INFECTION CONTROL INFORMATION

July 2004

PRODUCT EVALUATIONS

The following product evaluations have been recently posted on the DIS Web site (www.brooks.af.mil/dis/productevaluations.htm):

- Synopsis of Dental Waterline Treatment Products and Devices
  This synopsis provides information and a cost analysis of 18 waterline treatment products.
- VioNexus™ No Rinse Spray Antiseptic Handwash
- 1SHOT Safety Syringe

NEW INFECTION CONTROL PRODUCTS

New and innovative products are marketed each month and DIS is unable to evaluate all of them. Because DIS has not had the opportunity to evaluate these products, **we cannot confirm manufacturers' claims** about them. If you would like additional information about the products or are interested in evaluating them please visit http://www.brooks.af.mil/dis/newproducts.htm or the manufacturer's Web site for more information on the following products.

- **SaniSorb™ X** medical liquid solidifier to treat suction canister red bag waste (Multisorb Techologies , www.multisorb.com)

- **Louisville Slider**, a leverless high volume evacuator (Anodia Systems, www.mintakleen.com)

- **Signature Series Space Saver Seven** instrument cassette (Hu-Friedy,www.hu-friedy.com)

2005 DENTAL INFECTION CONTROL SAFETY COURSE

CO-SPONSORED BY: OSAP AND THE FEDERAL DENTAL SERVICES

The next co-sponsored Organization for Safety and Asepsis Procedures (OSAP)/Federal Services Dental Infection Control course is scheduled for **Monday, 24 January—Thursday, 27 January 2005** in Atlanta, Ga. We will be covering a broad range of topics and have guest speakers from the Centers for Disease Control and Prevention, dental schools, and the Federal Services again this year. As in previous years, OSAP will handle registration issues. There will be a limited number of USAF command sponsored quotas that will be assigned by the MAJCOMS. The course also meets criteria for AFIT funding. The course is not scheduled to end until 1600 on Thursday, 27 January 2005; travel arrangements should be made accordingly. Registration information can be found by visiting www.osap.org. For additional information, the USAF point of contact is Lt Col Jennifer Harte at DSN 792-7668, commercial (847) 688-7668, or jennifer.harte@ndri.med.navy.mil.

A tentative course schedule and answers to frequently asked questions about the course can be found by visiting: www.brooks.af.mil/dis/announcements.htm.

FREQUENTLY ASKED QUESTIONS

Fire Safety and Alcohol-Based Handrubs

Question: I've read that it is unsafe to use alcohol-based handrubs in health-care settings because of the fire risk. Is there any new information about safety precautions that we should take to minimize the risk of fire if using alcohol-based handrubs?

Answer: In Europe, where alcohol-based hand rubs have been used extensively for years, the incidence of fires associated with such products has been low.[1] The results of a recent survey in the U.S. also supports this.[2] However, since alcohols are flammable, precautions should be taken to minimize any potential fire risk. Recently, the National Fire Protection Association (NFPA) published amended guidance to the Life Safety Code (LSC) allowing alcohol-based hand rubs in health-care facilities if several safety conditions are met[3]:

- The egress corridor width is 6 feet or greater and dispensers are separated at least 4 feet apart.

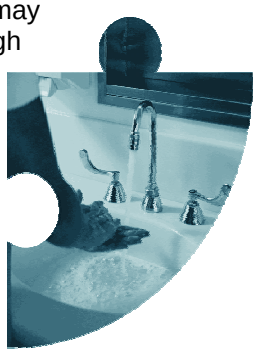
- The maximum individual dispenser fluid capacity is 1.2 liters for dispensers in rooms, corridors, and areas open to corridors, and 2.0 liters for dispensers in suites of rooms.

- If using wall-mounted dispensers, do not install over or directly adjacent to electrical outlets and switches.

- In locations with carpeted floor coverings, dispensers installed directly over carpeted surfaces are permitted only in areas with sprinklers.

- Each smoke compartment may contain a maximum aggregate of 10 gallons of alcohol-based hand rub solution in dispensers and a maximum of 5 gallons in storage.

Adherence of health-care personnel to recommended hand-hygiene procedures has been poor with an overall average rate of 40% in hospital settings. Common self-reported reasons are the lack of sinks, soap, and paper towels. Alcohol-based hand rubs have been proven effective and they may help improve adherence to hand-hygiene protocols in many health-care settings. Although alcohol-based hand rubs have the potential to increase hand hygiene compliance, sinks and other hand-hygiene supplies are readily available in dental operatories, making the use of these waterless hand-hygiene agents optional. In dental settings, alcohol-based hand rubs may be useful in exam rooms or radiology work areas where multiple patients are seen in a short period of time and frequent handwashing is indicated. Another indication may be in dental residencies where staff members perform frequent patient checks. Because dispensers should not be installed near electrical outlets and the restrictions on the amount of product in operatories, dental clinics may want to consider using smaller pump dispensers instead of purchasing wall-mounted dispensing systems. In summary, careful evaluation and ongoing educational and motivational programs to maintain awareness of the importance of hand hygiene are indicated before deciding to introduce alcohol-based hand rubs into a dental practice.



