INFECTION CONTROL INFORMATION

April 2004

PRODUCT EVALUATIONS

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

- 1SHOT Safety Syringe (4/04)
- SaniTyze Waterless Moisturizing Antimicrobial Gel (2/04)

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.

- **Pro•Portion Tartar and Stain Remover** (Sultan Chemists, www.sultanchemists.com)

- **ICX™ Water Treatment Tablet** (A-dec, www.a-dec.com)

FREQUENTLY ASKED QUESTIONS

Using Extracted Teeth in Educational Settings (4/04)

Question: What are the infection control recommendations for using extracted teeth in educational settings?

Answer: Extracted teeth are occasionally collected and used for preclinical or post-graduate educational training. The teeth should be cleansed of visible blood and gross debris and maintained in a hydrated state in a well-constructed container with a secure lid to prevent leakage during transport. The container should also be labeled with the biohazard symbol. Because the recommendation is to autoclave these teeth before clinical exercises, use of the most economical storage solution (e.g., water or saline) might be practical. A liquid chemical germicide (e.g., sodium hypochlorite [household bleach] diluted 1:10 with tap water) could reduce bacterial accumulation during storage although it does not completely disinfect/sterilize both the external surface and interior pulp tissue.

Before use in an educational setting, the teeth should be heat-sterilized to allow for safe handling. Pantera and Shuster demonstrated elimination of microbial growth using an autoclave cycle for 40 minutes. Autoclaving teeth for pre-clinical laboratory exercises does not alter their physical properties sufficiently to compromise the learning experience. It is unknown, however, whether autoclave sterilization of extracted teeth affects dentinal structure such that the chemistry and microchemical relationship between dental materials and the dentin is affected for purposes of dental materials research.

Using teeth that do not contain amalgam is preferable because they can be safely autoclaved. Extracted teeth containing amalgam restorations must not be heat sterilized because of the potential health hazard due to the risk of mercury vaporization and exposure. If extracted teeth containing amalgam restorations are to be used, immersion in 10% formalin solution for two weeks has been found to be an effective method of disinfecting both the internal and external structures of the teeth. When using formalin, the manufacturer MSDS should be

reviewed for occupational safety and health concerns and to ensure compliance with OSHA recommendations.

References:

CDC. Guidelines for infection control in dental health-care settings – 2003. MMWR 2003; 52(No. RR-17):1–66.

Pantera EA Jr, Schuster GS. Sterilization of extracted human teeth. J Dent Educ 1990;54:283–285.

Parsell DE, Stewart BM, Barker JR, Nick TG, Karnes L, Johnson RB. The effect of steam sterilization on the physical properties and perceived cutting characteristics of extracted teeth. J Dent Educ 1998;62:260–263.

Schulein TM. Infection control for extracted teeth in the teaching laboratory. J Dent Educ 1994;58:411–413.

Tate WH, White RR. Disinfection of human teeth for educational purposes. J Dent Educ 1991;55:583–585.

US Department of Labor, Occupational Safety and Health Administration. 29 CFR Part 1910.1030. Occupational exposure to bloodborne pathogens; needlesticks and other sharps injuries; final rule. Federal Register 2001;66:5317–5325. As amended from and includes 29 CFR Part 1910.1030. Occupational exposure to bloodborne pathogens; final rule. Federal Register 1991;56:64174–82. Available at www.osha.gov/SLTC/dentistry/index.html. Accessed April 2004.

US Department of Labor, Occupational Safety and Health Administration. OSHA instruction: enforcement procedures for the occupational exposure to bloodborne pathogens. Washington, DC: US Department of Labor, Occupational Safety and Health Administration, 2001; directive no. CPL 2-2.69.

Shade Selection in the Laboratory Using Extracted Teeth (4/04)

Question: Can extracted teeth be sent to the dental laboratory for shade comparisons?

Answer: Yes, extracted teeth can be sent to a dental laboratory for shade or size comparisons. The teeth should be cleaned and surface-disinfected with an EPA-registered hospital disinfectant with intermediate-level activity (i.e., tuberculocidal claim). They should be transported in a manner consistent with OSHA regulations—placed in a well-constructed container with a secure lid to prevent leakage during transport and labeled with the biohazard symbol.

References:

CDC. Guidelines for infection control in dental health-care settings – 2003. MMWR 2003; 52(No. RR-17):1–66.

US Department of Labor, Occupational Safety and Health Administration. 29 CFR Part 1910.1030. Occupational exposure to bloodborne pathogens; needlesticks and other sharps injuries; final rule. Federal Register 2001;66:5317–5325. As amended from and includes 29 CFR Part 1910.1030. Occupational exposure to bloodborne pathogens; final rule. Federal Register 1991;56:64174–82. Available at www.osha.gov/SLTC/dentistry/index.html. Accessed April 2004.

US Department of Labor, Occupational Safety and Health Administration. OSHA instruction: enforcement procedures for the occupational exposure to bloodborne pathogens. Washington, DC: US Department of Labor, Occupational Safety and Health Administration, 2001; directive no. CPL 2-2.69.

