



School of Medicine

Hospital Bath Basins are Frequently Contaminated with Multi-Drug Resistant Human Pathogens

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BACKGROUND

Hospital-acquired infections are the primary complication of hospital stay, accounting for an estimated 1.7 million infections and 99,000 associated deaths annually in the United States.¹ Environmental contamination of hospitals with nosocomial pathogens contributes to the transmission and spread of pathogens within the hospital setting.² Environmental surfaces are increasingly recognized as a potential source of nosocomial infection,³ yet the role of bath basins as reservoirs for hospital-acquired pathogens has not been studied thoroughly.

Bath basins may be a reservoir for pathogens. Improper use of bath basins may contribute to the transmission of hospital-acquired infections (Figure 1).

Figure 1: Bath Basin can be reservoir for pathogens



STUDY AIM

To investigate the role of bath basins as potential reservoirs of common multidrug-resistant organisms associated with nosocomial outbreaks.

Common hospital-acquired pathogens include:

- *Staphylococcus aureus* including methicillin-resistant *S. aureus* (MRSA)
- *Enterococcus* species including vancomycin-resistant *Enterococcus* (VRE)
- Gram-negative bacteria, including *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Legionella pneumophila*, *Escherichia coli*, and other enteric pathogens

METHODS

A prospective, multicenter trial involving 88 hospitals from 25 states within the United States and 4 Canadian providences was conducted from July 2007 to February 2011. Local infection preventionists randomly cultured basins used in intensive care units and patient floors with the use of a standardized, uniform collecting method. An external central laboratory, blinded to the origin of the samples, conducted all microbiologic processing in accordance with Clinical and Laboratory Standards Institute criteria (Figure 2).