References:
1. Widmer AF. Replace hand washing with use of a waterless alcohol hand rub? Clin Infect Dis 2000;31:136–143.
2. Boyce JM, Pearson ML. Low frequency of fires from alcohol-based hand rub dispensers in healthcare facilities. Infect Control Hosp Epidemiol 2003;24:618–619.
3. Air Force Medical Logistics Letter (AFMLL) 05-2004. May 2004.

FROM THE LITERATURE

Outbreak Linked to Artificial Fingernails

Outbreak of extended-spectrum beta-lactamase—producing Klebsiella Peneumoniae in a neonatal intensive care unit linked to artificial nails. Gupta A, Della-Latta P, Todd B, San Gabriel P, Haas J, Wu F, Rubenstein D, Saiman L. Infect Control Hosp Epidemiol 2004;25:210–215.

This article describes the investigation of an outbreak of extended-spectrum beta-lactamase (ESBL)-producing *Klebsiella pneumoniae* infections in a neonatal intensive care unit. Cultures of the gastrointestinal tracts of patients, the hands of health-care personnel (HCP), and the environment were performed to detect potential reservoirs for ESBL-producing *K. pneumoniae*. Strains of *K. pneumoniae* were typed by pulsed-field gel electrophoresis using *Xba*I. A case-control study was performed to determine risk factors for acquisition of the outbreak clone (clone A); cases were infants infected or colonized with clone A and controls (3 per case) were infants with negative surveillance cultures. During the study period, 19 case-infants, of whom 13 were detected by surveillance cultures, harbored clone A. The overall attack rate for the outbreak strain was 45%; 9 of 19 infants presented with invasive disease (n = 6) or developed invasive disease (n = 3) after colonization was detected. Clone A was found on the hands of two HCP, one of whom wore artificial nails, and on the designated stethoscope of a case-infant. Analysis revealed that length of stay per day and exposure to the health-care worker wearing artificial fingernails were associated with infection or colonization with clone A. As a result of this investigation, an institution-wide ban on the wearing of artificial nails was implemented and the authors concluded that short, well-groomed, natural nails should be mandatory for HCP with direct patient contact.

DIS Comment:

In this study, the acquisition of the outbreak strain was significantly associated with exposure to a nurse wearing artificial nails. This is not the first time that artificial fingernails or extenders have been epidemiologically implicated in health-care-associated infections. Multiple outbreaks involving fungal and bacterial infections in hospital intensive-care units and operating rooms have been reported.[1-5]

Keeping nails short is considered key because the majority of flora on the hands are found under and around the fingernails.[6] Hand carriage of gram-negative organisms has been determined to be greater among wearers of artificial nails than among nonwearers, both before and after handwashing.[7-10] Fingernails should be short enough to allow dental health-care personnel (DHCP) to thoroughly clean underneath them and prevent glove tears.[11,12] Sharp nail edges or broken nails are also likely to increase glove failure and long artificial or natural nails can make donning gloves more difficult and can cause gloves to tear more readily.[12]

References

1. Passaro DJ, Waring L, Armstrong R, et al. Postoperative *Serratia marcescens* wound infections traced to an out-of-hospital source. J Infect Dis 1997;175:992–995.
2. Foca M, Jakob K, Whittier S, et al. Endemic Pseudomonas aeruginosa infection in a neonatal intensive care unit. N Engl J Med 2000;343:695–700.
3. Moolenaar RL, Crutcher M, San Joaquin VH, et al. A prolonged outbreak of *Pseudomonas aeruginosa* in a neonatal intensive care unit: did staff fingernails play a role in disease transmission? Infect Control Hosp Epidemiol 2000;21:80–85.
4. Parry MF, Grant B, Yukna M, et al. Candida osteomyelitis and diskitis after spinal surgery: an outbreak that implicates artificial nail use. Clin Infect Dis 2001;32:352–357.
5. Winslow EH, Jacobson AF. Can a fashion statement harm the patient? Am J Nurs 2000;100:63–65.
6. McGinley KJ, Larson EL, Leyden JJ. Composition and density of microflora in the subungual space of the hand. J Clin Microbiol 1988;26:950–953.
7. Pottinger J, Burns S, Manske C. Bacterial carriage by artificial versus natural nails. Am J Infect Control 1989;17:340–344.
8. McNeil SA, Foster CL, Hedderwick SA, Kauffman CA. Effect of hand cleansing with antimicrobial soap or alcohol-based gel on microbial colonization of artificial fingernails worn by health care workers. Clin Infect Dis 2001;32:367–372.
9. Rubin DM. Prosthetic fingernails in the OR: a research study. AORN J 1988;47:944–945.

