Looking Inside the 2003 CDC Dental Infection Control Guidelines

JENNIFER A. HARTE, DDS, MS

ABSTRACT

On Dec. 19, 2003, the Centers for Disease Control and Prevention published updated infection control guidelines for dentistry. The guidelines provide comprehensive information on all aspects of dental infection control. The recommendations are designed to prevent or reduce the potential for disease transmission from patient to dental health care personnel, from dental health care personnel to patient, and from patient to patient. Most recommendations will be familiar and are already practiced routinely. This article highlights major updates and additions in the CDC guidelines and provides additional information to assist readers in applying the latest guidelines.

Almost a year ago, the CDC and Prevention published updated dental infection control guidelines in a supplement to the *Morbidity and Mortality Weekly Report. The Guidelines for Infection Control in Dental Health Care Settings — 2003*[1] represent a collaborative effort between leading experts in infection control from other federal agencies, public health, and hospital epidemiology and infection control. Unlike regulatory agencies such as the Occupational Safety and Health Administration, the U.S. Food and Drug Administration, or the U.S. Environmental Protection Agency, the CDC cannot mandate certain practices; it can only recommend. However, the CDC is recognized as the nation's disease prevention agency and develops a broad range of guidelines intended to improve health care and to inform clinicians and the public. As a result, many dental licensing boards adopt CDC's recommendations, or variations of them, as the infection control standard for dental practice in their states.

In contrast to the 1986 and 1993 CDC dental infection control recommendations, the 2003 CDC publication includes more background information and the scientific rationale for the recommendations. Also, readers will notice that each recommendation has a rank assigned to it categorizing the recommendation on the basis of existing scientific data, theoretical ratio-

Author / Jennifer A. Harte, DDS, MS,* is the chief military consultant for dental infection control to the Air Force surgeon general, U.S. Air Force Dental Investigation Service in Great Lakes, Ill. She was one of several coauthors of a similar article, "Guidelines for Infection Control in Dental Health Care Settings — 2003," that appeared in the January 2004 issue of *Journal of the American Dental Association* (pgs. 44-47).

*The opinions expressed in this text are those of the author and do not reflect the official policy of the U.S. Department of Defense or other departments of the U.S. government.

nale, and applicability (**Table 1**). Most recommendations will be familiar and already are practiced routinely. As with previous CDC recommendations, the guidelines are designed to prevent or reduce the potential for disease transmission from patient to dental health care personnel; from dental health care personnel to patient, and from patient to patient.

The following is an overview highlighting major updates and additions in the 2003 CDC guidelines. It is not intended to be a comprehensive review. Readers can access the complete document (**Figure 1**) by visiting www.cdc.gov/oralhealth/infectioncontrol.

Table 1

Evidence-Based Ranking Scheme for the 2003 CDC Dental Infection Control Recommendations

Each recommendation in the *Guidelines for Infection Control for Dental Health Care Settings — 2003* is categorized on the basis of existing scientific data, theoretical rationale, and applicability. Rankings are based on the system used by CDC and the Health care Infection Control Practices Advisory Committee (HICPAC) to categorize recommendations:

Category IA. Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.

Category IB. Strongly recommended for implementation and supported by experimental, clinical, or epidemiologic studies and a strong theoretical rationale.

Category IC. Required for implementation as mandated by federal or state regulation or standard. When IC is used, a second rating can be included to provide the basis of existing scientific data, theoretical rationale, and applicability. Because of state differences, the reader should not assume that the absence of a IC implies the absence of state regulations.

Category II. Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale.

Unresolved issue. No recommendation. Insufficient evidence or no consensus regarding efficacy exists.

