USAF
GUIDELINES FOR INFECTION CONTROL IN DENTISTRY

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CHAPTER 1

USAF DENTAL SERVICE INFECTION CONTROL PROGRAM

INTRODUCTION. The goals of the USAF Dental Service Infection Control Program are to protect the health of all patients and employees and to comply with applicable federal, state, and local regulations governing infection control, job safety, and management of regulated medical waste. These guidelines are designed to comply with current federal regulations including those issued by the Occupational Safety and Health Administration (OSHA), the Food and Drug Administration (FDA), and the Environmental Protection Agency (EPA). Guidelines and recommendations issued by nonregulatory agencies including the American Dental Association (ADA), the Centers for Disease Control and Prevention (CDC), and the Joint Commission for the Accreditation of Healthcare Organizations (JCAHO) are also used as references in the development of dental service infection control and employee protection programs. The most current federal, state, and local (including host country) regulations, and Air Force Instructions (AFI) take precedence over these guidelines whenever they are more stringent.

This document provides guidance for USAF dental clinics to develop an infection control program. It also provides appropriate guidance on issues which the dental clinic can adopt or modify to ensure that reasonable precautions are being taken to prevent, control, and contain infections in patients, staff, and visitors. Background information and supporting references for specific recommendations are provided in the Centers for Disease Control and Prevention *Guidelines for Infection Control in Dental Health-Care Settings—2003*, available on the CDC Web site at www.cdc.gov/oralhealth/infectioncontrol or the DECS Web site at https://decs.nhgl.med.navy.mil.

This document supersedes the *Year 2000 USAF Dental Infection Control Guidelines*, May 2000. According to AFI 47-101, personnel in USAF dental facilities (in coordination with the medical treatment facility [MTF] infection control committee) must meet the requirements in the most current USAF Guidelines for Infection Control in Dentistry. These guidelines are minimal standards and in some instances dental commanders may choose to set more stringent policy to ensure uniformity within the clinic or MTF (e.g., wearing scrub suits for all patient-care activities; wearing head and shoe covers during all procedures with the potential to generate spray or spatter of blood or other potentially infectious materials; spore testing sterilizers daily).

Dental health-care personnel (DHCP) refers to all paid and unpaid personnel in the dental health-care setting who might be occupationally exposed to infectious materials, including body substances and contaminated supplies, equipment, environmental surfaces, water, or air. DHCP include dentists, dental hygienists, dental assistants, dental laboratory technicians, students and trainees, contractual personnel, and other persons not directly involved in patient care but potentially exposed to infectious agents (e.g., administrative, clerical, housekeeping, maintenance, or volunteer personnel).

RESPONSIBILITIES

1. **The Consultant to the Surgeon General in Dental Infection Control and Occupational Health and Safety.** The USAF Surgeon General appoints a Special Consultant for Dental Infection Control and Occupational Health and Safety. The duties of this special consultant include, but are not limited to, the following:

a. Advising HQ USAF/SGD on current issues relevant to dental infection control and occupational health and safety.

b. Acting as a liaison between other USAF consultants in related areas including dental specialties, MTF infection control, infectious diseases and epidemiology, operating room nursing, Central Sterile Services (CSS), Bioenvironmental Engineering (BEE), and Public Health (PH).

c. Opening and maintaining lines of communication with federal regulatory and advisory agencies including OSHA, FDA, EPA, and the CDC as well as with other recognized authorities in the fields of dental infection control and occupational safety and health.

d. Developing and publishing HQ USAF/SG-approved guidelines for the USAF Dental Infection Control Program. The consultant will update this guidance, as needed, based on changes in federal regulations, recommendations from advisory agencies, and current USAF policy.

e. Assisting USAF dental services in developing effective programs by disseminating information via periodic infection control updates and by direct and written communication.

2. **The Dental Infection Control Officer.** The dental squadron/flight commander assumes overall responsibility for

oversight of dental service infection control and occupational health/safety programs within the base dental service. He or she will appoint a dental infection control officer (ICO) and/or dental noncommissioned officer (NCO) to assume these duties. Appropriate education and training are strongly encouraged prior to assuming these duties. Responsibilities include, but are not limited to, the following:

a. Developing and implementing a written base dental service infection control program including measures to comply with current USAF policy, guidelines, and OSHA requirements for protection of DHCP from exposure to bloodborne pathogens. Coordinate the dental infection control operating instructions with the MTF infection control program and PH exposure control plan.

b. Representing the dental service on the MTF Infection Control Committee (ICC)/Infection Control Review Function (ICRF).

c. Ensuring initial, annual, and update training for DHCP on dental infection control and occupational exposure to bloodborne pathogens in accordance with OSHA regulations and CDC standards. (see Chapters 2 and 3)

d. Conducting ongoing surveillance coordinated with guidance from the MTF ICC/ICRF (see Chapter 10).

e. Developing and implementing programs for the management of regulated waste within the dental clinic in accordance with federal, state, and local regulations.

f. Maintaining a dental infection control program notebook that contains, at a minimum, the following items:

- AFI 44-108, Medical Infection Control Program. Available at www.e-publishing.af.mil/.

- CDC Guidelines for Infection Control in Dental Health-Care Settings—2003. Available at www.cdc.gov/oralhealth/infectioncontrol.

- Current USAF Dental Infection Control Guidelines, policy letters, and dental infection control consultant's updates. Available at https://decs.nhgl.med.navy.mil/infcontrol.htm. Note: Information and updates are posted monthly.

- Current OSHA Regulatory Documents: 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;66:5317–25. Available at www.osha.gov/SLTC/dentistry/index.html.

- Installation and/or MTF regulations on infection control, occupational exposure to bloodborne pathogens, management of regulated medical waste and other relevant guidance.

ABBREVIATIONS

ADA	American Dental Association
AFI	Air Force Instruction
CDC	Centers for Disease Control and Prevention
DHCP	Dental Health-Care Personnel
DECS	USAF Dental Evaluation & Consultation Service
EPA	U.S. Environmental Protection Agency
FDA	U.S. Food and Drug Administration
HAI	Health-Care-Associated Infection
HBV	Hepatitis B Virus
HICPAC	Healthcare Infection Control Practice Advisory Committee
ICC	Infection Control Committee
ICO	Infection Control Officer
ICRF	Infection Control Review Function
JCAHO	Joint Commission on Accreditation of Healthcare Organizations
MSDS	Material Safety Data Sheet
MTF	Medical Treatment Facility
NCOIC	Noncommissioned Officer-in-Charge
OPIM	Other Potentially Infectious Material
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
PH	Public Health
PHS	Public Health Service
TB	Tuberculosis

CHAPTER 2

PERSONNEL HEALTH ELEMENTS OF AN INFECTION-CONTROL PROGRAM

INTRODUCTION. A protective health component for DHCP is an integral part of a dental infection-control program. The objectives are to educate DHCP regarding the principles of infection control, identify work-related infection risks, institute preventive measures, and ensure prompt exposure management and medical follow-up. Coordination between the dental ICO and other qualified health-care professionals within the MTF is necessary to provide DHCP with appropriate services.

KEY TERMS

Immunity: protection against a disease. Immunity is indicated by the presence of antibodies in the blood and can usually be determined with a laboratory test.

Immunization: the process by which a person becomes immune, or protected, against a disease. This term is often used interchangeably with vaccination or inoculation. However, the term "vaccination" is defined as the injection of a killed or weakened infectious organism in order to prevent the disease. Thus, vaccination, by inoculation with a vaccine, does not always result in immunity.

OPIM (Other Potentially Infectious Materials)*:* an OSHA term that refers to the following human body fluids: (1) Saliva in dental procedures, semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Postexposure prophylaxis: the administration of medications following an occupational exposure in an attempt to prevent infection.

Qualified health-care professional*:* any licensed health-care provider who can provide counseling and perform all medical evaluations and procedures in accordance with the most current recommendations of the US Public Health Service (PHS), including postexposure prophylaxis when indicated.

Vaccination: see immunization

Vaccine: a product that produces immunity therefore protecting the body from the disease. Vaccines are administered through needle injections, by mouth, and by aerosol.

A. General Recommendations

1. Develop a written program (in coordination with the MTF ICC/ICRF) for DHCP that includes policies, procedures, and guidelines for education and training; immunizations; exposure prevention and postexposure management; medical conditions, work-related illness, and associated work restrictions; contact dermatitis and latex hypersensitivity; and maintenance of records, data management, and confidentiality.

2. Establish and coordinate referral arrangements with qualified health-care professionals to ensure prompt and appropriate provision of preventive services (e.g., immunizations), occupationally related medical services, and postexposure management with medical follow-up (e.g., following exposure to bloodborne pathogens or tuberculosis).

B. Education and Training

1. Provide DHCP with comprehensive education and training regarding occupational exposure to potentially infectious agents and infection-control procedures/protocols appropriate for and specific to their assigned duties:

a. upon initial employment;

b. when new tasks or procedures affect the employee's occupational exposure; and

c. at a minimum, annually.

2. Provide training for DHCP who perform tasks or procedures likely to result in occupational exposure to infectious agents that includes:

a. description of their exposure risks;

b. review of prevention strategies and infection-control policies and procedures;

c. discussion regarding how to manage work-related illness and injuries, including postexposure prophylaxis; and

d. review of work restrictions if exposed to or infected with certain pathogens.

3. Provide newcomer's orientation training for all DHCP, including administrative employees. Inclusion of DHCP with minimal exposure risks (e.g., administrative employees) in annual or recurring education and training programs is optional, but should be considered as a means of enhancing facility-wide understanding of infection-control principles and the importance of the program.

4. Provide educational information appropriate in content and vocabulary to the educational level, literacy, and language of DHCP, including the opportunity for interactive questions and answers.

5. For a period of three years, maintain training records documenting each training session provided by the dental service or MTF in accordance with current OSHA and MTF guidelines. Include the following in the records:

a. the date of training;

b. a content outline;

c. the trainer's name and qualifications; and

d. the names and job titles of all persons attending the training.

C. Immunization Programs
1. Coordinate immunization services with PH and immunization departments within the MTF.

2. Ensure DHCP receive all appropriate immunizations (e.g., varicella, measles, mumps, rubella, influenza) based on USAF policy, the latest recommendations from the Advisory Committee on Immunization Practices (ACIP) and the Healthcare Infection Control Practices Advisory Committee (HICPAC) as well as their medical history and risk for occupational exposure.

3. Offer the HBV vaccination series to all DHCP (including civilian employees, volunteers, and dental laboratory personnel) with potential occupational exposure to blood or other potentially infectious material (OPIM).

a. Follow U.S. Public Health Service (PHS)/CDC recommendations for hepatitis B vaccination, serologic testing, follow-up, and booster dosing.

b. Provide employees appropriate education regarding the risks of HBV transmission and the availability of the vaccine. Have employees who decline the hepatitis B vaccination sign a declination form (using the wording found in Appendix A of the OSHA bloodborne pathogens standard [1910.1030]) to be kept on file with the employer.

D. Exposure Prevention and Postexposure Management
1. Coordinate a comprehensive postexposure management and medical follow-up program with PH and/or other appropriate MTF departments.

a. Include policies and procedures for prompt reporting, evaluation, counseling, treatment, and medical follow-up of occupational exposures.

b. Establish mechanisms for referral to a qualified health-care professional for medical evaluation and follow-up.

E. Medical Conditions, Work-Related Illness, and Work Restrictions
1. Coordinate, with PH and/or other appropriate MTF departments, work restriction and exclusion policies for DHCP with certain illnesses or infection. Encourage DHCP to seek appropriate preventive and curative care and report their illnesses or medical conditions. Follow MTF guidance and recommendations in the CDC Guideline for Infection Control in Healthcare Personnel (www.cdc.gov/ncidod/dhqp/guidelines.html).

2. Develop policies and procedures for evaluation, diagnosis, and management of DHCP with suspected or known latex allergy or occupational contact dermatitis. Seek definitive diagnosis by a qualified health-care professional for any DHCP with suspected latex allergy to carefully determine its specific etiology and appropriate treatment as well as work restrictions and accommodations.

