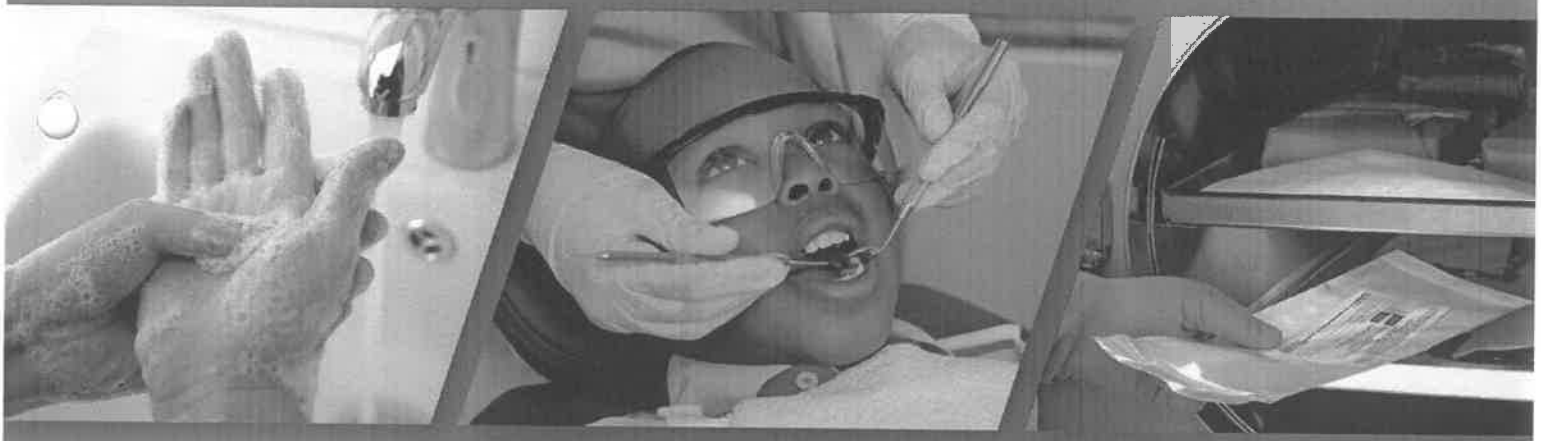
Summary of Infection Prevention Practices in Dental Settings



Basic Expectations for Safe Care

Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion

Note to Readers

This document is a summary guide of basic infection prevention recommendations for all dental health care settings. These include traditional settings such as private dental practices, dental clinics, dental schools and educational programs (including dental assisting, dental hygiene, and laboratory) and nontraditional settings that often use portable dental equipment such as clinics held in schools for sealant and fluoride placement and in other sites for humanitarian dental missions.

While the information included in this document reflects existing evidence-based guidelines produced by the Centers for Disease Control and Prevention (CDC), it is not intended as a replacement for more extensive guidelines. This summary guide is based primarily upon elements of Standard Precautions and represents a summary of basic infection prevention expectations for safe care in dental settings as recommended in the *Guidelines for Infection Control in Dental Health-Care Settings—2003*. Readers are urged to use the Infection Prevention Checklist for Dental Settings (Appendix A), a companion to the summary; and to consult the full guidelines for additional background, rationale, and scientific evidence behind each recommendation.

Suggested Citation

Centers for Disease Control and Prevention. *Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care*. Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services; October 2016.

Adapted from: *Guide to Infection Prevention for Outpatient Settings: Minimum Expectations for Safe Care*
http://www.cdc.gov/hai/settings/outpatient/outpatient-care-guidelines.html

Contents

Introduction

Transmission of infectious agents among patients and dental health care personnel (DHCP) in dental settings is rare. However, from 2003 to 2015, transmissions in dental settings, including patient-to-patient transmissions, have been documented.[1–4] In most cases, investigators failed to link a specific lapse of infection prevention and control with a particular transmission. However, reported breakdowns in basic infection prevention procedures included unsafe injection practices, failure to heat sterilize dental handpieces between patients, and failure to monitor (e.g., conduct spore testing) autoclaves.[2,3] These reports highlight the need for comprehensive training to improve understanding of underlying principles, recommended practices, their implementation, and the conditions that have to be met for disease transmission.

All dental settings, regardless of the level of care provided, must make infection prevention a priority and should be equipped to observe Standard Precautions and other infection prevention recommendations contained in CDC's *Guidelines for Infection Control in Dental Health-Care Settings—2003*.[5] The *Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care* summarizes current infection prevention recommendations and includes a checklist (Appendix A) that can be used to evaluate compliance.

The information presented here is based primarily upon the recommendations from the 2003 guideline and represents infection prevention expectations for safe care in dental settings. It is intended for use by anyone needing information about basic infection prevention measures in dental health care settings, but is not a replacement for the more extensive guidelines. Readers are urged to consult the full guidelines for additional background, rationale, and scientific evidence behind each recommendation. Additional topics and information relevant to dental infection prevention and control published by CDC since 2003 in this document can be found in Appendix B including

- Infection prevention program administrative measures.
- Infection prevention education and training.
- Respiratory hygiene and cough etiquette.
- Updated safe injection practices.
- Administrative measures for instrument processing.