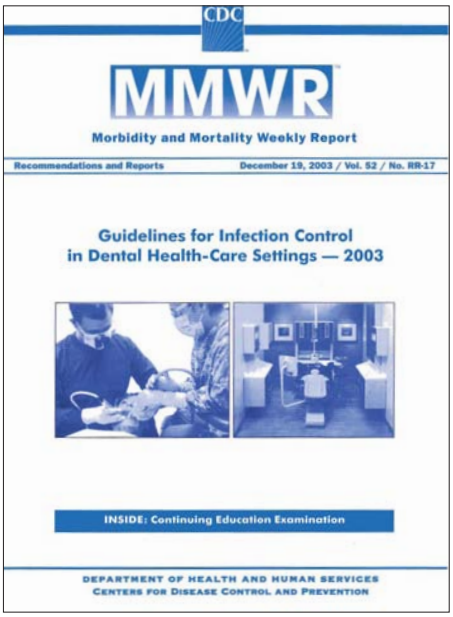

Figure 1. Guidelines for Infection Control in Dental Health Care Settings — 2003. Available online at www.cdc.gov/oralhealth/infectioncontrol.

Initial and ongoing training and education are key elements of a successful infection control program because if staff members understand the rationale behind infection control practices, they are more likely to comply with program policies. After initial training, staff members should receive training when new tasks or procedures affect their occupational exposure, and at a minimum annually. Training should include a description of their exposure risks; a review of prevention strategies and infection control policies and procedures; information on how to manage work-related illness and injuries, including postexposure prophylaxis; and a review of work restrictions for the exposure or infection.

As part of the office infection control program, the new guidelines also recommend dental practices develop a written health program (**Table 2**). This is much broader than the OSHA-mandated exposure control plan. For example, the CDC recommends that dental

Table 2

Elements of a Written Health Program for Dental Health Care Personnel

Include policies, procedures, and guidelines for:

- Education and training;
- Immunizations;
- Exposure prevention and postexposure management (including referral arrangements with qualified health care professionals to ensure prompt and appropriate treatment and follow up);
- Medical conditions, work-related illness, and associated work restrictions;
- Contact dermatitis and latex hypersensitivity; and
- Maintenance of records, data management, and confidentiality.

health care personnel be immunized against vaccine-preventable diseases such as measles, mumps, rubella, influenza, and chickenpox in addition to receiving the hepatitis B vaccination. Also, occasionally dental health care personnel might become ill with diseases requiring them to refrain from patient contact to prevent further transmission of infection (e.g., conjunctivitis, diarrheal diseases, varicella, acute viral respiratory infection) to either patients or other staff members. Dental practice infection control policies should encourage dental health care personnel to report illnesses or exposures without jeopardizing wages, benefits, or job status. To assist practitioners, the 2003 CDC guidelines include a two-page table describing work restrictions for selected diseases.

It's important to note that it's not the CDC's intention for dental offices to begin administering vaccines or diagnosing infectious diseases in staff members. Coordination between the dental practice's infection control coordinator and other qualified health care professionals (e.g., licensed physician) is necessary to provide dental health care personnel with appropriate services such as immunizations and postexposure management. Since the majority of dental practices are in ambulatory, private settings that do not have licensed medical staff and facilities to provide complete on-site health service programs, the infection control coordinator should establish programs that arrange for site-specific infection control services from external health care facilities and providers before dental health care personnel are placed at risk for exposure. Referral arrangements can be made with qualified health care professionals in an occupational health program of a hospital, with educational institutions, or with health care facilities that offer personnel health services.

Standard vs. Universal Precautions

Previous CDC dental infection control recommendations focused primarily on the risk of transmission of bloodborne pathogens among dental health care personnel and patients and use of universal precautions to reduce that risk. 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. Careful handling of sharp instruments; use of rubber dams to minimize blood spattering; handwashing; and use of personal protective equipment (e.g., gloves, masks, protective eyewear, and gowns) are all examples of preventive practices used to reduce exposure to blood and other potentially infectious materials.

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.[2] 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. Since standard precautions include the elements of universal precautions and because saliva has always been considered a potentially infectious material in dentistry, no difference exists in clinical dental practice between universal precautions and standard precautions; only the terminology has changed. As with universal precautions, dental health care personnel should apply standard precautions for all patient encounters.