CHAPTER 3

BLOODBORNE PATHOGENS

INTRODUCTION. OSHA has determined that medical/dental employees face a significant health risk as a result of occupational exposure to blood and "other potentially infectious materials" (OPIM) because they may contain bloodborne pathogens. This risk can be minimized or eliminated by using a combination of engineering and work practice controls, personal protective equipment (PPE), training, surveillance, hepatitis B vaccination, signs, labels and other provisions.

KEY TERMS

Bloodborne pathogens: disease-producing microorganisms spread by contact with blood or other body fluids contaminated with blood from an infected person. Examples include hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV).

Bloodborne pathogens standard: a standard developed, promulgated, and enforced by the Occupational Safety and Health Administration (OSHA) directing employers to protect employees from occupational exposure to blood and other potentially infectious material.

Engineering Controls*:* controls (e.g., sharps disposal containers, self-sheathing needles, safer medical devices, such as sharps with engineered sharps injury protections and needleless systems) that isolate or remove the bloodborne pathogens hazard from the workplace.

Occupational exposure incident*:* an occupational exposure incident can be defined as a percutaneous injury (e.g., needlestick or cut with a sharp object) or contact of mucous membrane or non-intact skin (e.g., exposed skin that is chapped, abraded, or afflicted with dermatitis) with blood, saliva, tissue, or other body fluids that are potentially infectious that may result from the performance of an employee's duties.

OPIM (Other Potentially Infectious Materials)*:* an OSHA term that refers to the following human body fluids: (1) Saliva in dental procedures, semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Parenteral*:* means piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.

Postexposure prophylaxis*:* the administration of medications following an occupational exposure in an attempt to prevent infection.

Standard precautions*:* Universal precautions were based on the concept that all blood and body fluids that might be contaminated with blood should be treated as infectious because patients with bloodborne infections can be asymptomatic or unaware they are infected. The relevance of universal precautions to other aspects of disease transmission was recognized, and in 1996, CDC expanded the concept and changed the term to standard precautions. Standard precautions integrate and expand the elements of universal precautions into a standard of care designed to protect health-care personnel (HCP) and patients from pathogens that can be spread by blood or any other body fluid, excretion, or secretion. Standard precautions apply to contact with 1) blood; 2) all body fluids, secretions, and excretions (except sweat), regardless of whether they contain blood; 3) nonintact skin; and 4) mucous membranes. Saliva has always been considered a potentially infectious material in dental infection control; thus, no operational difference exists in clinical dental practice between universal precautions and standard precautions.

Expanded precautions*:* (formerly called Transmission-Based-Precautions) a set of enhanced practices that apply to patients with documented or suspected infection or colonization with highly transmissible or epidemiologically important pathogens for which precautions beyond Standard Precautions are needed to interrupt transmission in health-care settings (i.e., airborne, contact, droplet precautions). Refer to the most current CDC and Healthcare Infection Control Practices Advisory Committee (HICPAC) isolation recommendations (www.cdc.gov/ncidod/dhqp/guidelines.html) when treating patients requiring additional precautions beyond standard precautions.

Qualified health-care professional*:* any licensed health-care provider who can provide counseling and perform all medical evaluations and procedures in accordance with the most current recommendations of the US Public Health Service (PHS), including postexposure prophylaxis when indicated.

Universal Precautions*:* see Standard Precautions

Work practice controls*:* practices incorporated into the everyday work routine that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

A. Preventing Transmission of Bloodborne Pathogens

1. Hepatitis B Vaccination

a. Offer the HBV vaccination series to all DHCP (including civilian employees, volunteers, and dental laboratory personnel) with potential occupational exposure to blood or OPIM.

b. Always follow current U.S. Public Health Service/CDC recommendations for hepatitis B vaccination, serologic testing, follow-up, and booster dosing.

c. Provide employees appropriate education regarding the risks of HBV transmission and the availability of the vaccine. Have employees who decline the hepatitis B vaccination sign a declination form (using the wording found in Appendix A of the OSHA bloodborne pathogens standard [1910.1030]) to be kept on file with the employer.

B. Preventing Exposures to Blood and OPIM

1. General Recommendations

a. Use standard precautions (Note: OSHA's bloodborne pathogens standard retains the term universal precautions) for all patient encounters. All blood and body fluids are treated as if potentially infectious. Do not delay or deny access to care to patients solely on the basis of known or suspected seropositivity for bloodborne pathogens.

b. In addition to standard precautions, other measures (e.g., expanded or transmission-based precautions) might be necessary to prevent potential spread of certain diseases (e.g., tuberculosis (TB), influenza, and varicella) that are transmitted through airborne, droplet, or contact transmission (e.g., sneezing, coughing, and contact with skin). When acutely ill with these diseases, patients do not usually seek routine dental outpatient care. Necessary additional precautions might include patient placement (e.g., isolation), adequate room ventilation, respiratory protection (e.g., N-95 masks) for DHCP, or postponement of nonemergency dental procedures.
Follow current MTF guidance and recommendations in the most current CDC isolation guidelines (www.cdc.gov/ncidod/dhqp/guidelines.html).

c. Consider sharp items (e.g., needles, scalers, burs, lab knives, and wires) that are contaminated with patient blood and saliva as potentially infectious and establish engineering controls and work practices to prevent injuries.

d. Conduct an occupational exposure determination (in accordance with current OSHA guidelines) without regard to the use of PPE. Include a determination as to whether there is actual or potential exposure to blood or OPIM involved in duty performance and identification of all individuals who work in areas where there is reasonably anticipated exposure to blood or OPIM.

e. Implement a written, comprehensive program (i.e., exposure control plan) designed to minimize and manage DHCP exposure to blood and body fluids that is accessible to employees, available to OSHA, and reviewed and updated at least annually. A copy of a generic exposure control plan for health-care facilities to modify and use can be found on the DECS Web site: https://decs.nhgl.med.navy.mil/infcontrol.htm. Develop a training program in accordance with current OSHA guidelines on controlling occupational exposure to bloodborne pathogens in dentistry.

f. Dental services are not required to prepare a separate, comprehensive, exposure control plan if they are covered under the MTF or installation plan. However, dental service specific procedures for protection of employees from occupational exposure to bloodborne pathogens should be incorporated into the dental infection control or occupational safety operating instructions when an installation or MTF plan covers the dental service.

2. Engineering and work-practice controls

a. The dental ICO is considered the local authority on dental-specific safety devices and must be knowledgeable about available devices (e.g., safety anesthetic syringes, safety scalpels); be able to discuss the advantages/disadvantages of each device with the MTF ICO/ICC; and be able to address staff member concerns. Follow local MTF policy regarding device selection, use, and documentation.

b. Do not pass syringes with unsheathed needles.

c. Do not recap used needles by using both hands or any other technique that involves directing the point of a needle toward any part of the body. Do not bend, break, or remove needles before disposal except to remove needles from non-disposable dental anesthetic syringes.

d. Use either a one-handed scoop technique or a mechanical device designed for holding the needle cap when recapping needles (e.g., between multiple injections and before removing from a nondisposable aspirating syringe).

e. Place used disposable syringes and needles, scalpel blades, and other sharp items (e.g., orthodontic wires, burs, endodontic files) in appropriate puncture-resistant containers located as close as feasible to the area in which the items are used.

C. Postexposure management and prophylaxis

1. Promptly report, evaluate, and document any occupational exposure incidents to blood or OPIM (including saliva, regardless of whether blood is visible) in dental settings.

a. A qualified health-care professional (i.e., a health-care provider who can provide counseling and perform all medical evaluations and procedures in accordance with the most current recommendations of the PHS, including postexposure chemotherapeutic prophylaxis when indicated) should evaluate any occupational exposure incident to blood or OPIM (including saliva, regardless of whether blood is visible) in dental settings.

b. Follow MTF policy and CDC recommendations (www.cdc.gov/ncidod/dhqp/guidelines.html) after percutaneous, mucous membrane, or nonintact skin exposure to blood or OPIM.

c. After each occupational exposure incident, review the circumstances surrounding the injury and the postexposure management plan to ensure the plan's effectiveness. Provide education and training and implement practice changes as appropriate.

CHAPTER 4

HAND HYGIENE

INTRODUCTION. Hand hygiene in health-care facilities is the most important aseptic procedure in the prevention of health-care-associated infections. Hand hygiene significantly reduces microbes on the hands and protects both patients and the dental staff. Handwashing products include plain soap and agents with antimicrobial activity. The wearing of gloves does not replace handwashing, but is an adjunct providing consistent protection from bloodborne pathogens and is required by OSHA. See Table 1 for a summary of hand hygiene techniques and indications.

KEY TERMS

Alcohol-based hand rub*:* an alcohol-containing preparation designed for application to the hands for reducing the number of viable microorganisms on the hands. In the United States, such preparations usually contain 60%–95% ethanol or isopropanol. These are waterless antiseptic agents not requiring the use of exogenous water. After applying such an agent, the hands are rubbed together until the agent has dried.

Antimicrobial soap*:* a soap (i.e., detergent) containing an antiseptic agent.

Antiseptic handwash*:* Washing hands with water and soap or detergents containing an antiseptic agent.

Antiseptic hand rub*:* The process of applying an antiseptic hand-rub product to all surfaces of the hands to reduce the number of microorganisms present.

Artificial nails*:* substances or devices applied or added to the natural nails to augment or enhance the wearer's own nails. They include, but are not limited to, bondings, tips, wrappings, and tapes.

Handwashing*:* washing hands with plain (non-antimicrobial) soap and water.

Hand hygiene*:* General term that applies to handwashing, antiseptic handwash, antiseptic hand rub, or surgical hand antisepsis.

Oral surgical procedure*:* involves the incision, excision, or reflection of tissue that exposes normally sterile areas of the oral cavity. Examples include biopsy, periodontal surgery, apical surgery, implant surgery, and surgical extractions of teeth (e.g., removal of erupted or nonerupted tooth requiring elevation of mucoperiosteal flap, removal of bone or sectioning of tooth, and suturing if needed).

Persistent activity*:* the prolonged or extended activity that prevents or inhibits the proliferation or survival of microorganisms after application of the product. This activity can be demonstrated by sampling a site minutes or hours after application and demonstrating bacterial antimicrobial effectiveness when compared with a baseline level. Previously, this property was sometimes termed *residual activity*.

Plain or non-antimicrobial soap*:* soap or detergent that does not contain antimicrobial agents or contains very low concentrations of such agents that are effective solely as preservatives.

Resident flora*:* species of microorganisms that are always present on or in the body; not easily removed by mechanical friction.

Surgical hand antisepsis*:* antiseptic handwash or antiseptic hand rub performed preoperatively by surgical personnel to eliminate transient and reduce resident hand flora. Antiseptic detergent preparations often have persistent antimicrobial activity.

Transient flora*:* microorganisms that may be present in or on the body under certain conditions and for certain lengths of time; more amenable to removal by mechanical friction than resident flora.

A. General Recommendations

1. Perform hand hygiene with either a nonantimicrobial or antimicrobial soap and water when hands are visibly dirty or contaminated with blood or OPIM. If hands are not visibly soiled, an alcohol-based hand rub can also be used. Follow the manufacturer's instructions.

2. Indications for hand hygiene include

   a. when hands are visibly soiled;

   b. after barehanded touching of inanimate objects likely to be contaminated by blood, saliva, or respiratory secretions;

   c. before and after treating each patient (e.g., before glove placement and after glove removal) and before leaving any patient-care (e.g., dental operatory, radiology), laboratory or instrument processing area;

   d. before donning gloves; and

   e. immediately after removing gloves.

3. For oral surgical procedures, perform surgical hand antisepsis before donning sterile surgeon's gloves. Follow the manufacturer's instructions by using either an antimicrobial soap and water, or soap and water followed by drying

hands and application of an alcohol-based surgical hand-scrub product with persistent activity.

4. Store liquid hand-care products in either disposable closed containers or closed containers that can be washed and dried before refilling. Do not add soap or lotion to (i.e., top off) a partially empty dispenser.

B. Special Considerations for Hand Hygiene and Glove Use

1. Use MTF-approved hand lotions to prevent skin dryness associated with handwashing.

2. Consider the compatibility of lotion and antiseptic products (e.g., alcohol-based hand rubs, antimicrobial soaps) and the effect of petroleum or other oil emollients on the integrity of gloves during product selection and glove use. Petroleum-based products can cause breakdown of latex gloves.

