source of nosocomial infections: a plea for action. *Arch Intern Med.* 2002;162:1483-1492.
3. Stone PW, Braccia D, Larson E. Systematic review of economic analyses of health care-associated infections. *Am J of Infect Control.* 2005;33:501-509.
4. CDC. Public health focus: surveillance, prevention, and control of nosocomial infections. *MMWR Morb Mortal Wkly Rep.* 1992;41:783-787. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/00017800.htm>. Accessed May 31, 2007. (No authors available at this website).
5. McGuckin MA, Shubin A. Interventional patient hygiene (IPH): Case study at the Bedside. University of Pennsylvania, Department of Physical Medicine & Rehab, Philadelphia, PA.
6. Leprat R, Demzot V, Bertrand X, et al. Non-touch fittings in hospitals: a possible source for Pseudomonas aeruginosa and Legionella spp. *J Hosp Inf.* 2003;53:77-82.
7. Assadin O, El-Madini N, Seper E, et al. Sensor operated faucets: a possible source of nosocomial infection? *Infect Control Hosp Epidemiol.* 2002;23:44-46.
8. Anne Camper / Peg Dirckx ; Copyright 1991-2004, by the Center for Biofilm Engineering at Montana State University-Bozeman, Bozeman, MT 59717-3980; <http://www.erc.montana.edu>.
9. Biofilm colonization on pipe; photo courtesy of Nick Zelver, Center for Biotilm Engineering at Montana State University-Bozeman, MT.
10. Clark AP, John LD. Nosocomial infections and bath water: any cause for concern? *Clin Nurse Spec.* 2006; 20:119-123.
11. Sehuister L, Chinn RYW. Guidelines for environmental infection control in health-care facilities: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). *MMWR Morb Mortal Wkly Rep.* 2003;52:1-42.
12. Larson EL. Comparison of traditional and disposable bed baths in critically ill patients. *Am J Crit Care.* 2004;13:235-241
13. Shannon R, Allen M, Durbin A, et al. Patient bath water as a source of nosocomial microbiological contamination: an intervention study using chlorohexidine. *J Healthcare Safety, Compliance, and Infect Control.* 1999;3:180-184.