Preventing Sharps Injury with Safety Devices

The majority of exposures in dentistry are preventable, and methods to reduce the risk of blood contacts have included use of standard precautions. Other strategies to reduce injuries include using devices with features engineered to prevent sharp injuries (e.g., needles with resheathing devices, safety scalpels, IV safety catheters) and modifications of work practices such as using a needle recapping device or restricting the use of fingers during suturing or administration of local anesthesia (**Table 3**). These approaches have contributed to the decrease in percutaneous injuries among dentists during recent years, however, needlesticks and other blood contacts continue to occur, which is a concern because percutaneous injuries pose the greatest risk of transmission.

Table 3

Examples of Work Practice Controls to Reduce Percutaneous Injuries

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

Table 4

Representative Examples of Safety Devices and Evaluation Resources

Safety Anesthetic Syringes

- 1SHOT Safety Syringe (Sultan Safety, LLC)
- Ultra Safety Plus XL Safety Syringe (Septodont, Inc.)

Safety Scalpels

- BD Bard-Parker Protected Disposable Scalpel (Becton, Dickinson and Company)
- Miltex Disposable Safety Scalpels (Miltex, Inc.)

Screening and Evaluation Tools

- CDC, Division of Oral Health: www.cdc.gov/oralhealth/infectioncontrol/forms.htm
- Training for Development of Innovative Control Technologies (TDICT): www.tdict.org

In 2001, revisions to OSHA's bloodborne pathogens standard as mandated by the Needlestick Safety and Prevention Act of 2000 became effective.[3] These revisions clarify the need for employers to consider safer needle devices as they become available and to involve employees directly responsible for patient care (e.g., dentists, hygienists, and dental assistants) in identifying and choosing such devices. To be in compliance with the OSHA mandate, CDC recommends that dental practices should identify, evaluate, and select devices with engineered safety features at least annually and as they become available on the market (**Table 4**).

Managing Occupational Exposures to Bloodborne Pathogens

Avoiding occupational exposures to blood is the primary way to prevent transmission of hepatitis HBV, hepatitis C virus (HCV), and HIV in health care settings. Occupational exposure incidents occur through needlesticks or cuts with a sharp object, as well as through contact between potentially infectious blood, tissues, or other body fluids and mucous membranes of the eye, nose, mouth, or nonintact skin (e.g., exposed skin that is chapped, abraded, or shows signs of dermatitis).

Although prevention is primary, postexposure management is a vital component of an infection control program to prevent infection after an occupational exposure to blood or other potentially infectious materials. Being prepared before an occupational incident occurs is essential. Therefore, dental practices and laboratories should establish written, comprehensive programs that include the hepatitis B vaccination and postexposure management protocols that 1) describe the types of contact with blood or other potentially infectious materials that can place dental health care personnel at risk for infection; 2) describe procedures for promptly reporting and evaluating such exposures; and 3) identify a health care professional who is qualified to provide counseling and perform all medical evaluations and procedures in accordance with current recommendations of the U.S. Public Health Service, including postexposure prophylaxis with chemotherapeutic drugs when indicated. While the new guidelines provide a protocol for managing occupational exposure incidents in the dental setting, having an arrangement with a qualified health care professional before an occupational exposure incident occurs remains key because certain interventions have to be initiated promptly to be effective.

Hand Hygiene

Hand hygiene refers to handwashing, antiseptic handwash, antiseptic handrub, or surgical hand antisepsis and is most important aseptic procedure in the prevention of health care-associated infections (**Table 5**). Hand hygiene significantly reduces microbes

Table 5

Hand Hygiene Methods and Indications

Methods	Agent	Technique	Duration (minimum)	Indications
Routine handwash	Water and nonantimicrobial detergent (e.g., plain soap*)	• Wet hands and wrists under cool running water. • Dispense handwashing agent sufficient to cover hands and wrists. • 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.	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)			
Antiseptic handrub	Alcohol-based handrub†	• 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.	2–6 minutes	• Before donning sterile, surgeon's gloves for oral surgical procedures.
	Water and nonantimicrobial detergent (e.g., plain soap*) followed by an alcohol-based surgical hand-scrub product with persistent activity	• 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. Follow manufacturer instructions for surgical handscrub product with persistent activity.	Follow manufacturer instructions for surgical hand-scrub product with persistent activity.	

