
Antimicrobial Curtains: Are They as Clean as You Think?

Shela A. Sridhar, Nathan A. Ledeboer, Rahul S. Nanchal, Tami Mackey, Mary Beth Graham, April VanDerSlik and L. Silvia Munoz-Price

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LETTER TO THE EDITOR

Antimicrobial Curtains: Are They as Clean as You Think?

To The Editor—Hospital-acquired infections have become an increasing public health concern in the last decade. Growing evidence suggests that healthcare textiles, including curtains in patient rooms, sheets and even apparel, are associated with a higher risk of transmission of hospital pathogens and, potentially, increased healthcare-associated infections.[1] Multiple reports have linked textiles to horizontal transmission of pathogens since the first documented fabric-associated outbreak in the late 1970s.[3] In recent years, technology and innovation have led to the use of antimicrobial fabrics, designed to decrease the spread of organisms through pretreated clothing, curtains, and sheets. In 2014, our institution decided to switch all curtains to antimicrobial fabric. Because of this change, facilities managers decided that it was no longer necessary to clean or exchange curtains between patient uses unless they were clearly soiled. We aimed to determine the degree of bacterial contamination of antimicrobial curtains in our medical intensive care unit (MICU).

This infection control project was performed at a 650-bed, academic, teaching hospital in the greater Milwaukee area. We sampled 20 curtains from 10 different patient rooms in the MICU. Each room had 2 curtains: 1 curtain adjacent to the entry glass door and 1 curtain surrounding the commode (Inpro; Muskego, WI). These curtains had been pretreated using silane-based technology as a mechanism to inhibit bacterial growth. Premoistened rayon swabs were used to sample a 20-cm ×28-cm (8-inch ×11-inch) area of each curtain (1 swab per curtain). All samples were obtained from the surfaces facing the patient beds. Swabs were immediately placed in tryptic soy broth and incubated for 48 hours. Tubes showing growth were then streaked to Columbia blood agar and MacConkey agar (ThermoFisher, Lenexa, KS, USA) and incubated 24 hours. Colonies growing on blood agar were directly identified by MALDI-TOF mass spectrometry (Bruker Daltonics, Bremen, Germany) according to the manufacturer's protocol. Colonies growing on MacConkey agar were subcultured to blood agar before identification.

Of 20 curtains, 95% showed bacterial growth (Table 1). Of the 10 door curtains, 50% showed Gram-negative bacilli and 100% had Gram-positive organisms. Of the 10 commode curtains (panel facing patient beds), 10% showed Gram-negative organisms and 90% had Gram-positive organisms.

Standard cleaning patterns to decrease microbial contamination of textiles typically consist of several different processes such as thermal and chemical washing (including washing of textiles not treated with antimicrobial alloys). These practices alone can result in reduction of microorganisms of up to 2.0 $\log_{10}$ per square centimeter.[3] The published literature indicates that there is a reduction of pathogens with pre-treated antimicrobial textiles (specifically, surfaces treated with copper)[2]; however, concurrent compliance with hand hygiene or environmental cleaning practices are not reported in this literature.[2] Current studies show that even pretreated textiles can become contaminated with microrganisms.[3] Even in this small project, antimicrobial curtains were often contaminated with pathogenic organisms. It is unfortunate that this "fecal patina" is not visible to the naked eye because this limitation allows for curtains to be bypassed for months by environmental cleaning services. Like other objects in patient rooms, we believe that curtains should be thoroughly disinfected or exchanged in between patients or should be totally avoided. The use of antimicrobial curtains should not preclude the disinfection of these surfaces upon terminal cleaning. Further research and guidance are necessary for the adequate handling of curtains used in patient rooms.

TABLE 1. Organisms Found on Privacy Curtain Panels Facing Patients on Both Commodes and Doors in All 10 Rooms

Room	Commode	Door
1	1+ CNS	2+ CNS
	1+ *Micrococcus luteus*	2+ *Bacillus* spp.
	1+ CNS #2	1+ *Acinetobacter* spp
2	4+ CNS	4+ CNS #1
		4+ CNS #2
3	No Growth	4+ CNS #1
		4+ CNS #2
		4+ CNS #3
		4+ *Pantoea* spp.
4	4+ CNS	4+ CNS
5	4+ *Enterococcus hirae*	4+ *E. hirae*
	4+ CNS	4+ CNS
6	3+ *E. faecium*	4+ *Streptococcus* spp
	3+ *Bacillus* spp	4+ *Pantoea* spp
7	4+ *Paenibacillus* spp	4+ *Bacillus* spp
	4+ CNS	4+ *Pantoea* spp
		4+ *Acinetobacter* spp
		4+ CNS
		3+ *Acinetobacter* spp
8	4+ *E. faecalis*	4+ CNS
	2+ CNS	
9	4+ *Bacillus* spp	4+ *E. faecalis*
	4+ *E. faecalis*	2+ CNS
	4+ CNS	
10	4+ CNS #1	4+ CNS
	4+ CNS #2	4+ *Corynebacterium* spp
		2+ *Pantoea* spp

NOTE. CNS, coagulase-negative staphylococci.

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Shela A. Sridhar, MD;[1,2]
Nathan A. Ledeboer, MD;[3]
Rahul S. Nanchal, MD;[1]
Tami Mackey, MT(ASCP);[6]
Mary Beth Graham, MD;[1,5]
April VanDerSlik, RN, BSN, CIC;[5]
L. Silvia Munoz-Price, MD, PhD[1,4]

Affiliations: 1. Department of Medicine, Medical College of Wisconsin, Milwaukee, Wisconsin; 2. Department of Pediatrics, Medical College of Wisconsin, Milwaukee, Wisconsin; 3. Department of Pathology, Medical College of Wisconsin, Milwaukee, Wisconsin; 4. Institute of Health and Society, Medical College of Wisconsin, Milwaukee, Wisconsin; 5. Froedtert Hospital, Milwaukee, Wisconsin; 6. Wisconsin Diagnostic Laboratories, Milwaukee, Wisconsin.

Address correspondence to Shela Sridhar, 8701 Watertown Plank Rd, Milwaukee WI, 53226 (ssridhar@mcw.edu).

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