3. Lotions should be dispensed in small, individual-use containers or pump dispensers that are not opened or refilled to reduce contaminants and bacterial growth.

4. Keep fingernails short with smooth, filed edges to allow thorough cleaning and prevent glove tears. Long nails make glove placement more difficult and may result in glove perforation. Follow MTF policy regarding artificial fingernails. Use of artificial fingernails is usually not recommended.

5. Chipped nail polish can harbor bacteria. Unchipped nail polish on short natural nails is acceptable.

6. Do not wear hand or nail jewelry if it makes donning gloves more difficult or compromises the fit and integrity of the glove.

7. All cases of hand dermatitis should be evaluated for treatment and follow-up. If open sores or weeping dermatitis exists, refrain from direct patient contact and handling of patient-care equipment until the condition is resolved.

Table 1: Hand-Hygiene Methods and Indications

Methods	Agent	Technique	Duration (minimum)	Indications
Routine handwash	Water and non-antimicrobial detergent (e.g., plain soap*)	- Wet hands and wrists under cool running water - Dispense handwashing agent sufficient to cover hands and wrists	15 seconds	- When visibly soiled† - After barehanded touching of inanimate objects likely to be contaminated by blood or saliva - Before and after treating each patient (e.g., before glove placement and after glove removal) - Before leaving patient-care, laboratory, or instrument processing areas - Before regloving after removing gloves that are torn, cut, or punctured
Antiseptic handwash	Water and antimicrobial agent/detergent (e.g., chlorhexidine, iodine and iodophors, chloroxylenol [PCMX], triclosan)	- Rub the agent into all areas, with particular emphasis around nails and between fingers, before rinsing with cool water - Dry hands completely with disposable towels before donning gloves - Use a towel to turn off the faucet if automatic controls are not available		
Antiseptic hand rub	Alcohol-based hand rub†	- Apply the product to palm of one hand - Rub hands together, covering all surfaces of hands and fingers, until hands are dry† - Follow manufacturer's recommendations regarding volume of product to use	Rub hands until the agent is dry†	
Surgical antisepsis	Water and antimicrobial agent/detergent (e.g., chlorhexidine, iodine and iodophors, chloroxylenol [PCMX], triclosan)	- Remove rings, watches, and bracelets - Remove debris from underneath fingernails using a nail cleaner under running water - Wet hands and wrists under cool running water - Using an antimicrobial agent, scrub hands and forearms for the length of time recommended by the manufacturer's instructions before rinsing with cool water - Dry hands completely (using a sterile towel is ideal) before donning sterile surgeon's gloves	2–6 minutes	- Before donning sterile, surgeon's gloves for oral surgical procedures
	Water and non-antimicrobial detergent (e.g., plain soap*) followed by an alcohol-based surgical hand-scrub product with persistent activity	Follow manufacturer instructions for surgical hand-scrub product with persistent activity	Follow manufacturer instructions for surgical hand-scrub product with persistent activity	

* Pathogenic organisms have been found on or around bar soap during and after use. Use of liquid soap with hands-free dispensing controls is preferable.
† 60%–95% ethanol or isopropanol. Alcohol-based hand rubs **should not** be used in the presence of visible soil or organic material. If using an alcohol-based hand rub, apply adequate amount to palm of one hand and rub hands together, covering all surfaces of the hands and fingers, until hands are dry. Follow manufacturer's recommendations regarding the volume of product to use. If hands feel dry after rubbing hands together for 10–15 seconds, an insufficient volume of product likely was applied. The drying effect of alcohol can be reduced or eliminated by adding 1%–3% glycerol or other skin-conditioning agents.

CHAPTER 5

PERSONAL PROTECTIVE EQUIPMENT

INTRODUCTION. Personal protective equipment (PPE) is designed to protect the skin and the mucous membranes of the eyes, nose, and mouth of DHCP from exposure to blood or OPIM. Use of PPE is dictated by the exposure risk posed by the procedure, not by the known or suspected serologic status of the patient. Primary PPE used in health-care settings includes gloves, surgical masks, protective eyewear, face shields, and protective clothing (e.g., long-sleeved gowns, jackets). Shoe and head covers are less frequently used types of PPE, but should be considered if contamination is likely.

KEY TERMS

OPIM (Other Potentially Infectious Materials)*:* an OSHA term that refers to the following human body fluids: (1) Saliva in dental procedures, semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Oral surgical procedure*:* involves the incision, excision, or reflection of tissue that exposes normally sterile areas of the oral cavity. Examples include biopsy, periodontal surgery, apical surgery, implant surgery, and surgical extractions of teeth (e.g., removal of erupted or nonerupted tooth requiring elevation of mucoperiosteal flap, removal of bone or sectioning of tooth, and suturing if needed).

Personal protective equipment (PPE)*:* specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., scrub suits, uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment. The type and characteristics of PPE will depend upon the task and degree of exposure anticipated.

Spatter*:* visible drops of liquid or body fluid that are expelled forcibly into the air and settle out quickly, as distinguished from particles of an aerosol, which remain airborne indefinitely.

A. General Recommendations

1. Wear scrub suits during patient-care and instrument processing activities. Military uniforms or civilian clothing, supplemented with a clinic smock or laboratory coat, may be worn if spray or spatter of blood or OPIM is not anticipated (e.g., dental exams or radiology procedures).

2. Ensure the appropriate military uniform is available for the duty day.

3. Supplement scrub suits with PPE when exposure to blood or OPIM is reasonably anticipated.

4. Uncontaminated scrub suits may be worn in designated areas according to local policy.

B. Personal Protective Equipment

1. Masks and Protective Eyewear

   a. Wear a surgical mask and eye protection with solid side shields (e.g., glasses, face shield) to protect mucous membranes of the eyes, nose, and mouth during procedures likely to generate splashing or spattering of blood or other body fluids. Protective eyewear meeting American National Standards Institute Standard Z87.1-1989 is encouraged, although not required to meet OSHA standards.

   b. Change masks between patients, or during patient treatment if the mask becomes wet.

   c. Clean with soap and water, or if visibly soiled, clean and disinfect reusable facial protective equipment (e.g., clinician and patient protective eyewear, face shields) between patients.

2. Head and Shoe Covers

   a. The use of shoe covers is optional, but should be considered when contamination of footwear is anticipated (e.g., surgical procedures where unusually heavy bleeding may be anticipated [e.g., maxillofacial reconstructive surgery, trauma surgery]).

   b. The use of head covers is optional, but should be considered when exposure to blood and OPIM in the form of

droplet, spray, and spatter are anticipated. Situations that meet these criteria include, but are not limited to, the following: sonic or ultrasonic scaling; surgical procedures using rotary or ultrasonic instrumentation; and manual decontamination of dental instruments where spray and spatter may be generated.

3. Protective Clothing

a. Wear protective clothing (e.g., long-sleeved reusable or disposable gown, clinic jacket, laboratory coat) that covers clothing and skin (e.g., forearms) likely to be soiled with blood, saliva, or OPIM. PPE does not have to be fluid impervious or fluid resistant to meet OSHA standards, but must prevent contamination of clothing or skin. For dental procedures, cotton or cotton/polyester laboratory coats or clinic jackets are satisfactory.

b. Procedures likely to result in spattering of blood or OPIM that require the use of long-sleeved protective clothing include but are not limited to, the following: the use of high- or low-speed handpieces or sonic or ultrasonic scalers; manipulation with sharp cutting instruments during periodontal and prophylaxis treatments; spraying water and air into a patient's mouth; oral surgical procedures; and manual instrument cleaning.

c. Change protective clothing if visibly soiled; change immediately or as soon as feasible if penetrated by blood or other potentially infectious fluids.

d. Remove barrier protection, including gloves, mask, eyewear, and gown before departing the work area (e.g., patient-care, instrument processing, or laboratory areas). Work area definitions may vary depending on local policy.

4. Gloves

a. Wear medical gloves (i.e., surgeon's or patient examination gloves) when a potential exists for contacting blood, saliva, OPIM, or mucous membranes.

b. Wear a new pair of medical gloves for each patient, remove them promptly after use, and wash hands immediately to avoid transfer of microorganisms to other patients or the environment.

c. Remove gloves that are torn, cut, or punctured as soon as feasible and wash hands before regloving.

d. Do not wash medical gloves before use or wash, disinfect, or sterilize gloves for reuse.

e. Ensure that appropriate gloves in the correct size are readily accessible.

f. Use appropriate gloves (e.g., puncture- and chemical-resistant utility gloves) when cleaning instruments and performing housekeeping tasks involving contact with blood or OPIM.

g. Consult with glove manufacturers regarding the chemical compatibility of glove material and dental materials used.

5. Sterile Surgeon's Gloves and Double Gloving During Oral Surgical Procedures (see Chapter 9)

a. Wear sterile surgeon's gloves when performing oral surgical procedures.

b. No recommendation is offered regarding the effectiveness of wearing two pairs of gloves to prevent disease transmission during oral surgical procedures. However, the majority of studies among health-care personnel (HCP) and DHCP have demonstrated a lower frequency of inner glove perforation and visible blood on the surgeon's hands when double gloves are worn; however, the effectiveness of wearing two pairs of gloves in preventing disease transmission has not been demonstrated.

C. Storage and Laundry

1. Scrub suits that have not been exposed to spray and spatter-containing blood or OPIM are not considered to be contaminated laundry. Uncontaminated clothing may be stored in personal lockers or offices for short periods of time during work hours (e.g., lunch breaks).

2. Launder scrub suits and reusable PPE that are visibly soiled with blood or OPIM or have been exposed to contaminated spray and spatter (PPE is considered contaminated in such instances even if no visible evidence of contamination is evident) at the expense of the MTF.

3. Turn in soiled linen at the end of the work period. Do not store contaminated clothing or PPE in personal clothing lockers or offices.

4. Place contaminated laundry in an appropriately marked container in accordance with MTF guidance.

a. Wear gloves and other appropriate PPE when handling contaminated laundry.

b. If contaminated laundry is wet, bags or containers must prevent leakage or soak-through.

c. Do not sort laundry in the clinic after it has been placed in containers for shipment to the laundry facility.

d. Disposable PPE that is not heavily contaminated with blood or OPIM is not considered by OSHA to be regulated medical waste. Disposal procedures may vary depending on local policy.

CHAPTER 6

STERILIZATION PROCEDURES

INTRODUCTION. Instrument processing requires multiple steps. Sterilization is a complex process requiring specialized equipment, adequate space, qualified DHCP who are provided with initial and ongoing training, and regular monitoring for quality assurance. Correct cleaning, packaging, sterilizer loading procedures, sterilization methods, or high-level disinfection methods are essential to ensure that an instrument is adequately processed and safe for reuse on patients.

KEY TERMS

Autoclave*:* an instrument for sterilization that uses moist heat under pressure.

Biological indicator*:* a device to monitor the sterilization process that consists of a standardized population of bacterial spores known to be resistant to the mode of sterilization being monitored. Biological indicators indicate that all the parameters necessary for sterilization were present.

Chemical indicator*:* a device to monitor the sterilization process that changes color or form when exposed to one or more of the physical conditions within the sterilizing chamber (e.g., temperature, steam). Chemical indicators are intended to detect potential sterilization failures that could result from incorrect packaging, incorrect loading of the sterilizer, or malfunctions of the sterilizer. A "pass" response does not verify that the items are sterile.

Chemical sterilant*:* chemicals used for the purpose of destroying all forms of microbial life including bacterial spores.

Chemical vapor sterilizer (chemiclave)*:* an instrument for sterilization that uses hot formaldehyde vapors under pressure.

Cleaning*:* the removal of visible soil, organic and inorganic contamination from a device or surface, using either the physical action of scrubbing with a surfactant or detergent and water or an energy-based process (e.g., ultrasonic cleaners) with appropriate chemical agents.

Control biological indicator*:* a biological indicator from the same lot as a test indicator that is left unexposed to the sterilization cycle and then incubated to verify the viability of the test indicator. The control indicator should yield positive results for bacterial growth.

Critical*:* the category that describes medical devices or instruments that are introduced directly into the human body, either into or in contact with the bloodstream or normally sterile areas of the body (e.g., surgical scalpel). These items are so called because of the substantial risk of acquiring infection if the item is contaminated with microorganisms at the time of use.