Adapted from reference # 1.

* 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 handrubs **should not** be used in the presence of visible soil or organic material. If using an alcohol-based handrub, 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.

Figure 2. Hand hygiene methods: Handwashing, surgical hand antisepsis, and alcohol-based handrub (from left to right).

Figure 3. Examples of personal protective equipment.

Table 6

Alcohol-Based Handrubs

Alcohol-based handrubs are alcohol-containing preparations designed for application to the hands for reducing the number of viable microorganisms on the hands. In the United States, these 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.

Advantages	Disadvantages
• Fast acting and effective antimicrobial action (if hands are not visibly soiled) • Potential to improve skin condition — causes less dermatitis (if the product contains emollients) • Potential to increase hand hygiene compliance	• Cannot be used when hands are visibly dirty or contaminated • Must carefully follow manufacturer instructions for amount of product to use and time to "rub"* • Flammable • Possible "gritty" feeling on hands when used with powdered gloves or from emollient "build up" after repeated use • May be more expensive than traditional hand-hygiene agents

* If hands feel dry after rubbing hands together for 10–15 seconds, an insufficient volume of product likely was applied.

on the hands and protects both patients and the dental staff (**Figure 2**).

Hand hygiene should be performed with either a nonantimicrobial or antimicrobial soap and water when hands are visibly dirty or contaminated with blood or other potentially infectious material. If hands are not visibly soiled, dental health care personnel now have the option of using a waterless product — an alcohol-based handrub. **Table 6** presents several advantages and disadvantages of using alcohol-based handrubs.

Wearing gloves does not replace the need for handwashing. Likewise, handwashing does not eliminate the need for gloves. Gloves reduce hand contamination by 70 percent to 80 percent, prevent cross-contamination, and protect patients and health care personnel from infection. However, hand contamination may occur as a result of small, undetected holes in gloves and contamination may occur during glove removal. Studies have shown that health care personnel and dental health care personnel are frequently unaware of small tears in gloves that occur during use.[4-7] If the integrity of a glove is compromised (e.g., punctured), it should be changed as promptly as safety permits.

Personal Protective Equipment

The recommendations for personal protective equipment remain unchanged from the 1993 CDC recommendations and OSHA's bloodborne pathogens standard. Personal protective equipment is designed to protect the skin and the mucous membranes of the eyes, nose, and mouth during procedures likely to generate splashing or spattering of blood or other body fluids (e.g., the use of high-speed handpieces, air/water syringes, or ultrasonic scalers). Primary personal protective equipment used in dentistry includes gloves, surgical masks, protective eyewear, and protective clothing (e.g., long-sleeved gowns or jackets that cover the forearms) (**Figure 3**). All personal protective equipment should be removed before dental health care personnel leave patient-care areas. Reusable personal protective equipment (e.g., clinician or patient protective eyewear and face shields) should be cleaned with soap and water, and when visibly soiled, disinfected between patients, according to the manufacturer's directions.

Figure 4. Examples of internal (left) and external (right) indicators used to monitor heat sterilization.