For the purposes of this document, 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. This includes

- Dentists.
- Dental hygienists.
- Dental assistants.
- Dental laboratory technicians (in-office and commercial).
- Students and trainees.
- Contractual personnel.
- Other persons not directly involved in patient care but potentially exposed to infectious agents (e.g., administrative, clerical, housekeeping, maintenance, or volunteer personnel).[5]

Objectives

By highlighting existing CDC recommendations, this summary guide

1. Provides basic infection prevention principles and recommendations for dental health care settings.
2. Reaffirms Standard Precautions as the foundation for preventing transmission of infectious agents during patient care in all dental health care settings.
3. Provides links to full guidelines and source documents that readers can reference for more detailed background and recommendations.

For additional references, background information, rationale, and evidence, readers should consult the references and resources listed in Appendix C. Detailed recommendations for dental health care settings can be found in the compendium document, *Recommendations from the Guidelines for Infection Control in Dental Health-Care Settings—2003.*

References

1. Redd JT, Baumbach J, Kohn W, et al. Patient-to-patient transmission of hepatitis B virus associated with oral surgery. *J Infect Dis.* 2007;195(9):1311–1314.
2. Radcliffe RA, Bixler D, Moorman A, et al. Hepatitis B virus transmissions associated with a portable dental clinic, West Virginia, 2009. *J Am Dent Assoc.* 2013;144(10):1110–1118.
3. Oklahoma State Department of Health. Dental Healthcare-Associated Transmission of Hepatitis C: Final Report of Public Health Investigation and Response, 2013. Available at: http://www.ok.gov/health2/documents/Dental%20Healthcare_Final%20Report_2_17_15.pdf.
4. Klevens RM, Moorman AC. Hepatitis C virus: an overview for dental health care providers. *J Am Dent Assoc.* 2013;144(12):1340–1347.
5. Centers for Disease Control and Prevention. Guidelines for infection control in dental health-care settings—2003. *MMWR Recomm Rep* 2003;52(RR-17):1–61. Available at: www.cdc.gov/mmwr/PDF/rr/rr5217.pdf.

Fundamental Elements Needed to Prevent Transmission of Infectious Agents in Dental Settings

Administrative Measures

Infection prevention must be made a priority in any dental health care setting. At least one individual with training in infection prevention—the infection prevention coordinator—should be responsible for developing written infection prevention policies and procedures based on evidence-based guidelines, regulations, or standards. Policies and procedures should be tailored to the dental setting and reassessed on a regular basis (e.g., annually) or according to state or federal requirements. Development should take into consideration the types of services provided by DHCP and the patient population served, extending beyond the Occupational Safety and Health Administration (OSHA) bloodborne pathogens standard to address patient safety. The infection prevention coordinator should ensure that equipment and supplies (e.g., hand hygiene products, safer devices to reduce percutaneous injuries, and personal protective equipment) are available and should maintain communication with all staff members to address specific issues or concerns related to infection prevention. In addition, all dental settings should have policies and protocols for early detection and management of potentially infectious persons at initial points of patient encounter.

Key ADMINISTRATIVE RECOMMENDATIONS for Dental Settings

1. Develop and maintain infection prevention and occupational health programs.
2. Provide supplies necessary for adherence to Standard Precautions (e.g., hand hygiene products, safer devices to reduce percutaneous injuries, personal protective equipment).
3. Assign at least one individual trained in infection prevention responsibility for coordinating the program.
4. Develop and maintain written infection prevention policies and procedures appropriate for the services provided by the facility and based on evidence-based guidelines, regulations, or standards.
5. Facility has system for early detection and management of potentially infectious persons at initial points of patient encounter.

Infection Prevention Education and Training

Ongoing education and training of DHCP are critical for ensuring that infection prevention policies and procedures are understood and followed. Education on the basic principles and practices for preventing the spread of infections should be provided to all DHCP. Training should include both DHCP safety (e.g., OSHA bloodborne pathogens training) and patient safety (e.g., emphasizing job- or task-specific needs). Education and training should be provided during orientation to the setting, when new tasks or procedures are introduced and at a minimum, annually. Training records should be maintained according to state and federal requirements.

Key Recommendations for EDUCATION AND TRAINING in Dental Settings

1. Provide job- or task-specific infection prevention education and training to all DHCP.
   a. This includes those employed by outside agencies and available by contract or on a volunteer basis to the facility.
2. Provide training on principles of both DHCP safety and patient safety.
3. Provide training during orientation and at regular intervals (e.g., annually).
4. Maintain training records according to state and federal requirements.

Dental Health Care Personnel Safety

Infection prevention programs should also address occupational health needs, including vaccination of DHCP, management of exposures or infections in personnel requiring post-exposure prophylaxis or work restrictions, and compliance with OSHA bloodborne pathogens standard. Referral arrangements for medical services 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.

