

# Keep Your Patients and Medical Devices Clear of Pathogens

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## **Sepsis is a serious and growing threat to patient safety**

The incidence of sepsis is estimated to be 751,000 cases per year with a mortality rate of 29-50%.<sup>1</sup> Between 1979 and 2000, the incidence of sepsis increased at an overall annual rate of 8.7%<sup>2</sup> with higher rates reported in the elderly population.<sup>1</sup> Sepsis is the leading cause of death in intensive care units<sup>3</sup> and costs an estimated \$16.7 billion a year in the US alone.<sup>1</sup> In the years to come, sepsis is anticipated to become an even greater threat to patient safety as the hospitalized patient population becomes older and more seriously ill, and there is increased use of cytotoxic and immunosuppressive drugs and therapies, increased use of invasive devices and increases in the prevalence of drug-resistant bacteria.<sup>3</sup>

Infections acquired by patients in a hospital setting are the most common complications affecting hospitalized patients.<sup>4</sup> Between 5 and 10% of patients admitted to acute-care hospitals acquire one or more infections.<sup>5,6</sup> Two recent studies presented to the American Society for Microbiology uncovered some surprising sources of infectious agents. EKG lead wires that are typically reused many times across patients and cellular phones used by healthcare workers have been found to be contaminated with multidrug-resistant pathogens.<sup>7,8</sup> It is likely that other devices that are used in multiple patients are similarly contaminated.

## **The focus on proper hand washing is increasing**

Hand washing has long been known to reduce the transmission of infectious agents from patient to healthcare worker to other patients,<sup>9</sup> and a discipline of hand washing has been shown to significantly reduce the spread of drug-resistant pathogens among patients.<sup>9</sup> On October 25, 2002, the Centers for Disease Control and Prevention (CDC) released new guidelines that recommend the use of alcohol-based handrubs in conjunction with traditional soap and water and sterile gloves to protect patients in healthcare settings.<sup>10</sup> "Clean hands are the single most important factor in preventing the spread of dangerous germs and antibiotic resistance in healthcare settings," says Julie Gerberding, M.D., director, CDC. "More widespread use of these (alcohol-based handrub) products that improve adherence to recommended hand hygiene practices will promote patient safety and prevent infections."<sup>11</sup> Healthcare workers in Europe have long held similar beliefs.<sup>12</sup> On July 18, 2003, the CDC guidelines were incorporated into the 7th Patient Safety Goal issued by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO). Effective January 1, 2004, the 16,000 healthcare organizations and programs that JCAHO accredits nationwide will be expected to be in compliance with this and other patient safety guidelines.

## Disinfect your reusable medical equipment — SAFELY

The CDC highly recommends the use of alcohol-based handrubs and soap and water for proper hand hygiene, but also mentions formulations of rubs, foams and wipes that contain quaternary ammonium compounds.<sup>10</sup> While some of these solutions have been found to be effective antiseptic hand cleansers, they may also cause medical devices to malfunction. These substances have been found to build up around critical electrical connections and cause circuitry to malfunction. Because of these findings, we strongly caution against the use of quaternary ammonium compounds (Table 1). To avoid potential problems, we recommend the following procedure.

Equipment should be cleaned on a regular basis according to the policies of your

institution's infection control department and/or biomed department. Prior to cleaning, disconnect unit from power source or removable cables and remove batteries as applicable. For general cleaning, the exterior surfaces of the equipment may be cleaned with soap and water using a lint-free cloth. To disinfect, wipe external surfaces with a diluted chlorine bleach solution.\* Rinse by wiping all surfaces with a cloth moistened with distilled water and dry thoroughly by wiping with a lint-free cloth. Do not allow any fluid to collect around electrical or cable connections.

To rinse, wipe with a cloth moistened with distilled water. Dry off all electrical contact points prior to reassembly of the device.

\* Diluted chlorine bleach—sodium hypochlorite, 100 ppm free chlorine, equivalent to a 1:500 dilution of household bleach (5.3% sodium hypochlorite).<sup>13</sup>