Contact Dermatitis and Latex Hypersensitivity

Occupationally related contact dermatitis can develop from frequent and repeated use of hand hygiene products, exposure to chemicals, and glove use. Less common but more serious, latex allergy (Type I hypersensitivity to latex proteins) is a serious systemic allergic reaction, usually beginning within minutes of exposure but sometimes occurring hours later and producing varied symptoms. More common reactions include runny nose, sneezing, itchy eyes, scratchy throat, hives, and itchy burning skin sensations. More severe symptoms include asthma marked by difficult breathing, coughing spells, and wheezing; cardiovascular and gastrointestinal ailments; and in rare cases, anaphylaxis and death.[8,9] A physician should evaluate dental health care personnel exhibiting symptoms of contact dermatitis or latex allergy. Self-diagnosis and arbitrary changing of glove brands or materials are not advised. A prompt diagnosis made through medical history, physical examination, and diagnostic tests will allow appropriate treatment and preventive measures.

Taking thorough health histories for both patients and dental health care personnel, followed by avoidance of contact with potential allergens can minimize the possibility of adverse reactions. CDC recommends educating dental health care personnel regarding the signs, symptoms, and diagnoses of skin reactions associated with frequent hand hygiene and glove use. Additionally, the guidelines recommend screening all patients for latex allergy and providing a latex-safe environment for patients and dental health care personnel with latex allergy and having emergency treatment kits with latex-free products available at all times.

Sterilization and Disinfection of Patient Care Items

The instrument processing section of the 2003 CDC guidelines is greatly expanded from the 1993 CDC document. Everything from designating a central instrument processing area to procedures to follow in the event of a positive spore test is described. Cleaning prior to sterilization remains critical to remove all blood and other debris that may interfere with the sterilization process. Using automated equipment (e.g., ultrasonic cleaners, instrument washers) to clean instruments is preferable to the more dangerous handscrubbing. Packaging instruments prior to sterilization is necessary to maintain sterility following removal from the sterilizer. A chemical indicator should be placed within each package, and if not visible from the outside, an external indicator should be applied to the package (**Figure 4**). Heat sterilization using steam autoclaves, dry heat sterilizers, or unsaturated chemical vapor remains the standard of care. Manufacturer instructions should always be followed for acceptable packaging materials, operating parameters, and loading procedures for sterilizers. Guidance is offered for using liquid chemical germicides to either high-level disinfect or sterilize those few heat-sensitive semi-critical instruments. Monitoring the sterilization process not only involves use of mechanical, chemical and biological (i.e., spore tests) indicators, but also involves initial and ongoing training of all staff members involved with instrument reprocessing, and the maintenance of sterilization equipment. The CDC recommendation to use mechanical monitors for each sterilization load can be accomplished by either documenting the time, temperature and pressure (if involved) of each load, or by saving the printout from the cycle if you have a printer accessory. CDC continues to recommend at least weekly use of a spore test and a matching control.

Environmental Infection Control

Environmental surfaces can be divided into clinical contact surfaces and housekeeping surfaces (**Table 7**). Clinical contact surfaces or those sur-

Figure 5. Example of a surface barrier on a clinical contact surface.

Table 7

Clinical Contact and Housekeeping Surfaces

Type of Surface	Definition	Examples
Clinical Contact	Surfaces that may touched frequently with gloved hand during patient care or that may become contaminated with blood or other potentially infectious material and subsequently contact instruments, devices, hands, or gloves	Light handles, switches, dental X-ray equipment, chairside computers, reusable containers of dental material, drawer handles, faucet handles, countertops, pen, telephone handle, doorknob
Housekeeping	Surfaces that do not come into contact with devices used in dental procedures	Floors, walls, sinks

faces that are touched can serve as sources of contamination and should be protected with impervious barriers or cleaned and disinfected between patients (**Figure 5**). If barriers are used, they should be changed between patients. Because housekeeping surfaces (e.g., floors, walls, and sinks) have limited risk of disease transmission, most of the time they can be cleaned with detergent and water. If blood or other body fluids are present, housekeeping surfaces should be cleaned and disinfected.