Recommendations for prevention of infections in DHCP can be found in the following documents—*Guidelines for Infection Control in Dental Health-Care Settings—2003* (available at: www.cdc.gov/mmwr/PDF/rr/rr5217.pdf), *Immunization of Health-Care Personnel: Recommendations of the Advisory Committee on Immunization Practices (ACIP)* (available at: http://www.cdc.gov/mmwr/pdf/rr/rr6007.pdf), and OSHA Bloodborne Pathogens and Needlestick Prevention (available at: http://www.osha.gov/SLTC/bloodbornepathogens/index.html).

Key Recommendations for DENTAL HEALTH CARE PERSONNEL SAFETY

1. Current CDC recommendations for immunizations, evaluation, and follow-up are available. There is a written policy regarding immunizing DHCP, including a list of all required and recommended immunizations for DHCP (e.g., hepatitis B, MMR (measles, mumps, and rubella) varicella (chickenpox), Tdap (tetanus, diphtheria, pertussis).
2. All DHCP are screened for tuberculosis (TB) upon hire regardless of the risk classification of the setting.
3. Referral arrangements are in place to qualified health care professionals (e.g., occupational health program of a hospital, educational institutions, health care facilities that offer personnel health services) to ensure prompt and appropriate provision of preventive services, occupationally-related medical services, and postexposure management with medical follow-up.
4. Facility has well-defined policies concerning contact of personnel with patients when personnel have potentially transmissible conditions.

Program Evaluation

A successful infection prevention program depends on

- Developing standard operating procedures.
- Evaluating practices and providing feedback to DHCP.
- Routinely documenting adverse outcomes (e.g., occupational exposures to blood) and work-related illnesses in DHCP.
- Monitoring health care associated infections in patients.

Strategies and tools to evaluate the infection prevention program can include periodic observational assessments, checklists to document procedures, and routine review of occupational exposures to bloodborne pathogens. The Infection Prevention Checklist for Dental Settings found in Appendix A is one tool DHCP can use to evaluate their infection prevention program. Evaluation offers an opportunity to improve the effectiveness of both the infection-prevention program and dental practice protocols. If deficiencies or problems in the implementation of infection prevention procedures are identified—further evaluation and feedback, corrective action, and training (if applicable) is needed to eliminate the problems.

Key Recommendation for PROGRAM EVALUATION in Dental Settings

1. Establish routine evaluation of the infection prevention program, including evaluation of DHCP adherence to infection prevention practices.

Standard Precautions

Standard Precautions are the minimum infection prevention practices that apply to all patient care, regardless of suspected or confirmed infection status of the patient, in any setting where health care is delivered. These practices are designed to both protect DHCP and prevent DHCP from spreading infections among patients. Standard Precautions include—

1. Hand hygiene.
2. Use of personal protective equipment (e.g., gloves, masks, eyewear).
3. Respiratory hygiene/cough etiquette.
4. Sharps safety (engineering and work practice controls).
5. Safe injection practices (i.e., aseptic technique for parenteral medications).
6. Sterile instruments and devices.
7. Clean and disinfected environmental surfaces.

Each element of Standard Precautions is described in the following sections. Education and training are critical elements of Standard Precautions, because they help DHCP make appropriate decisions and comply with recommended practices.

When Standard Precautions alone cannot prevent transmission, they are supplemented with Transmission-Based Precautions. This second tier of infection prevention is used when patients have diseases that can spread through contact, droplet or airborne routes (e.g., skin contact, sneezing, coughing) and are always used in addition to Standard Precautions. Dental settings are not typically designed to carry out all of the Transmission-Based Precautions (e.g., Airborne Precautions for patients with suspected tuberculosis, measles, or chickenpox) that are recommended for hospital and other ambulatory care settings. Patients, however, do not usually seek routine dental outpatient care when acutely ill with diseases requiring Transmission-Based Precautions. Nonetheless, DHCP should develop and carry out systems for early detection and management of

potentially infectious patients at initial points of entry to the dental setting. To the extent possible, this includes rescheduling non-urgent dental care until the patient is no longer infectious or referral to a dental setting with appropriate infection prevention precautions when urgent dental treatment is needed.

Hand Hygiene

Hand hygiene is the most important measure to prevent the spread of infections among patients and DHCP. Education and training programs should thoroughly address indications and techniques for hand hygiene practices before performing routine and oral surgical procedures.

For routine dental examinations and nonsurgical procedures, use water and plain soap (hand washing) or antimicrobial soap (hand antisepsis) specific for health care settings or use an alcohol-based hand rub. Although alcohol-based hand rubs are effective for hand hygiene in health care settings, soap and water should be used when hands are visibly soiled (e.g., dirt, blood, body fluids). For surgical procedures,[1] perform a surgical hand scrub before putting on sterile surgeon's gloves. For all types of hand hygiene products, follow the product manufacturer's label for instructions. Complete guidance on how and when hand hygiene should be performed, including recommendations regarding surgical hand antisepsis and artificial nails can be found in the *Guideline for Hand Hygiene in Health-Care Settings* (available at: http://www.cdc.gov/mmwr/PDF/rr/rr5116.pdf).

Key Recommendations for HAND HYGIENE in Dental Settings

1. Perform hand hygiene—
   - **a.** When hands are visibly soiled.
   - **b.** After barehanded touching of instruments, equipment, materials, and other objects likely to be contaminated by blood, saliva, or respiratory secretions.
   - **c.** Before and after treating each patient.
   - **d.** Before putting on gloves and again immediately after removing gloves.
2. Use soap and water when hands are visibly soiled (e.g., blood, body fluids); otherwise, an alcohol-based hand rub may be used.