10. Hedderwick SA, McNeil SA, Lyons MJ, Kauffman CA. Pathogenic organisms associated with artificial fingernails worn by healthcare workers. Infect Control Hosp Epidemiol 2000;21:505–509.
11. Larson EL. APIC guideline for hand washing and hand antisepsis in health-care settings. Am J Infect Control 1995;23:251–269.
12. CDC. Guidelines for infection control in dental health-care settings – 2003. MMWR 2003; 52(No. RR-17):1–66.

Latex Allergy and Occupational Asthma

Latex allergy and occupational allergy in health care workers. Amr S, Bollinger ME. Environ Health Perspect 2004;112:378–381.

The prevalence of natural rubber latex (NRL) allergy has been estimated to be 5-18% in health-care personnel (HCP) and latex exposure has been one of the leading causes of occupational asthma in the last several years. Two cases of nurses who developed sensitivity to NRL, both with dermatologic symptoms and respiratory symptoms that included asthma are presented. The patients' allergies to NRL were confirmed on the basis of clinical history, a positive skin test to latex, and the presence of latex-specific immunoglobulin E (IgE) serology by radioallergosorbent test (RAST). Both patients worked in the same community hospital for approximately 20 years. Following the diagnosis of allergy to latex, both patients avoided direct skin contact with latex, but they continued to work in the same respective environments, where powdered latex gloves and other potentially sensitizing chemicals were used. Instead of improving, the clinical condition of the patients worsened and they remained symptomatic, even after they were removed from their workplace. Their airways reacted to low levels of a variety of sensitizers and irritants in the environment. Both nurses were referred for vocational rehabilitation.

DIS Comment:
Latex allergy (type I hypersensitivity to latex proteins) can be a serious systemic allergic reaction, usually beginning within minutes of exposure but sometimes occurring hours later and producing varied symptoms. More common reactions include runny nose, sneezing, itchy eyes, scratchy throat, hives, and itchy burning skin sensations. More severe symptoms include asthma marked by difficult breathing, coughing spells, and wheezing; cardiovascular and gastrointestinal ailments; and in rare cases, anaphylaxis and death.[1,2] The American Dental Association (ADA) began investigating the prevalence of type I latex hypersensitivity among dental health-care personnel (DHCP) at the ADA annual meeting in 1994. In 1994 and 1995, approximately 2,000 dentists, hygienists, and assistants volunteered for skin-prick testing. Data demonstrated that 6.2% of those tested were positive for type I latex hypersensitivity.[3] Data from the subsequent 5 years of this ongoing cross-sectional study indicated a decline in prevalence from 8.5% to 4.3%.[4] This downward trend is similar to that reported by other studies and might be related to use of latex gloves with lower allergen content.[5-7]

NRL proteins responsible for latex allergy are attached to glove powder. When powdered latex gloves are worn, more latex protein reaches the skin. In addition, when powdered latex gloves are donned or removed, latex protein/powder particles become aerosolized and can be inhaled, contacting mucous membranes.[8] As a result, allergic patients and DHCP can experience cutaneous, respiratory, and conjunctival symptoms related to latex protein exposure. DHCP can become sensitized to latex protein with repeated exposure.[9-13] Work areas where only powder-free, low-allergen latex gloves are used demonstrate low or undetectable amounts of latex allergy-causing proteins[14-16] and fewer symptoms among HCP related to natural rubber latex allergy. Because of the role of glove powder in exposure to latex protein, the National Institute for Occupational Safety and Health (NIOSH) recommends that if latex gloves are chosen, HCP should be provided with reduced protein, powder-free gloves.[1] Nonlatex (e.g., nitrile or vinyl) powder-free and low-protein gloves are also available.[17,18] Although rare, potentially life-threatening anaphylactic reactions to latex can occur; dental practices should be appropriately equipped and have procedures in place to respond to such emergencies.

DHCP should be familiar with the signs and symptoms of latex sensitivity.[1,17,19,20] A physician should evaluate DHCP exhibiting symptoms of latex allergy, because further exposure could result in a serious allergic reaction. A diagnosis is made through medical history, physical examination, and diagnostic tests.