As always, disinfectants should be registered with the EPA. The CDC now recommends either using an EPA-registered hospital disinfectant with a low- (i.e., HIV and HBV label claims) to intermediate-level (i.e., tuberculocidal claim) activity after each patient. However, if the surface is visibly contaminated with blood, an intermediate-level disinfectant is indicated. It's important to note that if a low-level disinfectant is chosen, it must have label claims stating effectiveness against both HIV and HBV. Although the scientific evidence supports the effectiveness of low-level disinfectants under certain conditions, for practical purposes offices may find it more convenient to select a product with a higher degree of potency (intermediate-level disinfectant) to cover all situations.

Dental Unit Waterlines, Biofilm and Water Quality

The American Dental Association and the CDC have addressed dental water quality in the past, primarily with the ADA recommending that dental manufacturers develop dental units and equipment that can deliver treatment water containing no more than 200 colony-forming units (CFU) of bacteria/mL.[10] Standards established by the EPA set limits of ≤500 CFU/mL for drinking water, and the CDC now recommends that dental unit water delivered to patients also meet this standard. The only exception is that during oral surgical procedures, only sterile water should be delivered to patients. Conventional dental units cannot reliably deliver sterile water even when equipped with independent water reservoirs because the water-bearing pathway cannot be reliably sterilized. Delivery devices (e.g., bulb syringe or sterile, single-use disposable products) should be used to deliver sterile water. Oral surgery and implant handpieces, as well as ultrasonic scalers, are commercially available that bypass the dental unit to deliver sterile water or other solutions by using single-use disposable or sterilizable tubing.[11] (**Table 8**)

In 1993, CDC recommended that dental waterlines be flushed at the beginning of the clinic day to reduce the microbial load. However, studies have demonstrated this practice does not affect biofilm in the waterlines or reliably improve the quality of water

Table 8

Selected Devices Available to Deliver Sterile Irrigating Solutions During Oral Surgical Procedures

Implantmed by W & H distributed by A-dec corporation: www.a-dec.com

KaVo INTRAsurg 500 by KaVo America: www.kavousa.com

Osteopower 2i Modular Surgical Handpiece System by Osteomed Corp: www.osteomed-corp.com

Odontoson-M Ultrasonic Scaler by Odonto-Wave: www.Odonto-Wave.com

Various Ultrasonic Scalers providing sterile water delivery by Amadent (Satelec): www.amadent.com

AquaSept (individual autoclavable reservoir units bypassing dental unit waterlines to the handpiece) by Lares Research (Northland Ind.): www.laresdental.com

Table 9

Representative Examples of Waterline Treatment Products

Chemical germicides for periodic waterline treatment ■ Dentacide (Frio Technologies Inc.) ■ Lines (Micrylium) ■ Sterilex Ultra (Sterilex Corporation)
Chemical germicides for continuous waterline treatment ■ BioClenz (Frontier Pharmaceutical) ■ DentaPure DP40 Cartridge (MRLB International, Inc.) ■ ICX (A-dec)
Centralized waterline treatment systems ■ PureLine50 (Sterisil, Inc.) ■ VistaClear Waterline Treatment System (Pelton and Crane) ■ Waterclave Water Purifier (Waterclave, LLC)

Figure 6. Example of an aseptic technique when handling parenteral medications.

used during dental treatment.[12-14] Because the recommended value of ≤500 CFU/mL cannot be achieved by using this method, other strategies should be employed. Dental unit water that remains untreated or unfiltered is unlikely to meet the drinking water standard.[15-21] Commercial devices and procedures designed to improve the quality of water used in dental treatment are available; methods demonstrated to be effective include self-contained water systems combined with chemical treatment (**Table 9**), in-line microfilters, and combinations of these treatments. Simply using source water containing ≤500 CFU/mL of bacteria (e.g., tap, distilled, or sterile water) in a self-contained water system will not eliminate bacterial contamination in treatment water if biofilms in the water system are not controlled. Removal or inactivation of dental waterline biofilms requires use of chemical germicides.