Figure 2: Microbiology Processing Flow Chart

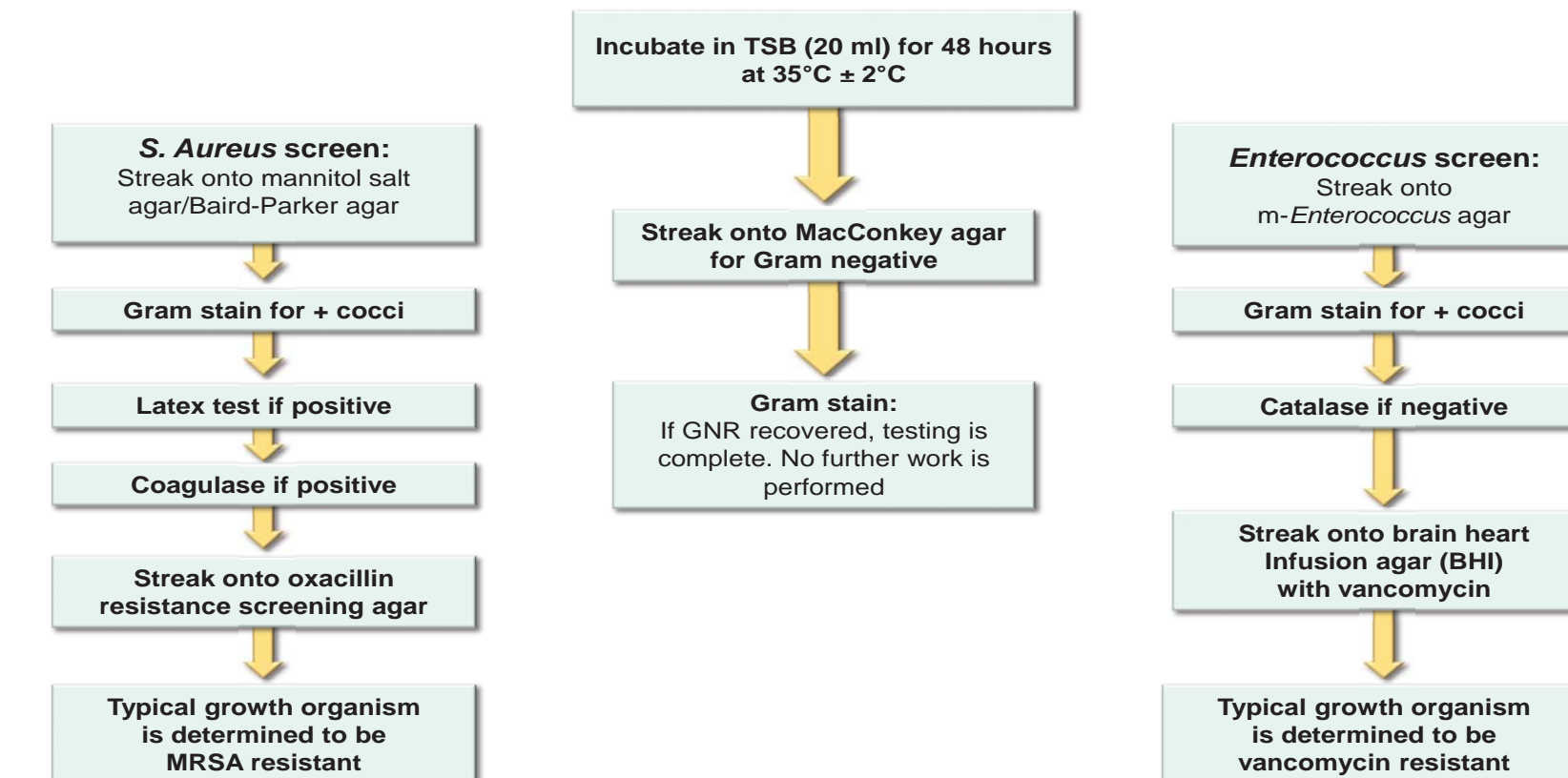


Table 1: Pathogens cultured from bath basins in the United States and Canada (N = 1103)

Pathogen		No. of positive basins (N=1103)	No. of positive hospitals (N=88)
<i>Staphylococcus aureus</i>	Methicillin-susceptible <i>Staphylococcus aureus</i>	4 (0.4%)	4 (4.5%)
	Methicillin-resistant <i>Staphylococcus aureus</i>	36 (3.3%)	28 (31.8%)
<i>Enterococcus</i> species	Vancomycin-susceptible <i>Enterococcus</i>	29 (2.7%)	14 (15.9%)
	Vancomycin-resistant <i>Enterococcus</i>	385 (34.9%)	80 (90.9%)
Gram-negative Bacilli		495 (44.9%)	86 (97.7%)
Any growth ^A		686 (62.2%)	88 (100%)

Data are presented as number (%) of the total number listed in column heading.
^A Only growth of one of these 5 classes of bacteria was included: 1) *Enterococcus* species (not necessarily resistant to vancomycin); 2) *S. aureus* (not necessarily resistant to methicillin); or 3) Gram-negative bacilli.

REFERENCES

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RESULTS

Overall, 1103 basins were sampled during the study period, and 62.2% were contaminated with 1 or more of the following: *Enterococcus* species, *Staphylococcus aureus*, or Gram-negative bacilli. A total of 385 (34.9%) basins from 80 (90.9%) hospitals were colonized with VRE, 36 (3.3%) basins from 28 (31.8%) hospitals were colonized with MRSA, and 495 (44.9%) basins from 86 (97.7%) hospitals were colonized with Gram-negative bacilli (Table 1).

CONCLUSIONS

Bath basins frequently harbor pathogens associated with nosocomial infection. Multidrug-resistant organisms such as VRE and MRSA show a high rate of contamination of hospital bath basins. Hospital bath basins could be a potential source for the transmission of multidrug-resistant organisms.

PREVENTION STRATEGIES

The identification of bath basins as a reservoir of multidrug-resistant organisms warrants heightened safety precautions:

- Handle basins with gloves only.
- Avoid temporary storage of other medical equipment in basins.
- Store basins properly, in a uniform place in patient room.

Stringent methods to curb the incidence of hospital-acquired infections should also include:

- Basins should be perceived like carriers of multidrug-resistant organisms.
- Replacement of basin with disposable alternatives should be studied.^{3,4}

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