

most frequent isolate.<sup>2</sup> We recently performed a study that evaluated for bacterial growth on stethoscope diaphragms, as well as the peripheral rim that secures the diaphragm, and found that 100% of 40 stethoscopes were contaminated with coagulase-negative staphylococci, and 37.5% were contaminated with *Staphylococcus aureus*.<sup>3</sup> Of note, 87.5% of stethoscope diaphragms harbored bacteria and 100% of stethoscopes had bacteria isolated from under the plastic rim that secures the diaphragm. No gram-negative organisms or *Clostridium difficile* were isolated using appropriate culture techniques. In addition, our study was unique in that it documented transfer of micrococci species from an inoculated stethoscope to the clean skin of a study subject.<sup>3</sup> Although it is difficult to prove that pathogenic organisms can be transferred by the stethoscope in the clinical setting, our study showed that not only are most, if not all, stethoscopes used in the hospital contaminated but also that they have the potential to transfer an inoculum of bacteria to human skin. This has potential important clinical ramifications with the emergence of resistant enterococcal and staphylococcal species,<sup>4,5</sup> which need to be contained to the patient's room by use of isolation techniques (which should include a dedicated stethoscope or use of isopropyl alcohol on the stethoscope diaphragm). The application of isopropyl alcohol to the diaphragm is highly effective in eradicating bacteria from both the diaphragm and rim area.<sup>3</sup>

That inanimate objects can serve as a point source for nosocomial infection has been established in several reports. Outbreaks of nosocomial bacterial infections attributed to electronic thermometers,<sup>6</sup> blood pressure cuffs,<sup>7</sup> and latex gloves<sup>8</sup> have been reported recently. *C. difficile* also has been transmitted nosocomially, usually from healthcare worker's hands.<sup>9</sup> Although no documented cases of nosocomial infection due to contaminated stethoscopes have been reported, it certainly seems a possibility, given the transmission of infection through inanimate objects as noted above. Certain patient groups, including burn patients, the immunosuppressed, and patients in the intensive-care unit, may be at higher risk for acquisition of bacterial colonization from the stethoscope, which could lead to infection. That handwashing decreases the risk of nosocomial

infection<sup>10</sup> is well-accepted. In my opinion, all healthcare workers also should clean the surface of their stethoscopes regularly. This quick, simple, and inexpensive procedure may be another way to decrease the risk of transmitting infection to our patients.

#### REFERENCES

1. Brook I. The stethoscope as a potential source of transmission of bacteria. *Infect Control Hosp Epidemiol* 1997;18:608.
2. Breathnach AS, Jenkins DR, Pedler SJ. Stethoscopes as possible vectors of infection by staphylococci. *BMJ* 1993;305:1573-1574.
3. Marinella MA, Pierson C, Chenoweth C. The stethoscope: a potential source of nosocomial infection? *Arch Intern Med* 1997;157:786-790.
4. Archer GL, Climo MW. Antimicrobial susceptibility of coagulase-negative staphylococci. *Antimicrob Agents Chemother* 1994;38:2231-2237.
5. Flores PA, Gordon SM. Vancomycin-resistant *Staphylococcus aureus*: an emerging public health threat. *Cleve Clin J Med* 1997;64:527-532.
6. Livornese LL, Dias S, Samel C, Romanowski B, Taylor S, May P, et al. Hospital-acquired infection with vancomycin-resistant *Enterococcus faecium* transmitted by electronic thermometers. *Ann Intern Med* 1992;117:112-116.
7. Layton MC, Perez M, Heald P, et al. An outbreak of mupirocin-resistant *Staphylococcus aureus* on a dermatology ward with an environmental reservoir. *Infect Control Hosp Epidemiol* 1993;14:369-375.
8. Patterson JE, Vecchio J, Patelick EL, Farrel P, Mazon D, Zervos MJ, et al. Association of contaminated gloves with transmission of *Acinetobacter calcoaceticus* var. *anitratus* in an intensive care unit. *Am J Med* 1991;91:479-483.
9. McFarland LV, Mulligan ME, Kwok RYY, Stamm WE. Nosocomial acquisition of *Clostridium difficile* infection. *N Engl J Med* 1989;320:204-210.
10. Steere A, Mallison GF. Handwashing practices for the prevention of nosocomial infections. *Ann Intern Med* 1975;83:683-690.

**Mark A. Marinella, MD**  
Wright State University  
School of Medicine  
Dayton, Ohio

#### The author replies.

I am grateful to Dr. Marinella for presenting his recent data on the potential transmission of organisms by stethoscopes.<sup>1</sup> Unfortunately, his groups' study appeared after my letter was submitted to *Infection Control and Hospital Epidemiology*.

I agree with his advice that all healthcare workers should clean their stethoscopes regularly, so that poten-

tial sources of bacterial transmission could be avoided. This is of even greater importance in an era when antimicrobial resistance is increasing.

#### REFERENCE

1. Marinella MA, Pierson C, Chenoweth C. The stethoscope: a potential source of nosocomial infection? *Arch Intern Med* 1997;157:786-790.