Disinfectant*:* a chemical agent used on inanimate (i.e., nonliving) objects (e.g., floors, walls, sinks) to destroy virtually all recognized pathogenic microorganisms, but not necessarily all microbial forms (e.g., bacterial endospores). The EPA groups disinfectants on whether the product label claims it to be a "limited," "general" or "hospital" disinfectant.

Disinfection*:* destruction of pathogenic and other kinds of microorganisms by physical or chemical means. Disinfection is less lethal than sterilization, because it destroys the majority of recognized pathogenic microorganisms, but not necessarily all microbial forms (e.g., bacterial spores). Disinfection does not ensure the degree of safety associated with sterilization processes.

Dry heat sterilizer*:* an instrument for sterilization that uses heated air.

Event-related packaging/shelf life*:* a storage practice that recognizes that a package and its contents remain sterile until some event (e.g., the packaging becomes wet or torn) causes the item(s) to become contaminated.

Flash sterilization*:* process designed for the steam sterilization of unwrapped patient-care items for immediate use. Currently, the time required for flash sterilization depends on the type of sterilizer and the type of item (i.e., porous vs. non-porous items).

High-level disinfection*:* a disinfection process that inactivates vegetative bacteria, mycobacteria, fungi, and viruses but not necessarily high numbers of bacterial spores. The FDA further defines a high-level disinfectant as a sterilant used under the same contact conditions except for a shorter contact time.

Hospital disinfectant*:* a germicide that is registered by the EPA for use on inanimate objects in hospitals, clinics, dental offices, or any other medical-related facility. Efficacy has been demonstrated against *Salmonella choleraesuis, Staphylococcus aureus,* and *Pseudomonas aeruginosa.*

Implantable device*:* according to the Food and Drug Administration (FDA), a "device that is placed into a surgically or naturally formed cavity of the human body if it is intended to remain there for a period of 30 days or more" [21 CFR 812.3(d)].

Intermediate-level disinfectant*:* for purposes of this document, a liquid chemical germicide with an EPA-registration number as hospital disinfectant and with a label claim of potency as a tuberculocidal.

Low-level disinfectant*:* for purposes of this document, a liquid chemical germicide registered by the EPA as a hospital disinfectant.

Mechanical indicator*:* devices (e.g., gauges, meter, display, printout) that display an element of the sterilization process (e.g., time, temperature, pressure).

Noncritical*:* the category that describes medical items or surfaces that carry the least risk of disease transmission. This category has been expanded to include not only noncritical medical devices but also

environmental surfaces. Noncritical medical devices (e.g., blood pressure cuff) touch only unbroken (intact) skin. Noncritical environmental surfaces can be further divided into clinical contact surfaces (e.g., light handle) and housekeeping surfaces (e.g., floors).
Semicritical*:* the category that describes medical devices or instruments (e.g., mouth mirror) that come into contact with mucous membranes and do not ordinarily penetrate body surfaces.
Spore test*:* see biological indicator
Sterile/sterility*:* state of being free from all living microorganisms. In practice, usually described as a probability function, (e.g., the probability of a surviving microorganism being 1 in 1,000,000).
Sterilization*:* the use of a physical or chemical procedure to destroy all microorganisms, including large numbers of resistant bacterial spores.
Ultrasonic cleaner*:* a device that removes debris by a process called cavitation, in which waves of acoustic energy are propagated in aqueous solutions to disrupt the bonds that hold particulate matter to surfaces.
Washer-disinfector*:* an automatic unit designed to clean and thermally disinfect instruments. The unit uses a high-temperature cycle rather than a chemical bath.

A. GENERAL RECOMMENDATIONS

1. Use only FDA-cleared medical devices for sterilization and follow the manufacturer's instructions for correct use (e.g., cycle lengths, operating parameters).

   a. The following methods of heat sterilization are acceptable in USAF dental clinics: steam autoclave (either gravity displacement or prevacuum type); unsaturated chemical vapor sterilizer (chemiclave); or dry heat sterilizers (either static or forced air).

   b. Select a sterilization method compatible with items and packaging materials to be sterilized.

   c. Assure that scheduled maintenance and calibration are performed on all decontamination and sterilization equipment according to manufacturer recommendations and MTF guidance.

2. Clean and heat-sterilize critical and semicritical dental instruments before each use.

   a. If heat-sensitive items must be used, FDA-cleared sterilant/high-level disinfectants (e.g., hydrogen peroxide based products, peracetic acid) or an FDA-cleared low-temperature sterilization method (e.g., ethylene oxide) must be used. Using heat-sensitive semicritical items that must be processed with liquid chemical germicides is discouraged; heat-tolerant or disposable alternatives are available for the majority of such items.

   b. Follow manufacturer instructions for use of chemical sterilants/high-level disinfectants.

   c. Do not use intermediate or low-level disinfectants intended for use on environmental surfaces to clean and disinfect dental instruments.

   d. Ethylene oxide sterilization is acceptable for use on heat-sensitive dental instruments (excluding dental handpieces or other devices with narrow-bore lumens or lubricated parts) where this modality is available through the MTF Central Sterile Services (CSS). Do not install ethylene oxide sterilization equipment in dental clinics.

3. Clean, lubricate, and heat-sterilize all dental handpieces, including prophy angles (unless disposable) and motors between patients according to manufacturer instructions.

4. Arrange packs loosely in the sterilization chamber; do not overload. Open or disassemble hinged or other complex instruments to permit exposure to sterilizing agents.

5. To avoid contamination, allow packages to dry in the sterilizer before they are handled.

6. Single-use disposable instruments are acceptable alternatives if they are used only once and disposed of correctly.

7. Do not use liquid chemical sterilants/high-level disinfectants for environmental surface disinfection or as holding solutions.

8. Ensure that noncritical patient-care items are barrier-protected or cleaned, or if visibly soiled, cleaned and disinfected after each use with an EPA-registered hospital disinfectant with a tuberculocidal claim (i.e., intermediate level).

9. Inform DHCP of all OSHA guidelines for exposure to chemical agents used for disinfection and sterilization.

B. Instrument Processing Area

1. Designate a central processing area. Divide the instrument processing area, physically or, at a minimum, spatially,

into distinct areas for: receiving, cleaning, and decontamination; preparation and packaging; sterilization; and storage. Do not store sterile or clean instruments in an area where contaminated instruments are held or cleaned.

2. Train DHCP to use work practices that prevent contamination of clean areas.

3. If centralization of instrument processing activities cannot be accomplished due to space, equipment, or manpower limitations, contact DECS for assistance in developing programs for central instrument processing and before beginning any renovations.

C. Receiving, Cleaning, and Decontamination Work Area

1. The decontamination process should be physically separate from dental treatment areas and ideally from other instrument processing functions.

2. Wear puncture- and chemical-resistant heavy-duty utility gloves for instrument cleaning and decontamination procedures.

3. Wear a mask, protective eyewear, and gown when splashing or spraying is anticipated during cleaning. Head and shoe covers may be indicated if required by MTF policy under certain conditions (e.g., manually cleaning instruments).

4. Minimize handling of loose contaminated instruments during transport to the instrument processing area. Use work-practice controls (e.g., carry instruments in a puncture-resistant covered container that is red or labeled with the biohazard symbol) to minimize exposure potential.

5. Clean all visible blood and other contamination from dental instruments and devices before sterilization or disinfection procedures. The use of holding solutions (e.g., enzymatic cleaner/detergent solution) are optional, but should be considered to prevent hardening of bioburden until dental instruments are ready for processing.

6. Use automated cleaning equipment (e.g., ultrasonic cleaner, instrument washer, washer-disinfector) to remove debris to improve cleaning effectiveness and decrease worker exposure to blood and OPIM. Follow manufacturer instructions for use and maintenance.

a. Use PPE and work-practice controls that minimize contact with sharp instruments if manual cleaning is necessary (e.g., long-handled brush).

b. Table-top ultrasonic cleaning equipment should be periodically tested according to manufacturer instructions. In the absence of manufacturer instructions, a generic test method can be used (see Box 1).

D. Preparation and Packaging

1. Use an FDA-cleared container system or wrapping compatible with the type of sterilization process used.

2. Use an internal chemical indicator in each package. If the internal indicator cannot be seen from the outside of the package, also use an external indicator.

3. Before sterilization of critical and semicritical instruments, inspect instruments for cleanliness, then wrap or place them in packages (e.g., wrapped cassettes, peel pouches) designed to maintain sterility during storage.

4. Label packages with the following:

a. sterilizer identification number;

b. load number;

c. operator's initials; and

d. an indefinite shelf-life label (e.g., one labeled with "indefinite shelf life unless integrity of the package is compromised) with the date of sterilization (to facilitate the retrieval of processed items in the event of a sterilization failure). If using time-related shelf-life policies, place the expiration date on the package.

5. Use of self-adhesive labels or tapes is preferred. Markers used for labeling should be indelible, nonbleeding, and nontoxic. Felt-tip ink pens or a very soft lead pencil may be used. Do not write on paper or cloth wrapping materials. Peel packages may be labeled on the plastic portion or on the self-sealing tab.

6. To avoid contamination, allow packages to dry in the sterilizer before they are handled.

E. Sterilization of Unwrapped Instruments
Some tabletop sterilizers have “unwrapped” instrument cycles and some dry heat sterilization equipment cannot accommodate packaging materials. This should not be confused with flash sterilization cycles, which are usually shorter in duration than the “unwrapped” cycles.

1. Clean and dry instruments before the unwrapped sterilization cycle.

2. Use mechanical and chemical indicators for each unwrapped sterilization cycle (i.e., place an internal chemical indicator among the instruments or items to be sterilized).

3. To avoid contamination and thermal injury, allow unwrapped instruments to dry and cool in the sterilizer before they are handled.

4. Semicritical instruments that will be used immediately or within a short time can be sterilized unwrapped on a tray or in a container system, provided that the instruments are handled aseptically during removal from the sterilizer and transport to the point of use.

5. Critical instruments intended for immediate reuse can be sterilized unwrapped if the instruments are maintained sterile during removal from the sterilizer and transport to the point of use (e.g., transported in a sterile covered container).

6. Do not sterilize implantable devices unwrapped.

7. For future sterilization equipment purchases, consult DECS before purchasing any sterilization equipment that cannot accommodate commonly used packaging materials (e.g., paper and plastic peel pouches, paper or cloth wrapping materials).

F. Flash Sterilization Cycles
1. Do not use flash sterilization for reasons of convenience, as an alternative to purchasing additional instrument sets, or to save time.

2. Clean and dry instruments before the flash sterilization cycle.

3. Do not package or wrap instruments used during flash sterilization unless the sterilizer is specifically designed and labeled for this use.

4. Use mechanical, chemical, and biological indicators for each flash sterilization cycle.

5. To avoid contamination and thermal injury, allow instruments to dry and cool in the sterilizer before they are handled.

6. Critical instruments intended for immediate reuse can undergo flash sterilization if the instruments are maintained sterile during removal from the sterilizer and transport to the point of use (e.g., transported in a sterile covered container).

7. Semicritical instruments that will be used immediately or within a short time can undergo flash sterilization on a tray or in a container system, provided that the instruments are handled aseptically during removal from the sterilizer and transport to the point of use.

8. Do not flash-sterilize implantable devices.

G. Sterilization Monitoring
1. Use mechanical, chemical, and biological (i.e., spore test) monitors according to manufacturer instructions to ensure the effectiveness of the sterilization process. Indicators must be specifically designed for the sterilization process (i.e., steam, dry heat, chemical vapor).

2. Monitor each load with mechanical (e.g., time, temperature, and pressure) and chemical indicators.

3. Use an internal chemical indicator in each package. If the internal indicator cannot be seen from the outside of the package, also use an external indicator. Autoclave, chemical vapor, and dry heat adhesive sterilization (indicator)

tapes are acceptable for use only as external indicators because they only demonstrate that the package has been exposed to heat.

4. Do not use instrument packs if mechanical or chemical indicators indicate inadequate processing.

5. Perform air removal testing (e.g., Bowie-Dick test or equivalent) on prevacuum steam autoclaves according to manufacturer instructions.