Personal Protective Equipment

Personal protective equipment (PPE) refers to wearable equipment that is designed to protect DHCP from exposure to or contact with infectious agents. PPE that is appropriate for various types of patient interactions and effectively covers personal clothing and skin likely to be soiled with blood, saliva, or other potentially infectious materials (OPIM) should be available. These include gloves, face masks, protective eye wear, face shields, and protective clothing (e.g., reusable or disposable gown, jacket, laboratory coat). Examples of appropriate use of PPE for adherence to Standard Precautions include—

- Use of gloves in situations involving possible contact with blood or body fluids, mucous membranes, non-intact skin (e.g., exposed skin that is chapped, abraded, or with dermatitis) or OPIM.
- Use of protective clothing to protect skin and clothing during procedures or activities where

[1] Definition from 2003 CDC Dental Guidelines—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 nonerupted tooth requiring elevation of mucoperiosteal flap, removal of bone or section of tooth, and suturing if needed).

contact with blood or body fluids is anticipated.

- Use of mouth, nose, and eye protection during procedures that are likely to generate splashes or sprays of blood or other body fluids.

DHCP should be trained to select and put on appropriate PPE and remove PPE so that the chance for skin or clothing contamination is reduced. Hand hygiene is always the final step after removing and disposing of PPE. Training should also stress preventing further spread of contamination while wearing PPE by:

- Keeping hands away from face.
- Limiting surfaces touched.
- Removing PPE when leaving work areas.
- Performing hand hygiene.

The application of Standard Precautions and guidance on appropriate selection and an example of putting on and removal of personal protective equipment is described in detail in the *2007 Guideline for Isolation Precautions* (available at: http://www.cdc.gov/hicpac/pdf/isolation/Isolation2007.pdf).

Key Recommendations for PERSONAL PROTECTIVE EQUIPMENT (PPE) in Dental Settings

1. Provide sufficient and appropriate PPE and ensure it is accessible to DHCP.
2. Educate all DHCP on proper selection and use of PPE.
3. Wear gloves whenever there is potential for contact with blood, body fluids, mucous membranes, non-intact skin or contaminated equipment.
   a. Do not wear the same pair of gloves for the care of more than one patient.
   b. Do not wash gloves. Gloves cannot be reused.
   c. Perform hand hygiene immediately after removing gloves.
4. Wear protective clothing that covers skin and personal clothing during procedures or activities where contact with blood, saliva, or OPIM is anticipated.
5. Wear mouth, nose, and eye protection during procedures that are likely to generate splashes or spattering of blood or other body fluids.
6. Remove PPE before leaving the work area.

Respiratory Hygiene/Cough Etiquette

Respiratory hygiene/cough etiquette infection prevention measures are designed to limit the transmission of respiratory pathogens spread by droplet or airborne routes. The strategies target primarily patients and individuals accompanying patients to the dental setting who might have undiagnosed transmissible respiratory infections, but also apply to anyone (including DHCP) with signs of illness including cough, congestion, runny nose, or increased production of respiratory secretions.

DHCP should be educated on preventing the spread of respiratory pathogens when in contact with symptomatic persons. Respiratory hygiene/cough etiquette measures were added to Standard Precautions in 2007. Additional information related to respiratory hygiene/cough etiquette can be found in the *2007 Guideline for Isolation Precautions* (available at: http://www.cdc.gov/hicpac/pdf/isolation/Isolation2007.pdf). Recommendations for preventing the spread of influenza are available at: http://www.cdc.gov/flu/professionals/infectioncontrol/.

Key Recommendations for RESPIRATORY HYGIENE/COUGH ETIQUETTE in Dental Settings

1. Implement measures to contain respiratory secretions in patients and accompanying individuals who have signs and symptoms of a respiratory infection, beginning at point of entry to the facility and continuing throughout the visit.
   - **a.** Post signs at entrances with instructions to patients with symptoms of respiratory infection to—
     - **i.** Cover their mouths/noses when coughing or sneezing.
     - **ii.** Use and dispose of tissues.
     - **iii.** Perform hand hygiene after hands have been in contact with respiratory secretions.
   - **b.** Provide tissues and no-touch receptacles for disposal of tissues.
   - **c.** Provide resources for performing hand hygiene in or near waiting areas.
   - **d.** Offer masks to coughing patients and other symptomatic persons when they enter the dental setting.
   - **e.** Provide space and encourage persons with symptoms of respiratory infections to sit as far away from others as possible. If available, facilities may wish to place these patients in a separate area while waiting for care.
2. Educate DHCP on the importance of infection prevention measures to contain respiratory secretions to prevent the spread of respiratory pathogens when examining and caring for patients with signs and symptoms of a respiratory infection.