Procedures should be in place for minimizing latex-related health problems among DHCP and patients while protecting them from infectious materials. These procedures should include 1) reducing exposures to latex-containing materials by using appropriate work practices, 2) training and educating DHCP, 3) monitoring symptoms, and 4) substituting nonlatex products where appropriate.[1]

References

1. CDC. National Institute for Occupational Safety and Health. NIOSH Alert: preventing allergic reactions to natural rubber latex in the workplace. Cincinnati, OH: US Department of Health and Human Services, Public Health Service, CDC, National Institute for Occupational Safety and Health, 1997.
2. Dillard SF, Hefflin B, Kaczmarek RG, Petsonk EL, Gross TP. Health effects associated with medical glove use. AORN J 2002;76:88–96.
3. Hamann CP, Turjanmaa K, Rietschel R, et al. Natural rubber latex hypersensitivity: incidence and prevalence of type I allergy in the dental professional. J Am Dent Assoc 1998;129:43–54.
4. Siew C, Hamann C, Gruninger SE, Rodgers P, Sullivan KM. 2003.Type I Latex Allergic Reactions among Dental Professionals, 1996–2001. Journal of Dental Research, 82 (Special Issue): #1718.
5. Saary MJ, Kanani A, Alghadeer H, Holness DL, Tarlo SM. Changes in rates of natural rubber latex sensitivity among dental school students and staff members after changes in latex gloves. J Allergy Clin Immunol 2002;109:131–135.
6. Hunt LW, Kelkar P, Reed CE, Yunginger JW. Management of occupational allergy to natural rubber latex in a medical center: the importance of quantitative latex allergen measurement and objective follow-up. J Allergy Clin Immunol 2002; 110(suppl 2):S96–106.
7. Turjanmaa K, Kanto M, Kautiainen H, Reunala T, Palosuo T. Long-term outcome of 160 adult patients with natural rubber latex allergy. J Allergy Clin Immunol 2002; 110(suppl 2):S70–74.
8. Heilman DK, Jones RT, Swanson MC, Yunginger JW. A prospective, controlled study showing that rubber gloves are the major contributor to latex aeroallergen levels in the operating room. J Allergy Clin Immunol 1996;98:325–330.
9. Baur X, Jager D. Airborne antigens from latex gloves. Lancet 1990;335:912.
10.Turjanmaa K, Reunala T, Alenius H, Brummer-Korvenkontio H, Palosuo T. Allergens in latex surgical gloves and glove powder. Lancet 1990;336:1588.
11. Baur X, Chen Z, Allmers H. Can a threshold limit value for natural rubber latex airborne allergens be defined? J Allergy Clin Immunol 1998;101:24–27.
12. Trape M, Schenck P, Warren A. Latex gloves use and symptoms in health care workers 1 year after implementaion of a policy restricting the use of powdered gloves. Am J Infec Control 2000;28:352–358.
13. Allmers H, Brehler R, Chen Z, Raulf-Heimsoth M, Fels H, Baur X. Reduction of latex aeroallergens and latex-specific IgE antibodies in sensitized workers after removal of powdered natural rubber latex gloves in a hospital. Allergy Clin Immunol 1998;102:841–846.
14. Tarlo SM, Sussman G, Contala A, Swanson MC. Control of airborne latex by use of powder-free latex gloves. J Allergy Clin Immunol 1994;93:985–989.
15. Swanson MC, Bubak ME, Hunt LW, Yunginger JW, Warner MA, Reed CE. Quantification of occupational latex aeroallergens in a medical center. J Allergy Clin Immunol 1994;94:445–551.
16. Hermesch CB, Spackman GK, Dodge WW, Salazar A. Effect of powder-free latex examination glove use on airborne powder levels in a dental school clinic. J Dent Educ 1999;63:814–820.
17. American Dental Association Council on Scientific Affairs. The dental team and latex hypersensitivity. J Am Dent Assoc 1999;130:257–264.
18. Miller CH. Infection control strategies for the dental office [Chapter 29]. In: Ciancio SG, ed. ADA guide to dental therapeutics. 2nd ed. Chicago, IL: ADA Publishing, 2000:543–558.
19. Bolyard EA, Tablan OC, Williams WW, Pearson ML, Shapiro CN, Deitchman SD, Hospital Infection Control Practices Advisory Committee. Guideline for infection control in health care personnel, 1998. Am J Infect Control 1998;26:289–354.
20. Terezhalmy GT, Molinari JA. Personal protective equipment and barrier techniques. In: Cottone JA, Terezhalmy GT, Molinari JA, eds. Practical infection control in dentisty. 2nd ed. Baltimore, MD: Williams & Wilkins, 1996:136–145.