FROM THE LITERATURE

Risk, Prevention, and Management of HIV, HBV, and HCV

Cleveland JL, Cardo DM. Occupational exposures to human immunodeficiency virus, hepatitis B virus, and hepatitis C virus: risk, prevention, and management. Dent Clinics of North America 2003;47:681–696.

The transmission of bloodborne viruses in dental health-care settings can have serious consequences but is fortunately a rare event. After reviewing the risk of infection with the three bloodborne viruses of most concern in occupational transmission, human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV); this article reviews their prevention and the management of potential exposures. Postexposure prophylaxis (PEP) is discussed in detail for HIV, HBV, and HCV. Pre-exposure hepatitis B vaccination and the use of standard precautions to prevent exposure to blood are the most effective strategies for preventing dental health-care personnel (DHCP) from occupational exposure to occupational infection with HIV, HBV, or HCV. Each dental health-care facility should develop a comprehensive written program for preventing and managing occupational exposures that (1) describes the type of blood exposures that may place DHCP at risk for infection; (2) outlines procedures for promptly reporting and evaluating such exposures; and (3) identifies a health-care professional who is qualified to provide counseling and perform all medical evaluations and procedures in accordance with the most current U.S. Public Health Service (CDC) recommendations. Finally resources should be available that permit rapid access to clinical care, testing, counseling, and PEP for exposed DHCP and the testing and counseling of source patients.

DIS Comment:

Exposures that might place DHCP at risk of HIV, HBV, and HCV infection include percutaneous injuries (e.g., needlestick or cut with a sharp object), or contact between potentially infectious blood, tissues, or other body fluids and mucous membranes of the eye, nose, or mouth or nonintact skin (e.g., exposed skin that is chapped, abraded, or afflicted with dermatitis). Percutaneous injuries pose a greater risk of transmission. The majority of exposures in dentistry are preventable, and methods to reduce the risk of blood contacts have included use of standard precautions and engineering controls, and modifications of work practices. These approaches might have contributed to the decrease in percutaneous injuries among dentists during recent years. However, needlesticks and other blood contacts continue to occur, which is a concern because percutaneous injuries pose the greatest risk of transmission.

Engineering controls remove or isolate a hazard in the workplace. In the context of sharps injury prevention, engineering controls include sharps disposal containers and needles and other sharps devices with an integrated engineered sharps injury prevention feature. The emphasis on engineering controls has led to the development of many types of devices with engineered sharps injury prevention features. With the current focus on engineered technology, there is little new information on the use of work-practice controls to reduce the risk of sharps injuries during patient care. However, work-practice controls are an important adjunct for preventing blood exposures, including percutaneous injuries. Examples include:

- Using a one-handed scoop technique, a mechanical device designed for holding the needle cap to facilitate one-handed recapping, or an engineered sharps injury protection device (e.g., needles with re-sheathing mechanisms) for recapping needles between uses and before disposal;
- Not bending or breaking needles before disposal;
- Avoiding passing a syringe with an unsheathed needle;
- Removing burs before disassembling the handpiece from the dental unit;
- Using instruments, rather than fingers, to grasp needles, retract tissue, and load/unload needles and scalpels;
- Placing used disposable syringes and needles, scalpel blades, and other sharp items in appropriate puncture-resistant containers located as close as feasible to where the items were used; and
- Giving verbal announcements when passing sharps.

Postexposure management is an integral component of a complete program to prevent infection after an occupational exposure to blood. During dental procedures, saliva is predictably contaminated with blood. Even when blood is not visible, it can still be present in limited quantities and therefore is considered a potentially infectious material by OSHA. A qualified health-care professional should evaluate any

occupational exposure incident to blood or OPIM, including saliva, regardless of whether blood is visible, in dental settings. The CDC Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis can be found at: www.cdc.gov/ncidod/hip/Guide/phspep.htm. DIS recently posted a summary of recommended procedures to follow in the event of an occupational exposure incident which can be found by visiting: www.brooks.af.mil/dis/DIS69/sec2b.htm#DIS69007.

Dental Water Quality: Distillation and Line Cleaning

Palenik CJ, Miller CH. The effect of distillation and line cleaning on the quality of water emitted from dental units. Am J Dent 2003;16:385–389.

The presence of microbially contaminated water in dental unit waterlines (DUWL) was first reported in 1963 and since that time numerous studies have indicated the presence of large numbers of microorganisms in DUWL. This study monitored water emitted from dental units connected to centralized water distillation units fitted with reservoirs for dispensing chemicals designed to control biofilms. Levels of microbial contamination prior to the initiation of cleaning indicated marked variability (720-332,000 CFU/mL) and that water containing less than 200 CFU/mL was not being emitted from any operatory water source. However, acceptable water quality was obtained over a period of three weeks from all unit sources after line-cleaning processes were completed. In one office, cleaning was suspended for three weeks without affecting water quality. Resumption of weekly cleanings produced desirable water from all sources in the three offices within two weeks. **Results indicate that dental units attached to a centralized combined water distillation-cleaning solution distribution system can produce water with less than 200 CFU/mL and that missing one weekly cleaning did not negatively affect water quality.**

