individuals is very high; 200 million people have dental visits in United States each year,[9] and the US dental workforce routinely and occupationally exposed to *L. pneumophila* comprises almost 200,000 dentists.[10] These data demonstrate that LD incidence, and therefore LD risk in dental healthcare settings, is limited. Such an inference, however, does not imply that infection control measures focusing on DUW are unnecessary,[11] given the general high level of contamination,[8] but only that these measures are based on the Precautionary Principle.[12]

In conclusion, the chicken–egg dilemma (ie, strain-typing matches of isolates from the environment and the patient do not demonstrate where the organism occurred first) regarding waterborne pathogens[13] may also apply to the present report. In addition, the scientific evidence for an active role of human carriers in LD transmission and *L. pneumophila* spread is increasing. This hypothesis is even more convincing than the hypothesis of the atmospheric dispersion of contaminated aerosols for more than 10 Km, in explaining the long-distance LD outbreaks.[14]

ACKNOWLEDGMENTS

The author is indebted with Drs Paolo Paganelli and Alberto Libero of the National Association of Italian Dentists (ANDI) for the material provided.

*Financial support:* No financial support was provided relevant to this article.

*Potential conflicts of interest:* The author reports no conflicts of interest relevant to this article.

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*Infect Control Hosp Epidemiol* 2016;37:1258–1260

 0899-823X/2016/3710-0022. DOI: 10.1017/ice.2016.184

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## 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

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.

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.

## ACKNOWLEDGMENTS

*Potential conflicts of interest:* L. Silvia Munoz Price receives consultant fees from Xenex and Clorox as well as speaker fees from Xenex and Ecolab. All other authors report no conflicts of interest relevant to this article.

*Financial support:* No financial support was provided relevant to this article.

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*Infect Control Hosp Epidemiol* 2016;37:1260–1262

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## Tourniquet Contamination in Helicopter Emergency Medicine Services in Germany

*To the Editor*—Problems with infection control policies regarding tourniquets, such as visible bloodstains and contamination with methicillin-resistant *Staphylococcus aureus*, have been reported in the past[1] and colonization of reusable tourniquets with multidrug-resistant organisms has been discussed as a potential source of transmission in hospitalized patients.[2]

As part of our quality assurance program we assessed the reprocessing procedure and the bacterial contamination load on reusable tourniquets at 23 helicopter stations of the German Helicopter Emergency Medical Services operated by DRF Luftrettung gAG.

The tourniquet in use during the day was collected at the end of the shift (from sunrise to sundown) and sampled with RODAC (replicate organism detection and counting) plates, and a questionnaire about its use and reprocessing standards was distributed and collected. RODAC plates were used in accordance with microbiology procedure quality standards[3] and results are given in colony-forming units per RODAC plate.

Table 1 shows the results for the 21 data sets that were included in the final analysis; 2 data sets could not be used because in one case the tourniquet could not be sampled and in one case the questionnaire was incomplete.

We did not find any multidrug-resistant organisms although the helicopters are frequently used for interhospital transfer of critically ill patients colonized with multidrug-resistant organisms; however, tourniquets are rarely used for these patients. Colonized tourniquets showed mostly regular environmental and skin organisms in low to moderate numbers. Only one sample had 200 colony-forming units of coagulase-negative staphylococci and 5 samples showed 1–5 colony-forming units of mold. There was no correlation between duration of use, mode of storage, or frequency of use and the total count of colony-forming units. Reprocessing protocols were heterogeneous, with most stations using disinfection wipes after each use. The best microbiologic results were observed in stations using disinfection wipes after every use and daily machine washing at 60°C.

Leitch et al[4] reported contamination with methicillin-resistant *S. aureus* of tourniquets of phlebotomists but also observed lapses in hand hygiene compliance. They observed no change in tourniquet contamination when polyurethane strips were used as an additional barrier and concluded that the contamination of tourniquets is via phlebotomists' hands and not directly from patient's skin. This could explain why we mostly found normal environmental and skin flora in our probes despite partially inadequate and nonstandardized reprocessing practices. The out-of-hospital emergency medicine setting might also be different from the inpatient setting, where studies frequently show contamination of tourniquets with *S. aureus* and methicillin-resistant *S. aureus* but also lack of standardization of cleaning procedures of the used tourniquets.[5]

In conclusion, tourniquets used in the German Helicopter Emergency Medical Services do not seem to be a relevant vector of transmission of pathogenic or multidrug-resistant organisms. However, there is potential for improvement and a need for standardization of cleaning procedures after use. A combination of using disinfecting wipes after each use and daily machine washing at 60°C seems to yield the best results.

ACKNOWLEDGMENTS

*Financial support*. None reported.

*Potential conflicts of interest*. S.S.-S. reports that he is co-owner of the Deutsches Beratungszentrum für Hygiene and receives royalties for book publishing from Springer and Schattauer publishers, Germany. J.H. reports no conflicts of interest relevant to this article.

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*Infect Control Hosp Epidemiol* 2016;37:1262–1264

 0899-823X/2016/3710-0024. DOI: 10.1017/ice.2016.183

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