6. Monitor sterilizers at least weekly **<u>or as directed by MTF policy</u>** by using a biological indicator (i.e., spore test) with a matching control (i.e., biological indicator and control from same lot number). This includes sterilizers considered ready to use but in a "back-up" mode. Follow biological indicator and sterilizer manufacturer instructions. (Note: The dental clinic should be spore testing on the same frequency as the MTF to meet JCAHO requirements.)

a. Sterilizers that are not being spore tested should be tagged "NOT IN SERVICE" and cannot be used until they have provided three consecutive negative spore tests.

b. If the sterilizer is used for multiple types of cycles (e.g., wrapped items, flash-sterilized items), test each sterilization mode.

c. Ensure the type of biological spore indicator selected is appropriate for the sterilization process being monitored (e.g., *Geobacillus stearothermophilus* [steam or chemical vapor] or *Bacillus atrophaeus* [dry heat]) and is used according to manufacturer instructions (e.g., proper location in the sterilizer).

d. Only use biological indicators that contain spores. Items labeled with the statement "equivalent to biological indicators" (or similar wording), enzyme tablets, or integrating indicators that do not contain spores are not acceptable methods of biological monitoring in USAF facilities. Consult DECS if further information is required.

e. Rapid-readout biological indicators that contain spores and have enzyme-based early readout capability (e.g., test results at 1 or 3 hours) are acceptable when the following conditions are met:

- The biological indicator is used within an appropriate challenge test pack.

- Mechanical and chemical monitoring processes are performed.

- The performance of the sterilization process is periodically verified on at least a weekly basis, including the use of a control biological indicator. The periodic verification may be either continued incubation of the biological indicator with enzyme-based early-readout capability (according to manufacturer instructions) or the use of a conventional biological indicator.

- Do not use rapid readout biological indicators for the following: during initial installation testing of steam sterilizers; after sterilizer relocation; after sterilizer malfunction; after sterilization process failures; and after any major repairs of the sterilizer. Since conventional biological indicators must be used in these instances, maintain a conventional incubator in the facility.

7. Use a biological indicator for every sterilizer load that contains an implantable device. Whenever possible, verify results before using the implantable device.

8. The following are recommended in the case of a positive spore test (or as directed by MTF policy):

a. Notify the dental ICO/NCOIC, medical equipment repair personnel, and MTF ICO per MTF policies. Secure the sterilizer to prevent further use. Items other than implantable devices do not necessarily need to be recalled.

b. Remove the sterilizer from service and review sterilization procedures (e.g., work practices and use of mechanical and chemical indicators) to determine if operator error could be responsible.

c. Retest the sterilizer by using biological, mechanical, and chemical indicators after correcting any identified procedural problems.

d. If the repeat spore test is negative, and mechanical and chemical indicators are within normal limits, the sterilizer may be returned to service.

9. The following are recommended if the repeat spore test is positive:

a. Do not use the sterilizer until it has been inspected or repaired or the exact reason for the positive test has been determined.

b. To the extent possible, recall and reprocess all items processed since the last negative spore test.

c. After the cause of the sterilizer failure has been determined and corrected, rechallenge the sterilizer with biological indicator tests in three consecutive empty chamber sterilization cycles before placing the sterilizer back in service.

10. Maintain sterilization records (i.e., mechanical, chemical, and biological) for a period dictated by local statutes and MTF policy or two years, whichever is longer. Minimum documentation includes:

a. date and time of test;

b. sterilizer identification number;

c. sterilizing conditions - temperature and exposure period (automated printout documentation is acceptable, if available);

d. the individual conducting the test;

e. results of the test and control; and

f. nature and date of any malfunctions or repairs.

11. Report spore testing results to the MTF ICC/ICRF in the format and on a schedule dictated by MTF policy.

H. Storage Area for Sterile/Clean Dental Supplies and Transport

1. Implement practices on the basis of event-related or time-related shelf-life for storage of wrapped, sterilized instruments and devices. Label packages as discussed in the *Preparation and Packaging* section.

2. Examine wrapped packages of sterilized instruments before opening them to ensure the barrier wrap has not been compromised during storage.

3. Reclean, repack, and resterilize any instrument package that has been compromised (e.g., dropped, torn, or wet).

4. Store sterile items and dental supplies in clean, dry, and dust/lint-free areas with limited access. Covered or closed cabinets are recommended. If sterile items are stored in a patient-care area (e.g., dental operatory), they must be in covered or closed cabinets.

5. Do not store sterile supplies or patient-care items under the sink (or any location where they may become wet), on the floor, windowsills, or any area other than designated shelving or cabinets.

6. Do not store sterile items with items not intended for clinical use (e.g., office supplies, cleaning supplies).

7. As a general rule, keep like items together (i.e., sterile with sterile and clean with clean). However, sterile and non-sterile patient treatment items may be stored in the same drawers or cabinets, as long as there is no possibility of similar nonsterile items being used inadvertently when sterility is required (e.g., sterile and nonsterile gauze sponges stored in the same drawer or cabinet).

8. To allow for adequate air circulation, ease of cleaning, and compliance with local fire codes, follow MTF guidelines when storing clean and sterile materials. In the absence of such guidance store clean and sterile materials at least 8 to 10 inches above the floor, 18 inches below the ceiling, and 2 inches from the outside walls.

9. Maintain stock rotation according to the principle “first in, first out” so that older items are used first, thus preventing waste due to expiration.

10. Only handle packages when absolutely necessary. Inventory control should involve minimal handling of supplies.

11. Do not use shipping cartons to dispense sterile or clean patient treatment items in dental operatories, laboratories, instrument processing, and supply areas.

12. Sterile supplies should be transported in a covered or enclosed cart. Carts should be decontaminated and dried prior to being used for transporting sterile supplies.

Box 1: Ultrasonic Cleaner Test Procedure

The aluminum foil test is a simple and fast method to check for an even distribution of the cleaning power in an ultrasonic cleaner. In the absence of manufacturer's recommendations, the following procedure can be used:

1. Using standard lightweight or regular household aluminum foil, cut a piece of foil to fit the width of the cleaner chamber. For example: A tank with dimensions of 9 inches long by 5 inches wide by 4 inches deep would require a foil sample measuring 9 inches by 5 inches.

2. Prepare a fresh solution of ultrasonic cleaning solution and fill the tank according to the manufacturer's instructions. Do not turn the heater on for the test.

3. Insert the foil vertically into the cleaner chamber, with the length of the foil running the length of the chamber and the bottom of the foil about one inch above the bottom.

4. Holding the foil as steady as possible, turn on the ultrasonic cleaning unit for 20-60 seconds (if the unit is supplied with a high/low switch, it should be set in the high position).

5. With a properly functioning unit, the entire foil surface will be uniformly "peppered" (covered with a tiny pebbling effect). If areas greater than ½ Inch Square show no pebbling, the unit may require servicing.

CHAPTER 7

ENVIRONMENTAL INFECTION CONTROL

INTRODUCTION: Environmental surfaces (i.e., a surface or equipment that does not contact patients directly) can become contaminated during patient care. Certain surfaces, especially ones touched frequently (e.g., light handles, unit switches, and drawer knobs) can serve as reservoirs of microbial contamination, although they have not been associated directly with transmission of infection to either DHCP or patients. Transfer of microorganisms from contaminated environmental surfaces to patients occurs primarily through DHCP hand contact. When these surfaces are touched, microbial agents can be transferred to instruments, other environmental surfaces, or to the nose, mouth, or eyes of workers or patients. Although hand hygiene is key to minimizing this transferal, barrier protection or cleaning and disinfecting environmental surfaces also protects against health-care-associated infections. Although the scientific evidence supports the use of low-level disinfectants if certain conditions are met (i.e., the product has both HIV- and HBV-label claims, the surface is not visibly contaminated with blood), for reasons of convenience USAF dental clinics will continue to use products with a higher degree of potency (i.e., intermediate-level disinfectant products) on environmental surfaces to cover all situations.

KEY TERMS

Barrier material*:* material that prevents the penetration of microorganisms, particulates, and fluids. Barrier choices range from inexpensive plastic food wrap to commercially available custom-made covers.

Cleaning*:* the removal of visible soil, organic, and inorganic contamination from a device or surface, using either the physical action of scrubbing with a surfactant or detergent and water or an energy-based process (e.g., ultrasonic cleaners) with appropriate chemical agents.

Clinical contact surface*:* a surface contaminated from patient materials either by direct spray or spatter generated during dental procedures or by contact with DHCP's gloved hands. These surfaces can subsequently contaminate other instruments, devices, hands, or gloves. Examples of such surfaces include: light handles, switches, dental radiograph equipment, dental chairside computers, reusable containers of dental materials, drawer handles, faucet handles, countertops, pens, telephones, and doorknobs.

Critical*:* the category that describes medical devices or instruments that are introduced directly into the human body, either into or in contact with the bloodstream or normally sterile areas of the body (e.g. surgical scalpel). These items are so called because of the substantial risk of acquiring infection if the item is contaminated with microorganisms at the time of use.

Disinfectant*:* a chemical agent used on inanimate (i.e., nonliving) objects (e.g., floors, walls, sinks) to destroy virtually all recognized pathogenic microorganisms, but not necessarily all microbial forms (e.g., bacterial endospores). The EPA groups disinfectants on whether the product label claims it to be a "limited," "general'" or "hospital" disinfectant.

Disinfection*:* the destruction of pathogenic and other kinds of microorganisms by physical or chemical means. Disinfection is less lethal than sterilization, because it destroys most recognized pathogenic microorganisms, but not necessarily all microbial forms, such as bacterial spores. Disinfection does not ensure the margin of safety associated with sterilization processes.

High-level disinfection*:* a disinfection process that inactivates vegetative bacteria, mycobacteria, fungi, and viruses but not necessarily high numbers of bacterial spores. The FDA further defines a high-level disinfectant as a sterilant used under the same contact conditions except for a shorter contact time.

Hospital disinfectant*:* a germicide that is registered by EPA for use on inanimate objects in hospitals, clinics, dental offices, or any other medical-related facility. Efficacy has been demonstrated against *Salmonella choleraesuis*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*.

Intermediate-level disinfection*:* a disinfection process that inactivates vegetative bacteria, most fungi, mycobacteria, and most viruses (particularly the enveloped viruses) but not bacterial spores.

Intermediate-level disinfectant*:* for purposes of this document, a liquid chemical germicide with an EPA-registration number as hospital disinfectant and with a label claim of potency as a tuberculocidal.

Low-level disinfectant*:* for purposes of this document, a liquid chemical germicide registered by the EPA as a hospital disinfectant.

Noncritical*:* the category that describes medical items or surfaces that carry the least risk of disease transmission. This category has been expanded to include not only noncritical medical devices but also environmental surfaces. Noncritical medical devices touch only unbroken (nonintact) skin (e.g., blood pressure cuff). Noncritical environmental surfaces can be further divided into clinical contact surfaces (e.g. light handle) and housekeeping surfaces (e.g., floors).

Regulated waste*:* liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials. (Definitions may vary by locality.)

***Semicritical**:* the category that describes medical devices or instruments (e.g., mouth mirror) that come into contact with mucous membranes and do not ordinarily penetrate body surfaces.

A. General Recommendations

1. Consult the MTF ICC/ICRF regarding cleaners and disinfectants used in the dental clinic.

   a. Do not use bleach as a primary hospital-grade environmental surface disinfectant in the dental clinic. It lacks detergent properties and may be corrosive to some surfaces. Bleach may be used as an additional disinfection step if deemed necessary and approved by the ICC/ICRF.

   b. A manufacturer-recommended diluted bleach solution may be used to clean dental unit waterlines. (see Chapter 8)

2. Follow manufacturer instructions for correct use of cleaning and EPA-registered hospital disinfecting products. Consult with dental product manufacturers for compatibility of cleaners and disinfectants with equipment surfaces.

3. Do not use liquid chemical sterilants/high-level disinfectants (e.g., hydrogen peroxide based products, peracetic acid, glutaraldehydes) for disinfection of environmental surfaces (clinical contact or housekeeping).

4. Do not use low- or intermediate-level disinfectants on critical or semicritical dental instruments or materials.

5. Avoid the use of spray bottles that generate mists or aerosols (e.g., use a dispenser that generates streams or droplets or hold a towel behind the “spray” of disinfectant to minimize the spray).