Sharps Safety

Most percutaneous injuries (e.g., needlestick, cut with a sharp object) among DHCP involve burs, needles, and other sharp instruments. Implementation of the OSHA Bloodborne Pathogens Standard has helped to protect DHCP from blood exposure and sharps injuries. However, sharps injuries continue to occur and pose the risk of bloodborne pathogen transmission to DHCP and patients. Most exposures in dentistry are preventable; therefore, each dental practice should have policies and procedures available addressing sharps safety. DHCP should be aware of the risk of injury whenever sharps are exposed. When using or working around sharp devices, DHCP should take precautions while using sharps, during cleanup, and during disposal.

Engineering and work-practice controls are the primary methods to reduce exposures to blood and OPIM from sharp instruments and needles. Whenever possible, engineering controls should be used as the primary method to reduce exposures to bloodborne pathogens. Engineering controls remove or isolate a hazard in the workplace and are frequently technology-based (e.g., self-sheathing anesthetic needles, safety scalpels, and needleless IV ports). Employers should involve those DHCP who are directly responsible for patient care (e.g., dentists, hygienists, dental assistants) in identifying, evaluating and selecting devices with engineered safety features at least annually and as they become available. Other examples of engineering controls include sharps containers and needle recapping devices.

When engineering controls are not available or appropriate, work-practice controls should be used. Work-practice controls are behavior-based and are intended to reduce the risk of blood exposure by changing the way DHCP perform tasks, such as using a one-handed scoop technique for recapping needles between uses and before disposal. Other work-

practice controls include not bending or breaking needles before disposal, not passing a syringe with an unsheathed needle by hand, removing burs before disassembling the handpiece from the dental unit, and using instruments in place of fingers for tissue retraction or palpation during suturing and administration of anesthesia.

All used disposable syringes and needles, scalpel blades, and other sharp items should be placed in appropriate puncture-resistant containers located close to the area where they are used. Sharps containers should be disposed of according to state and local regulated medical waste rules.

For more information about sharps safety, see the *Guidelines for Infection Control in Dental Health-Care Settings—2003* (available at: www.cdc.gov/mmwr/PDF/rr/rr5217.pdf), the CDC *Workbook for Designing, Implementing, and Evaluating a Sharps Injury Prevention Program* (available at: www.cdc.gov/sharpssafety/), and the CDC Sample Screening and Device Evaluation Forms for Dentistry (available at: www.cdc.gov/OralHealth/infectioncontrol/forms.htm).

Key Recommendations for SHARPS SAFETY in Dental Settings

1. Consider sharp items (e.g., needles, scalers, burs, lab knives, and wires) that are contaminated with patient blood and saliva as potentially infective and establish engineering controls and work practices to prevent injuries.
2. 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.
3. 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 non-disposable aspirating syringe).
4. Place used disposable syringes and needles, scalpel blades, and other sharp items in appropriate puncture-resistant containers located as close as possible to the area where the items are used.

Safe Injection Practices

Safe injection practices are intended to prevent transmission of infectious diseases between one patient and another, or between a patient and DHCP during preparation and administration of parenteral (e.g., intravenous or intramuscular injection) medications. Safe injection practices are a set of measures DHCP should follow to perform injections in the safest possible manner for the protection of patients. DHCP most frequently handle parenteral medications when administering local anesthesia, during which needles and cartridges containing local anesthetics are used for one patient only and the dental cartridge syringe is cleaned and heat sterilized between patients. Other safe practices described here primarily apply to use of parenteral medications combined with fluid infusion systems, such as for patients undergoing conscious sedation. Unsafe practices that have led to patient harm include 1) use of a single syringe—with or without the same needle—to administer medication to multiple patients, 2) reinsertion of a used syringe—with or without the same needle—into a medication vial or solution container (e.g., saline bag) to obtain additional medication for a single patient and then

using that vial or solution container for subsequent patients, and 3) preparation of medications in close proximity to contaminated supplies or equipment.

Safe injection practices were covered in the Special Considerations section (Aseptic Technique for Parenteral Medications) of the 2003 CDC dental guidelines. However, because of reports of transmission of infectious diseases by inappropriate handling of injectable medications, CDC now considers safe injection practices to be a formal element of Standard Precautions. Complete guidance on safe injection practices can be found in the *2007 Guideline for Isolation Precautions* (available at: http://www.cdc.gov/hicpac/pdf/isolation/Isolation2007.pdf). Additional materials, including a list of frequently asked questions from providers and a patient notification toolkit, are also available (http://www.cdc.gov/injectionsafety/). The *One & Only Campaign* is a public health effort to eliminate unsafe medical injections. The campaign is led by CDC and the Safe Injection Practices Coalition (SIPC). To learn more about safe injection practices and access training videos and resources, please visit http://www.oneandonlycampaign.org/.