DIS Comment:
In 1995, the American Dental Association addressed the dental water concern by asking manufacturers to provide equipment with the ability to deliver treatment water with ≤200 CFU/mL of unfiltered output from waterlines. Since the publication of this article, new recommendations for dental unit water quality have been published. The Centers for Disease Control and Prevention's Guidelines for Infection Control in Dental Health-Care Settings, 2003 now recommend that dental offices use water that meets EPA regulatory standards for drinking water (i.e., ≤500 CFU/mL of heterotrophic water bacteria) for routine dental treatment output water. Simply using source water containing ≤500 CFU/mL of bacteria (e.g., tap, distilled, or sterile water) in a self-contained water system will not eliminate bacterial contamination in treatment water if biofilms in the water system are not controlled. Removal or inactivation of dental waterline biofilms requires use of chemical germicides. Dental health-care personnel should be trained regarding water quality, biofilm formation, water treatment methods, and appropriate maintenance protocols for water delivery systems. Water treatment and monitoring products require strict adherence to maintenance protocols, and noncompliance with treatment regimens has been associated with persistence of microbial contamination in treated systems. Clinical monitoring of water quality can ensure that procedures are correctly performed and that devices are working in accordance with the manufacturer's previously validated protocol. The authors note that although the results of this study are encouraging, it must be considered as being preliminary. The sample size was small (nine operatories in three separate dental offices) and only one DUWL cleaning system and one type of cleaning chemical was tested. The authors evaluated the intentional missing of weekly cleaning sessions to study the effects of occasional unintended interruptions, not to save on cleaner cost or labor expenditures. Manufacturer recommendations regarding the frequency of use should always be followed.

CDC Workbook to Protect Health-Care Workers from Sharps Injuries

The Centers for Disease Control and Prevention (CDC) has a new tool to protect health-care personnel (HCP) from injuries caused by needlesticks and other sharp medical instruments. Such injuries can lead to diseases, such as hepatitis B and C and AIDS. These diseases may be caused when a health-care worker is accidentally stuck by needles or other devices that are contaminated with the blood of an infected patient. CDC estimates that hospital workers sustain more than 1,000 injuries a day from contaminated needles and other sharp devices used during the delivery of patient care. CDC data suggest that at least 65% of these injuries are preventable by using safer devices and by taking appropriate safety measures. The risks and costs associated with a blood exposure are serious and real. Costs include the direct costs associated with the initial and follow-up treatment of exposed HCP, which are estimated to range from $500 to $3,000 depending on the treatment provided. Costs that are harder to quantify include the emotional cost associated with fear and anxiety from worrying about the possible consequences of an exposure, direct and indirect costs associated with drug toxicities and lost time from work, and the societal cost associated with an HIV or Hepatitis C seroconversion; the latter includes the possible loss of a worker's services in patient care, the economic burden of medical care, and the cost of any associated litigation.

The CDC workbook, entitled "Sharps Safety: Be Sharp. Be Safe," promotes a comprehensive prevention program in the health-care setting. According to CDC Director Julie L. Gerberding "Protecting health-care personnel is a CDC priority. Safer devices play an important role in preventing injuries to HCP, but they aren't the complete solution. We need to create a culture of safety in the work environment to make sure health-care organizations promote and support sharps injury prevention." The CDC workbook provides a practical plan for preventing injuries from needlesticks and other sharp devices. Once implemented, the program should lead to improved workplace safety for HCP. In addition, the strategies should help health-care facilities meet certain aspects of accrediting organization requirements as they apply to health-care worker safety and federal and state regulatory standards.

The workbook includes several sections that describe each of the organizational steps and operational processes. A toolkit of forms and worksheets is included to help guide program development and implementation. The workbook also contains:
- A comprehensive overview of the literature on the risks and prevention of sharps injuries in HCP;
- A description of devices with sharps injury prevention features, and factors to consider when selecting such devices; and
- Internet links to Web sites with relevant information on sharps injury prevention.

The CDC's Sharps Safety workbook is available by visiting www.cdc.gov/sharpssafety.

INFECTION CONTROL PRODUCT EVALUATORS

DIS will be starting several infection control product evaluations in the next month and is looking for dentists in the federal services (e.g., USAF, USA, USN, PHS, VA, USCG) to participate in the clinical-user evaluations. The product will be mailed to interested clinicians along with the questionnaires and a cover letter describing the evaluation process. DIS is primarily interested in whether you liked or disliked the way the product handled and its various features. After using the product for a period of approximately three months, each evaluator completes a questionnaire and returns the questionnaire to DIS. If the item being evaluated is a piece of equipment, it needs to be returned to DIS or the manufacturer. If the item is a material or other type of consumable, it does not. DIS then takes the results and generates a final report for our Web site and the manufacturer. Many of our evaluators have told us they really enjoy being involved in the process. It gives them a chance to use state-of-the-art materials and equipment at no cost to their clinics. They also have said they like having a chance to give their opinions about the new products they are trying.

If you are a **dentist** in the federal services (e.g., USAF, USA, USN, PHS, VA, USCG) and would like to participate in infection control product evaluation please email me at jennifer.harte@ndri.med.navy.mil.