**Itzhak Brook, MD**  
Georgetown University  
School of Medicine  
Washington, DC

## Prevention of Nosocomial Cross-Infections

### To the Editor:

Complicated technology, the pandemic spread of bloodborne viral infections, and evolution of common bacterial resistance to antibiotics<sup>1</sup> have created situations in healthcare facilities wherein healthcare workers (HCWs) and patients are at high mutual risk for cross-infections. Universal Precautions issued in 1987 for protecting HCWs and patients from bloodborne pathogens led to burgeoning use of unsterile protective latex gloves, at the expense of handwashing.<sup>2</sup> Handwashing declined to 25% of rates before gloving, and examination glove use increased to >9.15 billion per annum in the United States.<sup>3</sup> Side effects include increasing problems with glove allergy in HCWs and increased risk for nosocomial spread of skinborne pathogens via gloves to patients, especially during the handling of equipment used in veins.<sup>3-5</sup> Because protective latex, vinyl, or nitrile gloves do not protect HCWs from accidental penetrative injuries from hollow-bore steel needles and other sharp instruments contaminated with blood or body fluids, in 1992 it was suggested that blunt instruments should be used, instead of sharp ones, whenever possible in the care of patients.<sup>5</sup> Side effects include a threefold to 10-fold increase in staphylococcal and vancomycin-resistant enterococcal bloodstream infections,<sup>5</sup> partly owing to hidden recesses capable of bacteriologic colonization in needleless intravenous access ports,<sup>4</sup> partly owing to use of unsterile gloves when handling blunt cannulae (as well as needles),<sup>3</sup> and partly owing to the complicated technology involved.<sup>2,5</sup> Therefore, to shield patients from some 2 million

nosocomial skin- or glove-borne bacterial infections occurring annually and to shield HCWs from human immunodeficiency virus, hepatitis B virus, and hepatitis C virus infections that might result from more than 600,000 accidental needlesticks annually, one might recommend as follows:

1. Protective gloves should be worn when handling blood or potentially contaminated body fluids and should be removed immediately afterwards, followed by careful handwashing and fingernail washing.

2. Gloves should be supplied such that they can be donned and maintained sterile by HCWs during the performance of invasive procedures involving the use of sharp nee-

dles or incisive instruments.

3. HCWs should wash hands and fingernails between contacts with successive patients, whether or not gloves are donned. Because adequate handwashing requires precious time, the judicious use of a single sterile glove or finger cot can prove efficient, as well as cost-effective, in some situations.

4. Patients and the medical profession should demand the safest possible sterile equipment, to prevent accidental sharp needle injuries and to shield themselves from pathogens.

5. Mutual caring by the public and the medical profession will provide the best care within and apart from health facilities. Handwashing is a manifestation of mutual caring.

## REFERENCES

1. Loeffler IJP. Microbes, chemotherapy, evolution and folly. *Lancet* 1996;348:1703-1704.
2. Jarvis WR. Handwashing—the Semmelweis lessons forgotten? *Lancet* 1994;344:1311-1312.
3. Shields JW. Handwashing and the use of examination gloves. *Lancet* 1998;351:571.
4. Shields JW. Patient versus healthcare worker risks in needleless infusion systems. *Infect Control Hosp Epidemiol* 1998;19:86-87.
5. Cookson ST, Ihrig M, O'Mara EM, Denny M, Volk H, Banerjee SN, et al. Increased bloodstream infection rates in surgical patients associated with variation from recommended use and care following implementation of a needleless device. *Infect Control Hosp Epidemiol* 1998;19:23-31.

Jack W. Shields, MD, MS  
Santa Barbara, California

## Correction

### Accuracy of Reporting Nosocomial Infections in Intensive-Care-Unit Patients to the National Nosocomial Infections Surveillance System: A Pilot Study

In the article “Accuracy of Reporting Nosocomial Infections in Intensive-Care-Unit Patients to the National Nosocomial Infections Surveillance System: A Pilot Study” (1998;19:308-316), there was an error and one oversight. On page 310, under the heading “Collection of the Data,” the second sentence should read, “A total of 32 ICPs, all of them members of the North Carolina Chapter of the Association for Professionals in Infection Control and Epidemiology, performed the data collection.”

Also, a portion of the acknowledgments was omitted inadvertently from the article. The authors would like to express their appreciation to the North Carolina Chapter of the Association for Professionals in Infection Control and Epidemiology and the skilled and dedicated infection control professionals who served as data collectors in this study. They are Martha Alspaugh, Carolinas Medical Center, Charlotte; Brynne Beaver, Rowan Memorial Hospital, Salisbury; Jane Briggs, Durham Regional Medical Center, Durham; Melissa Bronstein, Duke University Medical Center, Durham; Anne Brown, Watauga Hospital, Boone; Vickie Brown, UNC Hospitals, Chapel Hill; Linda Calderone, Rex Hospital, Raleigh; Connie Clark, Nash General Hospital, Rocky Mount; Kathy Cochran, ECU School of Medicine, Greenville; Evelyn Cook, Lexington

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