Key Recommendations for SAFE INJECTION PRACTICES in Dental Settings

1. Prepare injections using aseptic technique[2] in a clean area.
2. Disinfect the rubber septum on a medication vial with alcohol before piercing.
3. Do not use needles or syringes* for more than one patient (this includes manufactured prefilled syringes and other devices such as insulin pens).
4. Medication containers (single and multidose vials, ampules, and bags) are entered with a new needle and new syringe, even when obtaining additional doses for the same patient.
5. Use single-dose vials for parenteral medications when possible.
6. Do not use single-dose (single-use) medication vials, ampules, and bags or bottles of intravenous solution for more than one patient.
7. Do not combine the leftover contents of single-use vials for later use.
8. The following apply if multidose vials are used—
   a. Dedicate multidose vials to a single patient whenever possible.
   b. If multidose vials will be used for more than one patient, they should be restricted to a centralized medication area and should not enter the immediate patient treatment area (e.g., dental operatory) to prevent inadvertent contamination.
   c. If a multidose vial enters the immediate patient treatment area, it should be dedicated for single-patient use and discarded immediately after use.
   d. Date multidose vials when first opened and discard within 28 days, unless the manufacturer specifies a shorter or longer date for that opened vial.
9. Do not use fluid infusion or administration sets (e.g., IV bags, tubings, connections) for more than one patient.

[2] A technique that prevents or reduces the spread of microorganisms from one site to another, such as from patient to DHCP, from patient to operatory surfaces, or from one operatory surface to another.

* A Note about Administering Local Dental Anesthesia: When using a dental cartridge syringe to administer local anesthesia, do not use the needle or anesthetic cartridge for more than one patient. Ensure that the dental cartridge syringe is appropriately cleaned and heat sterilized before use on another patient.

Sterilization and Disinfection of Patient-Care Items and Devices

Instrument processing requires multiple steps using specialized equipment. Each dental practice should have policies and procedures in place for containing, transporting, and handling instruments and equipment that may be contaminated with blood or body fluids. Manufacturer's instructions for reprocessing reusable dental instruments and equipment should be readily available—ideally in or near the reprocessing area. Most single-use devices are labeled by the manufacturer for only a single use and do not have reprocessing instructions. Use single-use devices for one patient only and dispose of appropriately.

Cleaning, disinfection and sterilization of dental equipment should be assigned to DHCP with training in the required reprocessing steps to ensure reprocessing results in a device that can be safely used for patient care. Training should also include the appropriate use of PPE necessary for safe handling of contaminated equipment.

Patient-care items (e.g., dental instruments, devices, and equipment) are categorized as critical, semicritical, or noncritical, depending on the potential risk for infection associated with their intended use.

- Critical items, such as surgical instruments and periodontal scalers, are those used to penetrate soft tissue or bone. They have the greatest risk of transmitting infection and should always be sterilized using heat.
- Semicritical items (e.g., mouth mirrors, amalgam condensers, reusable dental impression trays) are those that come in contact with mucous membranes or non-intact skin (e.g., exposed skin that is chapped, abraded, or has dermatitis). These items have a lower risk of transmission. Because the majority of semicritical items in dentistry are heat-tolerant, they should also be sterilized using heat. If a semicritical item is heat-sensitive, DHCP should replace it with a heat-tolerant or disposable alternative. If none are available, it should, at a minimum, be processed using high-level disinfection.

  Note: Dental handpieces and associated attachments, including low-speed motors and reusable prophylaxis angles, should always be heat sterilized between patients and not high-level or surface disinfected. Although these devices are considered semicritical, studies have shown that their internal surfaces can become contaminated with patient materials during use. If these devices are not properly cleaned and heat sterilized, the next patient may be exposed to potentially infectious materials.

Digital radiography sensors are also considered semicritical and should be protected with a Food and Drug Administration (FDA)-cleared barrier to reduce contamination during use, followed by cleaning and heat-sterilization or high-level disinfection between patients. If the item cannot tolerate these procedures then, at a minimum, protect with an FDA-cleared barrier. In addition, clean and disinfect with an Environmental Protection Agency (EPA)-registered hospital disinfectant with intermediate-level (i.e., tuberculocidal claim) activity between patients. Because these items vary by manufacturer and their ability to be sterilized or high-level disinfected also vary, refer to manufacturer instructions for reprocessing.

- Noncritical patient-care items (e.g., radiograph head/cone, blood pressure cuff, facebow) are those that only contact intact skin. These items pose the least risk of transmission of infection. In the majority of cases, cleaning, or if visibly soiled, cleaning followed by disinfection with an EPA-registered hospital disinfectant is adequate. Protecting these surfaces with disposable barriers might be a preferred alternative.

Cleaning to remove debris and organic contamination from instruments should always occur before disinfection or sterilization. If blood, saliva, and other contamination are not removed, these materials can shield microorganisms and potentially compromise

the disinfection or sterilization process. Automated cleaning equipment (e.g., ultrasonic cleaner, washer-disinfector) should be used to remove debris to improve cleaning effectiveness and decrease worker exposure to blood. After cleaning, dried instruments should be inspected, wrapped, packaged, or placed into container systems before heat sterilization. Packages should be labeled to show the sterilizer used, the cycle or load number, the date of sterilization, and, if applicable, the expiration date. This information can help in retrieving processed items in the event of an instrument processing/sterilization failure.

The ability of a sterilizer to reach conditions necessary to achieve sterilization should be monitored using a combination of biological, mechanical, and chemical indicators. Biological indicators, or spore tests, are the most accepted method for monitoring the sterilization process because they assess the sterilization process directly by killing known highly resistant microorganisms (e.g., *Geobacillus* or *Bacillus* species). A spore test should be used at least weekly to monitor sterilizers. However, because spore tests are only performed periodically (e.g., once a week, once a day) and the results are usually not obtained immediately, mechanical and chemical monitoring should also be performed.