6. Do not immerse gauze in disinfectants or wrap items in disinfectant-soaked gauze because the cotton fibers may inactivate the active ingredients.

7. Use PPE, as appropriate, when cleaning and disinfecting environmental surfaces. Such equipment might include gloves (e.g., puncture- and chemical-resistant utility), protective clothing (e.g., gown, jacket, or lab coat), protective eyewear, and mask. Refer to product instructions, including MSDS information, for specific precautions.

8. To facilitate daily cleaning, keep treatment areas free of unnecessary equipment and supplies.

B. Clinical Contact Surfaces

1. Use surface barriers to protect clinical contact surfaces, particularly those that are difficult to clean (e.g., switches on dental chairs) and change surface barriers between patients.

   a. Clean and disinfect surfaces between patients only when the integrity of physical barriers has been compromised or when visibly soiled.

   b. Clean and disinfect environmental surfaces that have been covered with barriers at the end of each clinical day.

2. Clean and disinfect clinical contact surfaces that are not barrier-protected by using an EPA-registered hospital disinfectant having at least intermediate-level (i.e., tuberculocidal claim) activity after each patient.

3. General cleaning and disinfection are recommended for clinical contact surfaces, dental unit surfaces, and countertops at the end of daily work activities and are required if surfaces have become contaminated since their last cleaning.

C. Housekeeping Surfaces

1. If housekeeping services are not available, clean housekeeping surfaces (e.g., floors, walls, and sinks) with a detergent and water or an EPA-registered hospital disinfectant/detergent on a routine basis, depending on the nature of the surface and type and degree of contamination, and as appropriate, based on the location in the MTF, and when visibly soiled. Clean walls, blinds, and window curtains in patient-care areas when they are visibly dusty or soiled.

D. Spills of Blood and Body Substances

1. Clean spills of blood or OPIM and decontaminate surface with an EPA-registered hospital disinfectant with low- (i.e., HBV and HIV label claims) to intermediate-level (i.e., tuberculocidal claim) activity, depending on size of spill and surface porosity. Use of commercially available spill kits is recommended.

a. Don gloves and other appropriate PPE.

b. Visible organic material should be removed with absorbent material (e.g., disposable paper towels) and discarded in a leak-proof, appropriately labeled container (e.g., color-coded or contains a biohazard label).

c. Nonporous surfaces should be cleaned and then decontaminated with either an EPA-registered hospital disinfectant effective against HBV and HIV or an EPA-registered hospital disinfectant with a tuberculocidal claim (i.e., intermediate-level disinfectant).

E. Carpet and Cloth Furnishings

1. Avoid using carpeting and cloth-upholstered furnishings in patient-care (e.g., dental operatories), laboratory, and instrument processing areas.

F. Regulated Medical Waste

1. General Recommendations

a. Follow federal, state, and local regulations for disposal of regulated medical waste (Definitions of regulated medical waste vary by locality).

b. Ensure that DHCP who handle and dispose of regulated medical waste are trained in appropriate handling and disposal methods and are informed of the possible health and safety hazards.

2. Management of Regulated Medical Waste in Dental Health-Care Facilities

a. Use a color-coded or biohazard-labeled container that prevents leakage (e.g., biohazard bag) to contain nonsharp regulated medical waste.

b. Place sharp items (e.g., needles, scalpel blades, orthodontic bands, broken metal instruments, and burs) in an appropriate sharps container (e.g., one that is puncture resistant, color-coded, and leakproof). Close the container immediately before removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.

c. Pour blood, suctioned fluids or other liquid waste carefully into a drain connected to a sanitary sewer system (preferably not handwashing sinks or unit cuspidors), if local sewage discharge requirements are met and the state has declared this an acceptable method of disposal. Wear appropriate PPE while performing this task.

CHAPTER 8

DENTAL UNIT WATER QUALITY

INTRODUCTION: Current dental water systems cannot deliver water of optimal microbiologic quality without some form of intervention by the user. The scientific literature supports the need for improvement in dental unit water quality. Improving the microbiologic quality of water used in dental treatment shows commitment to ensuring a safe and healthy environment for patients and employees.

KEY TERMS

Biofilm*:* a mass or layer of live microorganisms attached to a surface. These microorganisms colonize and replicate on the interior surfaces of waterline tubing, creating adherent microbial accumulations.

Boil-Water Advisory*:* a public health announcement that the public should boil tap water before drinking it. When issued, the public should assume the water is unsafe to drink. Advisories can be issued after 1) failure of or substantial interruption in water treatment processes that result in increased turbidity levels or particle counts and mechanical or equipment failure; 2) positive test results for pathogens (e.g., *Cryptosporidium*, *Giardia*, or *Shigella)* in water; 3) violations of the total coliform rule or the turbidity standard of the surface water treatment rule; 4) circumstances that compromise the distribution system (e.g., watermain break) coupled with an indication of a health hazard; or 5) a natural disaster (e.g., flood, hurricane, or earthquake)

Colony-forming unit (CFU)*:* the minimum number of separable cells on the surface of or in semi-solid agar medium which gives rise to a visible colony of progeny is on the order of tens of millions. CFUs may consist of pairs, chains, and clusters as well as single cells and are often expressed as colony-forming units per milliliter (CFU/mL).

Dental treatment water*:* nonsterile water used for dental therapeutic purposes, including irrigation of non-surgical operative sites and cooling of high speed rotary and ultrasonic instruments.

Distilled water*:* water heated to the boiling point, vaporized, cooled, condensed, and collected so that no impurities are reintroduced.

Heterotrophic bacteria*:* those bacteria that require an organic carbon source for growth, i.e., they derive energy and carbon from organic compounds. The modifier "mesophilic" describes bacteria that grow best within the middle ranges of environmental temperature.

Independent water reservoir*:* a container used to hold water or other solutions and supply it to handpieces and air/water syringes attached to a dental unit. The independent reservoir, which isolates the unit from the public water system, may be provided as original equipment or as a retrofit device on all modern dental units. When used with a periodic chemical treatment protocol, they have demonstrated safety and efficacy.

Oral surgical procedure*:* involves the incision, excision, or reflection of tissue that exposes normally sterile areas of the oral cavity. Examples include biopsy, periodontal surgery, apical surgery, implant surgery, and surgical extractions of teeth (e.g., removal of erupted or nonerupted tooth requiring elevation of mucoperiosteal flap, removal of bone or sectioning of tooth, and suturing if needed).

Potable (drinking) water*:* water suitable for drinking per applicable public health standards.

Retraction*:* the entry of oral fluids and microorganisms into waterlines through negative water pressure.

Sterile water*:* water that is sterilized and contains no antimicrobial agents.

A. General Recommendations

1. Use water that meets EPA regulatory standards for drinking water (i.e., ≤500 CFU/mL of heterotrophic water bacteria) for routine (i.e., non-surgical) dental treatment output water.

2. Discharge water and air for a minimum of 20–30 seconds after each patient, from any device connected to the dental water system that enters the patient's mouth (e.g., handpieces, ultrasonic scalers, and air/water syringes).

3. Consult with the dental unit manufacturer on the need for periodic maintenance of antiretraction mechanisms.

4. Clean high-volume evacuator and low-volume suction lines and traps daily using an evacuation system cleaner. Follow manufacturer instructions.

B. Maintaining Water Quality

1. Consult DECS in the absence of dental unit manufacturer guidance for appropriate methods and equipment to maintain the recommended quality of dental water (i.e., ≤500 CFU/mL of heterotrophic water bacteria).

   a. Consult DECS before using any commercial dental waterline treatment products or devices not listed on the DECS Web site (https://decs.nhgl.med.navy.mil/infcontrol.htm).

b. See Box 2 for a dental waterline treatment protocol using sodium hypochlorite.

2. Use of independent reservoirs without use of a germicidal treatment will have no effect on waterline biofilms. Follow the unit manufacturer's recommended maintenance regimens to control biofilm formation (e.g., periodic or continuous use of a dental waterline treatment product, recommended source water [e.g., distilled water, reverse osmosis treated water, tap water]).

a. Handle the water reservoir with care to avoid cross contamination.

b. If using an independent water reservoir during surgical procedures, ensure the device can deliver sterile water (i.e., the reservoir and tubing are sterile single-use disposable or can tolerate heat sterilization).

C. Monitoring Dental Unit Water Quality

1. Follow recommendations for monitoring dental unit water quality provided by the manufacturer of the unit or waterline treatment product to assess compliance with recommended protocols and identify technique errors or noncompliance.

a. To obtain a representative sample, obtain water samples from all lines (i.e., air water syringe, handpieces, ultrasonic scaler), mix together, and place in a sterile specimen cup.

b. In the absence of manufacturer recommendations for monitoring dental unit water quality, test dental unit water from each unit monthly for three months. If the unit meets standards (i.e., $\leq$500 CFU/mL) during this period, then monitor water from the dental unit quarterly at a minimum. It is recommended to use a rotating schedule testing several units each month.

c. In the event that standards are not met (i.e., $\geq$500 CFU/mL), review work practices, waterline treatment protocols, and waterline treatment and monitoring records. Correct any identified procedural problems, retreat the waterlines, and retest. If the test remains positive, a "shock" treatment of the waterlines may be indicated. Contact DECS for guidance in the event that a unit consistently does not meet standards (i.e., $\geq$500 CFU/mL).

2. There is no need to identify specific organisms unless investigating a waterborne illness or a unit refractory to treatment. Testing should accurately detect a wide concentration range and type of aerobic, mesophilic, heterotrophic, waterborne bacteria within a reasonable incubation time at room temperature. Acceptable monitoring methods include:

a. Submitting water samples to the microbiology lab or Bioenvironmental Engineering for culturing using method 9215 (heterotrophic plate count) as described in *Standard Methods for the Evaluation of Water and Wastewater*, 20th Edition, American Public Health Association, American Waterworks Association, 1999.

b. Using an in-office self-contained system that is equivalent to method 9215.

3. Maintain waterline-monitoring records for a minimum of two years.

D. Boil-Water Advisories

1. The following apply while a boil-water advisory is in effect:

a. Do not deliver water from the public water system to the patient through the dental operative unit, ultrasonic scaler, or other dental equipment that uses the public water system.

b. Do not use water from the public water system for dental treatment, patient rinsing, or handwashing.

c. For handwashing, use antimicrobial-containing products that do not require water for use (e.g., alcohol-based hand rubs). If hands are visibly contaminated, use bottled water, if available, and soap for handwashing or an antiseptic towelette.

2. The following apply when the boil-water advisory is cancelled:

a. Follow guidance given by the local water utility regarding adequate flushing of waterlines. If no guidance is provided, flush dental waterlines and faucets for 1–5 minutes before using for patient care.

b. Treat dental waterlines as recommended by the dental unit manufacturer.

Box 2: **Weekly Dental Waterline Treatment Protocol Using Sodium Hypochlorite (bleach)**

1. Prepare a fresh bleach (6.0% sodium hypochlorite) solution (**1 part household bleach to 10 parts water**)

2. Remove water reservoir and discard residual water

3. Replace water reservoir and air purge all waterlines

4. Fill water reservoir to the top with bleach solution

5. Run bleach through all lines capable of carrying water

6. Allow bleach solution to stand for ten minutes

7. Remove water reservoir and discard bleach (discard in sink and thoroughly rinse with water when done)

8. Replace water reservoir and air purge to remove residual bleach

9. Flush all lines with 750 mL of clean[†] water, sterile[§] water, or tap water with 1 drop of bleach

10. Air purge and leave lines dry until next clinical use -- refill only with clean[†] water, sterile[§] water, or tap water with 1 drop of bleach. Avoid touching the water tube with ungloved hands which may contaminate the system with skin or enteric bacteria

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[†] freshly boiled water or water prepared by heat distillation; store in containers that have been cleaned at least once per week

[§] sterile bottled water

CHAPTER 9

SPECIAL CONSIDERATIONS

KEY TERMS

Allergic contact dermatitis*:* a type IV or delayed-hypersensitivity reaction resulting from contact with a chemical allergen (e.g., poison ivy, certain components of patient care gloves), generally localized to the contact area. Reactions occur slowly over 12-48 hours.