The CDC advises dentists to consult with the manufacturer of their dental unit or water delivery system to determine the best method for maintaining acceptable water quality (i.e., ≤500 CFU/mL) and the recommended frequency of monitoring. Monitoring of dental water quality can be performed by using commer-

Figure 7. Three elements of infection control during oral surgical procedures — surgical hand antisepsis, wearing sterile surgical gloves, using sterile irrigating solutions.

Table 10

Examples of Methods for Evaluating Infection Control Programs[1]

Program Element	Evaluation Example
Appropriate immunization of dental health care personnel	Conduct an annual review of individual personnel records to ensure up-to-date immunizations.
Assessment of occupational exposures to infectious agents	Report occupational exposures to infectious agents. Document the steps that occurred around the exposure and plan how it could be prevented in the future.
Comprehensive postexposure management and medical follow-up program after occupational exposures to infectious agents	Ensure that postexposure management plan is clear, complete, and available at all times to all dental health care personnel. All staff should understand the plan, which should include toll-free phone numbers for questions.
Adherence to hand hygiene before and after patient care	Observe and document circumstances of appropriate or inappropriate handwashing. Review findings in a staff meeting.
Proper use of personal protective equipment to prevent occupational exposures to infectious agents	Observe and document the use of barrier precautions and careful handling of sharps. Review findings in a staff meeting.
Routine and appropriate sterilization of instruments using a biologic monitoring system	Monitor paper log of steam cycle and temperature strip with each sterilization load, and examine results of weekly biologic monitoring. Take appropriate action when failure of sterilization process is noted.
Evaluation and implementation of safer medical devices	Conduct an annual review of the exposure control plan for documentation of new developments in safer medical devices.
Compliance of water in routine dental procedures with current U.S. EPA drinking water standards (fewer than 500 CFU of heterotrophic water bacteria)	Monitor dental water quality as recommended by the equipment manufacturer, using commercial self-contained test kits, or commercial water testing laboratories.
Proper handling and disposal of medical waste	Observe the safe disposal of regulated and nonregulated medical waste and take preventive measures if hazardous situations occur.
Health care associated infections	Assess the unscheduled return of patients after procedures and evaluate them for an infectious process. A trend may require formal evaluation.

cial self-contained test kits or commercial water-testing laboratories.

Special Considerations

Sections on special considerations include a variety of topics: dental handpieces and other devices attached to air and waterlines; saliva ejectors; radiology; parenteral medications; single-use or disposable devices; preprocedural mouth rinses; oral surgical procedures; handling of biopsy specimens and extracted teeth; laser/electrosurgery plumes; *M. tuberculosis*; Creutzfeldt-Jakob disease and other prion diseases; program evaluation; and research considerations.

For those using digital radiology, presently the sensor presents an infection control challenge. They should be cleaned and ideally heat sterilized or high-level disinfected between patients because they contact mucous membranes. However, these items vary by manufacturer or type of device in their ability to be sterilized or high-level disinfected. To minimize the potential for device-associated infections, the CDC recommends barrier protecting the sensor during use, and following removal of the barrier, the sensor should be cleaned and disinfected with an EPA-registered intermediate-level product. Because the sensors are expensive, it is recommended to consult the manufacturer for appropriate disinfection methods and compatible products.

The section on aseptic technique for parenteral medications provides guidance on safe handling of multiple- or single-dose medication vials (**Figure 6**) and fluid infusion sets (e.g., IV bags and tubing) to clinicians performing sedations or administering these types

Table 11

Selected Internet Resources for Dental Infection Control Information and Products

Dental Infection Control

American Dental Association (ADA) Dental Infection Control Issues: www.ada.org/prof/resources/topics/icontrol/index.asp
Centers for Disease Control and Prevention: Dental Infection Control: www.cdc.gov/OralHealth/infectioncontrol/index.htm
Occupational Safety and Health Administration (OSHA)
Dental Safety and Health Topics: www.osha.gov/SLTC/dentistry/index.html
Needlestick Prevention www.osha.gov/SLTC/needlestick/index.html
Organization for Safety and Asepsis Procedures (OSAP) www.osap.org/
USAF Dental Investigation Service (DIS) www.brooks.af.mil/dis/infcontrol.htm