Mechanical and chemical indicators do not guarantee sterilization; however, they help detect procedural errors and equipment malfunctions. Mechanical monitoring involves checking the sterilizer gauges, computer displays, or printouts; and documenting the sterilization pressure, temperature, and exposure time in your sterilization records. Since these parameters can be observed during the sterilization cycle, this might be the first indication of a problem.

Chemical monitoring uses sensitive chemicals that change color when exposed to high temperatures or combinations of time and temperature. Examples include chemical indicator tapes, strips or tabs, and special markings on packaging materials. Chemical monitoring results are obtained immediately following the sterilization cycle and therefore can provide more timely information about the sterilization cycle than a spore test. A chemical indicator should be used inside every package to verify that the sterilizing agent (e.g., steam) has penetrated the package and reached the instruments inside. If the internal chemical indicator is not visible from the outside of the package, an external indicator should also be used. External indicators can be inspected immediately when removing packages from the sterilizer. If the appropriate color change did not occur, do not use the instruments. Chemical indicators also help to differentiate between processed and unprocessed items, eliminating the possibility of using instruments that have not been sterilized.

> **Note:** A single-parameter internal chemical indicator provides information regarding only one sterilization parameter (e.g., time or temperature). Multiparameter internal chemical indicators are designed to react to ≥ 2 parameters (e.g., time and temperature; or time, temperature, and the presence of steam) and can provide a more reliable indication that sterilization conditions have been met.

Sterilization monitoring (e.g., biological, mechanical, chemical monitoring) and equipment maintenance records are an important component of a dental infection prevention program. Maintaining accurate records ensures cycle parameters have been met and establishes accountability. In addition, if there is a problem with a sterilizer (e.g., unchanged chemical indicator, positive spore test), documentation helps to determine if an instrument recall is necessary.

Ideally, sterile instruments and supplies should be stored in covered or closed cabinets. Wrapped packages of sterilized instruments should be inspected before opening and use to ensure the packaging material has not been compromised (e.g., wet, torn, punctured) during storage. The contents of any compromised packs should be reprocessed (i.e., cleaned, packaged, and heat-sterilized again) before use on a patient.

Recommendations for the cleaning, disinfection, and sterilization of dental equipment can be found in the *Guidelines for Infection Control in Dental*

Health-Care Settings—2003 (available at: www.cdc.gov/mmwr/PDF/rr/rr5217.pdf). Recommendations for the cleaning, disinfection, and sterilization of medical equipment are available in the *Guideline for Disinfection and Sterilization in Healthcare Facilities* (available at: http://www.cdc.gov/hicpac/pdf/guidelines/Disinfection_Nov_2008.pdf). FDA regulations on reprocessing of single-use devices are available at: http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/GuidanceDocuments/ucm071434.

Key Recommendations for STERILIZATION AND DISINFECTION OF PATIENT-CARE DEVICES for Dental Settings

1. Clean and reprocess (disinfect or sterilize) reusable dental equipment appropriately before use on another patient.
2. Clean and reprocess reusable dental equipment according to manufacturer instructions. If the manufacturer does not provide such instructions, the device may not be suitable for multi-patient use.
   a. Have manufacturer instructions for reprocessing reusable dental instruments/equipment readily available, ideally in or near the reprocessing area.
3. Assign responsibilities for reprocessing of dental equipment to DHCP with appropriate training.
4. Wear appropriate PPE when handling and reprocessing contaminated patient equipment.
5. Use mechanical, chemical, and biological monitors according to manufacturer instructions to ensure the effectiveness of the sterilization process. Maintain sterilization records in accordance with state and local regulations.

Environmental Infection Prevention and Control

Policies and procedures for routine cleaning and disinfection of environmental surfaces should be included as part of the infection prevention plan. Cleaning removes large numbers of microorganisms from surfaces and should always precede disinfection. Disinfection is generally a less lethal process of microbial inactivation (compared with sterilization) that eliminates virtually all recognized pathogenic microorganisms but not necessarily all microbial forms (e.g., bacterial spores).

Emphasis for cleaning and disinfection should be placed on surfaces that are most likely to become contaminated with pathogens, including clinical contact surfaces (e.g., frequently touched surfaces such as light handles, bracket trays, switches on dental units, computer equipment) in the patient-care area. When these surfaces are touched, microorganisms can be transferred to other surfaces, instruments or to the nose, mouth, or eyes of DHCP or patients. Although hand hygiene is the key to minimizing the spread of microorganisms, clinical contact surfaces should be barrier protected or cleaned and disinfected between patients. EPA-registered hospital disinfectants or detergents/disinfectants with label claims for use in health care settings should be used for disinfection. Disinfectant products should not be used as cleaners unless the label indicates the product is suitable for such use. DHCP should follow manufacturer recommendations for use of products selected for cleaning and disinfection (e.g., amount, dilution, contact time, safe use, and disposal). Facility policies and procedures should also address prompt and appropriate cleaning and decontamination of spills of blood or other potentially infectious materials. Housekeeping surfaces, (e.g., floors, walls, sinks) carry less risk of disease transmission than clinical contact

surfaces and can be cleaned with soap and water or cleaned and disinfected if visibly contaminated with blood.