**Table 1: Quaternary Ammonium Compounds**

Preferred Name	Synonym
Alkyl ethyl benzyl dimethyl ammonium chloride	NA
Aralkonium chloride	Alkyl dimethyl-3, 4-dichlorobenzyl ammonium chloride
Benzalkonium chloride	Alkyl dimethyl benzyl ammonium chloride
Cetalkonium chloride	Cetyl dimethyl benzyl ammonium chloride
Didecyl dimethyl ammonium chloride	Chloride didecyl dimethylammonium
Diocetyl dimethyl ammonium chloride	Chloride dioctyl dimethylammonium
Hexadecyl dimethyl benzyl ammonium chloride	Chloride hexadecyldimethylbenzyl ammonium
Methyl dodecyl benzyl trimethyl ammonium chloride	Chloride methyl didecyl benzyl trimethyl ammonium
Octa decyl dimethyl benzyl ammonium chloride	Chloride octadecyl demethylbenzyl ammonium
Octyl decyl dimethyl ammonium chloride	Chloride octyl decyl dimethyl ammonium
Octyl dimethyl ammonium chloride	Chloride octyl dimethyl ammonium

## Bibliography

- 1) Angus, D. and R. Wax, "Epidemiology of sepsis: An update," *Crit Care Med*, 2001. 29(Suppl): p. S109-S116
- 2) Martin, G., Mannino, D., Eaton, S. and Moss, M. "The epidemiology of sepsis in the United States from 1979 through 2000," *N Engl J Med*. 348:1546-54, 2003
- 3) Parrillo, J.E., Parker, M.M., Natanson, C., Suffredini, A.F., Danner, R.L., Cunnion, R.E. and Ognibene, F.P. "Septic shock in humans," *Annals of Internal Medicine*. 113:227-242, 1990
- 4) Burke, J. "Infection control - A problem for patient safety," *N Engl J Med*. 348: 651-656, 2003
- 5) Weinstein, R. "Nosocomial infection update," *Emerg Infect Dis*. 4:416-420, 1998
- 6) Jarvis, W. "Infection control and changing health-care delivery systems," *Emerg Infect Dis*. 7:170-173, 2001
- 7) Maki, D. and Brookmeyer, P. "A survey of EKG telemetry harnesses as a reservoir of resistant noscomial pathogens," *American Society for Microbiology* (editor). Accessed on: December 9, 2003 from [www.asmtusa.org/memonly/abstracts/AbstractView.asp? AbstractID=82845](http://www.asmtusa.org/memonly/abstracts/AbstractView.asp?AbstractID=82845)
- 8) Borer, A., Smolyakov, R., Eskira, S., Peled, N., Gilad, J., Man, I., Hyam, E., Riesenber, K. and Schlaeffer, F. "Cellular phones (CelP) of personnel as a potential source for nosocomial transmission of *Acinetobacter baumannii* (AB)," *American Society for Microbiology* (editor). Accessed on: December 9, 2003 from [www.asmtusa.org/memonly/abstracts/AbstractView.asp?AbstractID=82844](http://www.asmtusa.org/memonly/abstracts/AbstractView.asp?AbstractID=82844)
- 9) Austin, D.J., Bonten, M.J.M., Weinstein, R.A., Slaughter, S. and Anderson, R.M. "Vancomycin-resistant enterococci in intensive-care hospital settings: Transmission dynamics, persistence, and the impact of infection control programs," *Proc Natl Acad Sci*. 96: 6908-6913, 1999
- 10) Boyce, J.M. and Pittet, D. "Guideline for hand hygiene in health-care settings recommendations of the healthcare infection control practices advisory committee and the HICPAC/SHEA/APIC/IDSA hand hygiene task force," *Centers for Disease Control* (editor). Accessed on: December 9, 2003 from [www.cdc.gov/mmwr/PDF/RR/RR51116.pdf](http://www.cdc.gov/mmwr/PDF/RR/RR51116.pdf)
- 11) "CDC releases new hand hygiene guidelines," *Centers for Disease Control and Prevention* (editor). Accessed on: December 10, 2003 from [www.cdc.gov/handhygiene/pressrelease.htm](http://www.cdc.gov/handhygiene/pressrelease.htm)
- 12) Kampf, G. and Loffler, H. "Dermatological aspects of a successful introduction and continuation of alcohol-based hand rubs for hygienic hand disinfection," *Journal of Hospital Infection*. 55:1-7, 2003
- 13) Rutala, W. "APIC guidelines for infection control practice," *Association for Professionals in Infection Control and Epidemiology Inc.* (editor). Accessed on: November 17, 2003 from [www.apic.org/pdf/gddisinf.pdf](http://www.apic.org/pdf/gddisinf.pdf)
- 14) "Category IV Monograph: Hard Surface Disinfectants," *Health Canada Online* (editor). Accessed on: November 18, 2003 from [www.hc-sc.gc.ca/hpfb-dgpsa/tpd-dpt/hardsur\\_e.pdf](http://www.hc-sc.gc.ca/hpfb-dgpsa/tpd-dpt/hardsur_e.pdf)

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