Creutzfeldt-Jakob disease (CJD)*:* a degenerative neurological disorder of humans thought to be transmitted by abnormal isoforms of neural proteins called prions. CJD is one of a group of related diseases known as transmissible spongiform encephalopathies (TSEs).

Hypersensitivity*:* an immune reaction (allergy) in which the body has an exaggerated response to a specific antigen (e.g., food, pet dander, wasp venom). See allergic contact dermatitis, latex allergy.

Irritant contact dermatitis*:* the development of dry, itchy, irritated areas on the skin, which can result from frequent handwashing and gloving as well as exposure to chemicals. This condition is not an allergic reaction.

Laser plume*:* the transfer or electromagnetic energy into tissues which results in a release of particles, gases, and tissue debris.

Latex allergy*:* a type I or immediate anaphylactic hypersensitivity reaction to the proteins found in natural rubber latex.

Latex*:* a milky white fluid extracted from the rubber tree *Hevea brasiliensis* that contains the rubber material cis-1,4 polyisoprene.

N-95 respirator*:* one of nine types of disposable particulate respirators. “95” refers to the percentage of particles filtered.

Oral surgical procedure*:* involves the incision, excision, or reflection of tissue that exposes normally sterile areas of the oral cavity. Examples include biopsy, periodontal surgery, apical surgery, implant surgery, and surgical extractions of teeth (e.g., removal of erupted or nonerupted tooth requiring elevation of mucoperiosteal flap, removal of bone or sectioning of tooth, and suturing if needed).

Prion*:* a protein particle that lacks nucleic acid and has been implicated as the cause of various neurodegenerative diseases (e.g., scrapie, Creutzfeldt-Jakob disease, and bovine spongiform encephalopathy). It is a pathogenic form of a neural protein that is both less soluble and more resistant to enzyme degradation than the normal form.

Single-use device*:* also called a disposable device; designed to be used on one patient and then discarded, not reprocessed for use on another patient (e.g., cleaned, disinfected, or sterilized). Single-use devices in dentistry are usually not heat-tolerant and cannot be reliably cleaned.

A. Aseptic Technique for Parenteral Medications

1. Do not administer medication from a syringe to multiple patients, even if the needle on the syringe is changed.

2. Use single-dose vials for parenteral medications when possible.

3. Do not combine the leftover contents of single-use vials for later use.

4. The following apply if multidose vials are used:

   a. Cleanse the access diaphragm with 70% alcohol and allow to air dry before inserting a device into the vial.

   b. Use a sterile device to access a multiple-dose vial and avoid touching the access diaphragm. Both the needle and syringe used to access the multidose vial should be sterile. Do not reuse a syringe even if the needle is changed.

   c. Keep multidose vials away from the immediate patient treatment area to prevent inadvertent contamination by spray or spatter.

   d. Discard the multidose vial if sterility is compromised.

   e. Follow manufacturer guidelines for storage, use, and disposal of pharmaceuticals or MTF policies if more stringent.

5. Use fluid infusion and administration sets (i.e., IV bags, tubings and connections) for one patient only and dispose them appropriately.

B. Contact Dermatitis and Latex Hypersensitivity

1. Educate DHCP regarding the signs, symptoms, and diagnoses of skin reactions associated with frequent hand hygiene and glove use during facility orientation, and annually thereafter.

2. Screen all patients for latex allergy (e.g., take health history and refer for medical consultation when latex allergy is suspected). Consider the following questions, and if the patient answers “yes” to any of the questions, initiate a consult and take measures to prevent latex exposure: Have you ever been told you have a latex allergy?; Do you have a history of familial skin rashes?; Have you ever experienced any nasal congestion, swelling, itching, sneezing, wheezing, hives or shortness of breath after any medical or dental exam where latex gloves were used?; Have you had any reactions after handling any rubber products such as Band-Aids, rubber balls, balloons, or condoms?; Are you allergic to bananas, avocados, kiwis, chestnuts, or other fruits?; Have you had multiple surgical procedures in the past?

3. If using latex gloves, use reduced protein, powder-free gloves to reduce exposure to latex allergens (i.e., latex protein in glove powder). Acceptable synthetic (nonlatex) alternatives include nitrile, neoprene, vinyl, and thermoplastic elastomers.

4. Ensure a latex-safe environment for patients and DHCP with latex allergy.

a. Establish a written protocol for treating latex-allergic patients.

b. Identify all latex-containing products and then remove them from the designated operatory before patient treatment. Cover items that cannot be removed.

c. Make available synthetic (nonlatex) gloves, dental dam, and other materials to treat patients with known or suspected allergy to natural rubber latex. Prepare the instrument pack without contacting latex products; clean and wrap for sterilization using synthetic gloves (nonlatex) gloves. Prepare the operatory using synthetic (nonlatex) gloves.

d. If delivering local anesthesia, consult with the patient’s physician and consider using a single-use glass ampule of local anesthesia and injecting with a latex-free syringe.

e. Consider scheduling the patient as the first appointment of the day (preferably the first day of the week).

5. Have emergency treatment kits with latex-free products available at all times. Ensure the facility has a latex-free patient care resuscitation kit or cart.

6. Develop policies and procedures for evaluation, diagnosis, and management of DHCP with suspected or known occupational contact dermatitis.

7. Seek definitive diagnosis by a qualified health-care professional (e.g., allergist, dermatologist) for any DHCP with suspected latex allergy to carefully determine its specific etiology and appropriate treatment as well as work restrictions and accommodations.

C. Creutzfeldt-Jakob Disease (CJD) and Other Prion Diseases

1. Potential infectivity of oral tissues in CJD or variant CJD (vCJD) patients is an unresolved issue. Scientific data indicate the risk, if any, of sporadic CJD transmission during dental and oral surgical procedures is low to nil. Until additional information exists regarding the transmissibility of CJD or vCJD during dental procedures, special precautions in addition to standard precautions might be indicated when treating known CJD or vCJD patients; a list of such precautions is provided for consideration without recommendation at www.cdc.gov/ncidod/diseases/submenus/sub_bse.htm.

D. Dental Handpieces and Other Devices Attached to Air and Waterlines

1. Clean and heat-sterilize all handpieces and other intraoral instruments that can be removed from the air and waterlines of dental units between patients.

2. Follow the manufacturer’s instructions for cleaning, lubrication, and sterilization of handpieces and other intraoral instruments that can be removed from the air and waterlines of dental units.

3. Do not surface-disinfect, use liquid chemical sterilants, or use ethylene oxide on handpieces and other intraoral instruments that can be removed from the air and waterlines of dental units.

4. Consider advising patients not to close their lips tightly around the tip of the saliva ejector when evacuating oral fluids due to the potential for backflow.

E. Dental Laboratory

1. Follow hand-hygiene recommendations as described in Chapter 4.

2. Use PPE when handling laboratory items until they have been disinfected (e.g., impressions, occlusal records, wax bite rims). Use appropriate protection (e.g., mask, protective eyewear) from projectile and particulate hazards when lathes and other rotary instruments are used.

3. Before they are handled in the laboratory, clean, disinfect, and rinse all dental prostheses and prosthodontic materials (e.g., impressions, bite registrations, occlusal rims) by using an EPA-registered hospital disinfectant having at least an intermediate-level (i.e., tuberculocidal claim) activity. To accomplish sub-surface disinfection of acrylic items, place the item in a resealable plastic bag containing an intermediate-level disinfectant and place in an ultrasonic bath according to manufacturer instructions.

4. Consult with manufacturers regarding the stability of specific materials (e.g., impression materials) relative to disinfection procedures.

5. Include specific information on the DD Form 2322 regarding disinfection techniques (i.e., solution used and duration), when laboratory cases are sent to the lab and on return to the provider.

6. When using ultrasonic cleaners, place the item (e.g., denture, temporary restoration) in a sealed, disposable plastic bag (filled with cleaning solution) into the ultrasonic machine and process. Following removal from the ultrasonic cleaner, dispose of the cleaning solution and disinfect the item before returning it to the patient.

7. Clean and heat-sterilize heat-tolerant items used in the mouth (e.g., metal impression trays, face-bow forks).

8. Prior to reuse, clean and disinfect items (e.g., rag wheels, polishing point, burs, lathes) used on appliances previously worn by the patient, even if the appliance was cleaned and disinfected before the adjustment/repair.

9. Mix pumice with clean water and diluted 1:10 bleach or other appropriate disinfectant, and change daily at a minimum.

10. At a minimum, clean and disinfect rag wheels daily. Heat sterilization is preferable.

11. At a minimum, clean and surface disinfect lathes daily.

12. Clean and disinfect case pans and articulators when visibly soiled and after each case is completed.

13. If laboratory items (e.g., burs, polishing points, rag wheels, laboratory knives) are used on contaminated or potentially contaminated appliances, prostheses, or other materials, they should be cleaned and heat-sterilized between cases.

14. Clean and disinfect countertops and lab benches when visibly soiled and at the end of daily work activities.

F. Dental Radiology

1. Follow hand-hygiene recommendations as described in Chapter 4.

2. Wear gloves when exposing radiographs and handling contaminated film packets. Use other PPE (e.g., protective eyewear, mask, gown) as appropriate if spattering of blood or other body fluids is likely.

3. Use surface barriers to protect clinical contact surfaces (e.g., x-ray tube head, switches, control panels) and change surface barriers between patients. (see Chapter 7)

   a. Clean and disinfect surfaces between patients only when the integrity of the barrier has been compromised or when visibly soiled.

   b. Clean and disinfect environmental surfaces that have been covered with barriers at the end of each clinical day.

4. Use heat-tolerant or disposable intraoral devices whenever possible (e.g., film-holding and positioning devices). Clean and heat-sterilize heat-tolerant devices between patients.

5. Transport and handle exposed radiographs in an aseptic manner to prevent contamination of developing equipment.

6. Digital radiography sensors and other high-technology instruments (e.g., intraoral camera, electronic periodontal probe, occlusal analyzers, and lasers) come into contact with mucous membranes and are considered semicritical devices. They should be cleaned and ideally heat-sterilized or high-level disinfected between patients. However, these items vary by manufacturer or type of device in their ability to be sterilized or high-level disinfected. The following apply for digital radiography sensors:

a. Use FDA-cleared barriers.

b. To minimize the potential for device-associated infections, after removing the barrier, clean and disinfect using an EPA-registered hospital disinfectant with an intermediate-level activity after each patient.

c. Follow manufacturer recommendations for cleaning and disinfecting computer equipment. Use surface barriers if the equipment (e.g., computer keyboard, mouse) is likely to be contacted or contaminated during patient-care activities.

G. Handling of Biopsy Specimens

1. During transport, place biopsy specimens in a sturdy, leakproof container labeled with the biohazard symbol.

2. If a biopsy specimen container is visibly contaminated, clean and disinfect the outside of a container or place it in an impervious bag labeled with the biohazard symbol.

H. Handling of Extracted Teeth

1. Dispose of extracted teeth as regulated medical waste, unless returned to the patient.

2. Do not dispose of extracted teeth containing amalgam in regulated medical waste intended for incineration.

3. The following apply when using extracted teeth in educational settings:

a. Clean and place extracted teeth in a leakproof container labeled with a biohazard symbol.

b. Place amalgam-free teeth in a heat-resistant glass container.

c. Fill the container no more than half–way with deionized or distilled water or saline, and loosely cover.

d. Process through a steam sterilizer at 121°C for 40 minutes using a fluid or liquid cycle. At the end of the cycle, remove the container slowly without shaking to avoid the boiling over of the fluid.

e. If using extracted teeth containing amalgam, immerse in 10% formalin for two weeks before use in an educational setting.

I. Laser/Electrosurgery Plumes/Surgical Smoke

1. The CDC *Guidelines for Infection Control in Dental Health-Care Settings—2003* do not offer a formal recommendation regarding practices to reduce DHCP exposure to laser plumes/surgical smoke when using lasers in dentistry, however other organizations have established guidelines. At a minimum:

a. Follow manufacturer instructions regarding use and safety precautions.

b. Use standard precautions when working in the laser environment.

c. Wear appropriate PPE including N-95 or N-100 respirators to minimize exposure to laser plumes.

d. Wear protective laser eyewear.

e. Implement local exhaust ventilation controls that may include but are not limited to wall suction units with in-line filters and smoke evacuation units.