Additional guidance for the cleaning and disinfection of environmental surfaces—including for cleaning blood or body substance spills—is available in the *Guidelines for Environmental Infection Control in Health-Care Facilities* (available at: http://www.cdc.gov/hicpac/pdf/guidelines/eic_in_HCF_03.pdf) and the *Guideline for Disinfection and Sterilization in Healthcare Facilities* (available at: http://www.cdc.gov/hicpac/pdf/guidelines/Disinfection_Nov_2008.pdf).

Key Recommendations for ENVIRONMENTAL INFECTION PREVENTION AND CONTROL in Dental Settings

1. Establish policies and procedures for routine cleaning and disinfection of environmental surfaces in dental health care settings.
   a. Use surface barriers to protect clinical contact surfaces, particularly those that are difficult to clean (e.g., switches on dental chairs, computer equipment) and change surface barriers between patients.
   b. Clean and disinfect clinical contact surfaces that are not barrier-protected with an EPA-registered hospital disinfectant after each patient. Use an intermediate-level disinfectant (i.e., tuberculocidal claim) if visibly contaminated with blood.
2. Select EPA-registered disinfectants or detergents/disinfectants with label claims for use in health care settings.
3. Follow manufacturer instructions for use of cleaners and EPA-registered disinfectants (e.g., amount, dilution, contact time, safe use, disposal).

Dental Unit Water Quality

Dental unit waterlines (i.e., plastic tubing that carries water to the high-speed handpiece, air/water syringe, and ultrasonic scaler) promote bacterial growth and development of biofilm due to the presence of long narrow-bore tubing, inconsistent flow rates, and the potential for retraction of oral fluids. Dental health care personnel and patients could be placed at risk of adverse health effects if water is not appropriately treated.

All dental units should use systems that treat water to meet drinking water standards (i.e., ≤ 500 CFU/mL of heterotrophic water bacteria). Independent reservoirs—or water-bottle systems—alone are not sufficient. Commercial products and devices are available that can improve the quality of water used in dental treatment. Consult with the dental unit manufacturer for appropriate water maintenance methods and recommendations for monitoring dental water quality. During surgical procedures,[1] use only sterile solutions as a coolant/irrigant using an appropriate delivery device, such as a sterile bulb syringe, sterile tubing that bypasses dental unit waterlines, or sterile single-use devices.

Guidance on dental unit water quality can be found in the *Guidelines for Infection Control in Dental Health-Care Settings—2003* (available at: www.cdc.gov/mmwr/PDF/rr/rr5217.pdf), and the questions and answers on Dental Unit Water Quality (available at: http://www.cdc.gov/oralhealth/infectioncontrol/questions/dental-unit-water-quality.html).

Key Recommendations for DENTAL UNIT WATER QUALITY in Dental Settings

1. Use water that meets EPA regulatory standards for drinking water (i.e., ≤ 500 CFU/mL of heterotrophic water bacteria) for routine dental treatment output water.
2. Consult with the dental unit manufacturer for appropriate methods and equipment to maintain the quality of dental water.
3. Follow recommendations for monitoring water quality provided by the manufacturer of the unit or waterline treatment product.
4. Use sterile saline or sterile water as a coolant/irrigant when performing surgical procedures.

Risk Assessment

Facilities are encouraged to use the Infection Prevention Checklist for Dental Settings (Appendix A)—a companion to the summary guide—to periodically assess practices in their facility and ensure they are meeting the minimum expectations for safe care. In the course of auditing practices, facilities may identify lapses in infection control. If such lapses are identified, efforts should be made to correct the practices, appropriately educate DHCP (if applicable), and determine why the correct practice was not being performed. In addition, consideration should also be made for determining the risk posed to patients by the deficient practices. Certain infection control lapses (e.g., reuse of syringes on more than one patient or to access a medication container that is used for subsequent patients, reuse of lancets) have resulted in bloodborne pathogen transmission and should be halted immediately. Identification of such lapses warrants immediate consultation with the state or local health department and appropriate notification and testing of potentially affected patients. Additional resources describing approaches to evaluation and management of infection control breaches identified in health care settings—including those involving lapses related to reprocessing of medical devices—can be found in CDC's Steps for Evaluating an Infection Control Breach (available at: http://www.cdc.gov/hai/outbreaks/steps_for_eval_IC_breach.html). In addition, for circumstances warranting patient notification, CDC has developed a Patient Notification Toolkit (available at: http://www. cdc.gov/injectionsafety/pntoolkit/index.html) to assist health care facilities with conducting a patient notification.

Conclusions

The information presented in this document represents basic infection prevention expectations for safe care in dental health care settings. This guidance is not all-encompassing. DHCP and others are encouraged to refer to the original source documents, which provide more detailed guidance and references for the information included in this guide. DHCP are also encouraged to visit the main CDC Web page (www.cdc.gov) for the most current infection prevention information about emerging pathogens and updated information about existing recommendations.