General Infection Control

Centers for Disease Control and Prevention (CDC) www.cdc.gov/
Association for Professionals in Infection Control and Epidemiology www.apic.org
Association for the Advancement of Medical Instrumentation (AAMI) www.aami.org/
Joint Commission for the Accreditation of Health care Organizations (JCAHO) www.jcaho.org/
Society for Health care Epidemiology of America (SHEA) www.shea-online.org/

Dental Infection Control Product Information

American Dental Association (ADA): www.ada.org/ada/seal/index.asp
Clinical Research Associates: www.cranews.org
Dental Products Report: www.dentalproducts.net
Dentistry Today: www.dentistrytoday.com
USAF Dental Investigation Service (DIS): www.brooks.af.mil/dis/infcontrol.htm

of medications to patients. When these solutions and devices are not handled properly, life-threatening infections can occur.

The CDC has always provided infection control recommendations for clinicians performing surgeries, however in the new guidelines the CDC clarifies the definition of an oral surgical procedure: "Oral surgical procedures are defined as any procedure that involves 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 nonerupted tooth requiring elevation of mucoperiosteal flap, removal of bone or section of tooth, and suturing if needed." The recommendations include performing surgical hand antisepsis with an antimicrobial product before donning sterile surgeon's gloves and using sterile irrigating solutions during oral surgical procedures (**Figure 7**).

The guidelines also offer recommendations on how to evaluate your infection control program. A successful infection control program depends on developing standard operating procedures, evaluating practices, routinely documenting adverse outcomes (e.g., occupational exposures to blood) and work-related illnesses in dental health care personnel, and monitoring health care-associated infections in patients. Strategies and tools to evaluate the infection control program can include periodic observational assessments, checklists to document procedures, and routine review of occupational exposures to bloodborne pathogens. **Table 10** provides examples of methods for evaluating infection control programs. Evaluation offers an opportunity to improve the effectiveness of both the infection control program and dental practice protocols. If deficiencies or problems in the implementation of infection control procedures are identified, further evaluation is needed to eliminate the problems. Most practices will find that they are already performing many of the recommended evaluation activities, and if not, they can easily add them to their daily practice.

Conclusions

While the guidelines provide comprehensive information on all aspects of dental infection control, there is some important information that you will not obtain from the updated CDC guidelines. Health care providers desire and need information on specific products — what works and what doesn't — and which products are the most efficient and cost effective. Regulatory and legal issues preclude the CDC from commenting on the efficacy or effectiveness of specific products. Also of interest are specific "how to" techniques and methods used to achieve the recommendations. Because there are usually several ways to achieve the desired end result, CDC refrains from making specific recommendations on protocols or techniques. Resources are available that provide information to help health care providers make informed purchasing decisions and determine how to develop safe and efficient work practices to achieve the recommendations. Current literature reviews, answers to frequently asked questions, and product information and evaluations are just several examples of items individuals may find helpful. Much of this information is available to the general public without a membership requirement (**Table 11**).

CDC's new guidelines for infection control in dental health care settings should provide dental health care personnel with the information needed to make informed and intelligent choices when they select infection control processes, methods, and products. Although most dental practices will find they already are carrying out most of the recommendations in the guidelines, they now have the scientific rationale that underlies these recommendations. The practice of infection control in dentistry has made remarkable progress over the years, and dental offices that follow the latest CDC recommendations will strengthen an already admirable record of safe dental practice. Patients and providers alike can be assured that oral health care can be delivered and received in a safe manner. CDA

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To request a printed copy of this article, please contact / Jennifer A. Harte DDS, MS, United States Air Force Dental Investigation Service, 310C B St., Bldg 1H, Great Lakes, IL 60088.