J. *Mycobacterium tuberculosis*

1. General Recommendations

a. Follow MTF guidance and current CDC recommendations (www.cdc.gov/nchstp/tb/default.htm) for: developing, maintaining, and implementing a written TB infection-control plan; managing a patient with suspected or active TB; completing a community risk-assessment to guide employee tuberculin skin tests (TST) and follow-up; and

managing DHCP with TB disease.

b. Ensure DHCP, who might have contact with persons with suspected or confirmed active TB, have had a baseline TST according to MTF policy.

c. Educate all DHCP regarding the recognition of signs, symptoms, and transmission of TB.

d. Assess each patient for a history of TB as well as symptoms indicative of TB and document on the medical history form.

2. Follow MTF guidelines for patients known or suspected to have active TB. In general:

a. Evaluate the patient away from other patients and DHCP. When not being evaluated, the patient should wear a surgical mask or be instructed to cover the mouth and nose when coughing or sneezing.

b. Defer elective dental treatment until the patient is noninfectious.

c. Follow MTF guidance when emergency dental treatment is performed on a patient with active or suspected TB (e.g., wear a fit-tested, disposable N-95 respirator).

K. Oral Surgical Procedures

1. Oral surgical procedures involve the incision, excision, or reflection of tissue that exposes normally sterile areas of the oral cavity. Examples include biopsy, periodontal surgery, apical surgery, implant surgery, and surgical extractions of teeth (e.g., removal of erupted or nonerupted tooth requiring elevation of mucoperiosteal flap, removal of bone or section of tooth, and suturing if needed).

2. The following apply when performing oral surgical procedures:

a. Perform surgical hand antisepsis using an antimicrobial product (e.g., antimicrobial soap and water, or soap and water followed by alcohol-based hand scrub with persistent activity) before donning sterile surgeon's gloves.

b. Use sterile surgeon's gloves.

c. Use sterile saline or sterile water as a coolant/irrigant when performing oral surgical procedures. Use devices specifically designed for delivering sterile irrigating fluids (e.g., bulb syringe, single-use disposable products, and sterilizable tubing).

d. Place the date opened on all sterile irrigating solutions. Discard at the end of the day or sooner if contaminated or contamination is suspected.

L. Preprocedural Mouth Rinses

1. The use of preprocedural antimicrobial mouth rinses (e.g., chlorhexidine gluconate, essential oils, or povidone-iodine) is optional, but should be considered to reduce the level of oral microorganisms in aerosols and spatter generated during routine dental procedures and to decrease the number of microorganisms introduced in the patient's bloodstream during invasive dental procedures. The scientific evidence is inconclusive that using these rinses prevents clinical infections among DHCP or patients.

M. Single-Use (Disposable) Devices

1. Use single-use devices for one patient only and dispose of them appropriately.

CHAPTER 10

PROGRAM EVALUATION

INTRODUCTION. A successful infection-control and employee-protection program will have valid means to measure its effectiveness. The following methods can be used for this purpose: sterilization monitoring; scheduled and unscheduled inspections, waterline monitoring, and health-care-associated infection (HAI) surveillance.

KEY TERMS

Health-Care-Associated Infection (HAI)*:* a localized or symptomatic condition resulting from an adverse reaction to the presence of an infectious agent or its toxins not present or incubating at the time of the initial appointment (e.g., medical, dental, surgical). The term "health-care-associated infection" includes both nosocomial (i.e., hospital associated) and clinic acquired (i.e., clinic or outpatient associated) infections.

Surveillance*:* a comprehensive method of measuring outcomes and related processes of care, collecting and analyzing data, and providing timely feedback to the staff to assist in improving those outcomes. Surveillance is an essential component of infection control programs to reduce the frequency of adverse events such as infection or injury.

A. Sterilization Monitoring

1. Implement a sterilizer-monitoring program as described in Chapter 6.

B. Inspections

1. Conduct and document routine scheduled or unscheduled inspections of dental treatment rooms, dental laboratory and radiology areas, decontamination and sterilization areas, and locations where sterile and/or patient-care items are stored.

C. Waterline Monitoring

1. Implement a waterline-monitoring program as described in Chapter 8.

D. Health-Care-Associated Infections (HAI)

Surveillance for HAI provides data useful for identifying infected patients, determining the site of infection, and identifying the factors that contribute to HAI. Information containing patient identifiers or patient care staff should be carefully handled. Data should not be used for punitive purposes, but should be viewed as an opportunity to improve patient/employee/process outcome. Surveillance goals should include: providing objective assessment of dental HAI rates, reducing morbidity and cost, establishing baseline infection rates based on well defined case definition criteria, educating DHCP concerning data relevant to their practices, evaluating control measures designed to reduce infection rates, complying with accreditation standards, defending malpractice claims through implementation of an active surveillance program, and providing data useful in clinical research.

1. Establish criteria for definitions of HAI, and methods of surveillance and reporting in conjunction with the local MTF ICC/ICRF. (Table 2)

2. Develop surveillance systems based on evaluation of the populations of interest to assess the effectiveness of the dental infection control program. Such assessment is critical so that resources can be targeted at populations who are at risk for the outcomes of greatest importance.

   a. Generally, a combination of surveillance methods should be used. Do not use self-reporting as a sole means of surveillance. (Box 3)

   b. Rates may have to be calculated quarterly, semiannually, or annually, depending on the size of the denominator and on the type of services provided.

3. Results of HAI surveillance will be reported to the MTF ICC/ICRF in the format and on a schedule required by local policy.

Table 2: Health-Care-Associated Infections (HAI)

The following criteria (slightly modified from CDC NNIS* definitions) can be used to make the determination of a HAI following either oral surgical† or non-surgical dental procedures.

Oral Surgical Procedures†	**Non-surgical dental procedures**
1. Infection occurs within 30 days (or within one year if an implant is in place) after the procedure and the infection appears to be related to the procedure (i.e., the patient was not exhibiting signs/symptoms at the time of the initial appointment) **AND at least one of the following:** - purulent drainage/discharge from the surgical site - at least one of the following signs or symptoms: fever (>38ºC or 100.4ºF) or localized pain or tenderness - an abscess or other evidence of infection that is found on direct examination, during reoperation, or by histopathologic or radiologic examination - physician/dentist diagnosis of infection with or without treatment with antibiotic therapy.	Must meet at least one of the following criteria: 1. Organisms cultured from purulent material from tissues or the oral cavity. 2. Abscess or other evidence of infection on direct exam, during re-operation, histologic exam or radiographic exam. 3. At least one of the following: (with no other recognized cause) abscess, ulceration, raised white patches on inflamed mucosa or plaques on oral mucosa **AND at least one of the following:** - organisms seen on a Gram Stain - positive fungal potassium hydroxide stain - multinucleated giant cells seen on microscopic exam - positive antigen test on oral fluid/material - diagnostic single antibody tier (IgM) or fourfold increase in a paired sera (IgG) for pathogen - physician/dentist diagnosis of infection with or without topical/oral antifungal therapy or with or without antibiotic therapy.

* The National Nosocomial Infections Surveillance System (NNIS) is a cooperative effort that began in 1970 between the CDC and participating hospitals to create a national nosocomial infections database. The database is used to: describe the epidemiology of nosocomial infection; describe antimicrobial resistance trends; and produce nosocomial infection rates to use for comparison purposes. Participation is voluntary and involves only acute care general hospitals in the United States.

† Oral surgical procedures involve the incision, excision, or reflection of tissue that exposes the normally sterile areas of the oral cavity. Examples include biopsy, periodontal surgery, apical surgery, implant surgery, and surgical extractions of teeth (e.g., removal of erupted or non-erupted tooth, requiring elevation of mucoperiosteal flap, removal of bone and/or section of tooth, and suturing if needed).

Conditions which are not considered HAI include the following:

- colonization, which is the presence of microorganisms (on skin, mucous membranes, in open wounds, or in excretions or secretions) that are not causing adverse clinical signs or symptoms,
- inflammation, which is a condition that results from tissue response to injury or stimulation by noninfectious agents, such as chemicals;
- post extraction alveolar osteitis;
- suture abscesses;
- periapical inflammation flare-ups; and
- recurrent herpes infections.

Wound Classification

Invasive procedures (e.g., surgical procedures) can be categorized using a scheme adopted by the CDC.

- **Class I/Clean.** Uninfected operative wounds in which no inflammation is encountered and not involving the oral cavity. *(definition not applicable to dentistry)*
- **Class II/Clean-Contaminated.** Operative wounds in which oral cavity (oropharynx) is entered under controlled conditions and without unusual contamination, provided no evidence of infection or major break in technique is encountered. *(applies to most oral surgical procedures)*
- **Class III/Contaminated**. Open, fresh, accidental wounds, operations with major breaks in sterile technique, and incisions in which acute, nonpurulent inflammation is encountered.
- **Class IV/Dirty-Infected.** Old traumatic wounds with retained devitalized tissue and those that involve existing clinical infection. This definition suggests that the organisms causing postoperative infection were present in the operative field before the operation.

Box 3: Examples of Surveillance Methods for Dental Health-Care-Associated Infections (HAI)

Chart Review
- Generally, more invasive procedures are targeted (e.g., extractions of impacted third molars/periodontal surgeries using conscious sedation vs. single tooth extractions with local anesthesia) during chart reviews.
- Using the dental service report, identify patients who had the specific type of procedure performed that you are targeting (e.g., extraction of third molars, patients receiving conscious sedation, periodontal surgeries) during a specified time period (e.g., 60 days prior to dental treatment).
- Review the records for conditions meeting the HAI criteria.
- Complete a HAI work sheet (Box 4) if a possible infection is found. The medical infection control officer may be consulted for final determination before reporting the infection to the ICC/ICRF.

Antibiotic Usage Audit
- Request a printout from the pharmacy for antibiotic prescriptions written for dental patients during a specified time period (e.g., 60 days prior to dental treatment).
- Review the records for conditions meeting the HAI criteria.
- During this review, appropriateness of antibiotic use can also be reviewed.
- Complete a HAI work sheet (Box 4) if a possible infection is found. The medical infection control officer may be consulted for final determination before reporting the infection to the ICC/ICRF.

Unscheduled Post-Operative/Surgical Return Visits
- Have a HAI work sheet (Box 4) available in the sick call area for staff members to complete when they identify a potential HAI during an unscheduled post-operative/surgical return visit.
- The form is given to the dental infection control officer for further investigation. The medical infection control officer may be consulted for final determination before reporting the infection to the ICC/ICRF.

Self-Reporting
- Staff members should complete the HAI work sheet (Box 4) for every patient with a potential HAI.
- The form is given to the dental infection control officer for further investigation. The medical infection control officer may be consulted for final determination before reporting the infection to the ICC/ICRF.

Box 4: Sample Health-Care-Associated Infection (HAI) Work Sheet

Health-Care-Associated Infection (HAI) Work Sheet

PATIENT NAME: _____ RANK/STATUS:_____

SOCIAL SECURITY #: _____ PHONE #:_____

ORGANIZATION/ADDRESS: _____

PATIENT AGE: _____

DATE OF PROCEDURE: _____

TYPE OF PROCEDURE: _____

WOUND CLASSIFICATION: _____

PROVIDER(S): _____

DATE INFECTION DIAGNOSED: _____

DESCRIPTION OF THE INFECTION: _____
_____
_____

CULTURE OBTAINED: yes or no

CULTURE RESULTS (if applicable): _____

TREATMENT RENDERED (including any antibiotic prescriptions):
_____
_____

REPORTED BY: _____ DATE REPORTED: _____

FOLLOW-UP: _____

A Medical QA Document. Do Not Disclose Without Approval of the MTF Commander.

SELECTED REFERENCES USED DURING THE PREPARATION OF THIS DOCUMENT

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* Maintain the most current edition in the dental clinic infection control notebook.
† Recommended to obtain the most current edition for the dental clinic library.

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Updates to the *USAF Guidelines for Infection Control in Dentistry (September 2004)*

1. March 2005: Page 7, section B.2.a.
2. January 2006: Name change from “DIS” to “DECS”; Web site addresses updated, no content changes.