

## Guidelines for Infection Control in Dental Health Care Settings

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Continuing Education Units: 4 hours

*Online Course:* [www.dentalcare.com/en-US/dental-education/continuing-education/ce90/ce90.aspx](http://www.dentalcare.com/en-US/dental-education/continuing-education/ce90/ce90.aspx)

*Disclaimer:* Participants must always be aware of the hazards of using limited knowledge in integrating new techniques or procedures into their practice. Only sound evidence-based dentistry should be used in patient therapy.

In 2003, the U.S. Centers for Disease Control and Prevention (CDC) published updated recommendations for dental infection control. Developed in collaboration with authorities on infection control from the CDC and other public agencies, academia, and private and professional organizations, this course consolidates and expands previous CDC recommendations and incorporates the infection-control provisions of the Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens Standard. This course provides an overview of current CDC recommendations for minimizing the potential for disease transmission during the delivery of dental care.

### **Conflict of Interest Disclosure Statement**

- The authors report no conflicts of interest associated with this work.

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### Overview

In 2003, the U.S. Centers for Disease Control and Prevention (CDC) published updated recommendations for dental infection control. Developed in collaboration with authorities on infection control from the CDC and other public agencies, academia, and private and professional organizations, “Guidelines for Infection Control in Dental Health-Care Settings — 2003” consolidates and expands previous CDC recommendations and incorporates the infection-control provisions of the Occupational Safety and Health Administration (OSHA) Bloodborne Pathogens Standard.

Each recommendation in the 2003 document is categorized on the basis of existing scientific data, theoretical rationale, and applicability. The CDC category designations, as described below, accompany each recommendation cited in this course.

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

**Category IB** recommendations are strongly recommended for implementation and supported by experimental, clinical, or epidemiologic studies and a strong theoretical rationale.

**Category IC** recommendations are required for implementation as mandated by federal or state regulation or standard.\* When the “IC” designation is used, a second rating may be included to provide the basis of existing scientific data, theoretical rationale, and applicability.

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\* The omission of a Category IC designation in the CDC document should not be construed as a definitive absence of regulations. Always check with state and local authorities to ensure compliance with all laws that apply in your area.

The 2003 CDC guidelines address educating and protecting dental healthcare personnel; preventing transmission of bloodborne pathogens (including postexposure management); hand hygiene; personal protective equipment; contact dermatitis and latex hypersensitivity; sterilization and disinfection of patient-care items; environmental infection control (encompassing operator surface management and medical waste); dental unit waterlines, biofilm, and water quality; dental handpieces and other devices that attach to dental unit airlines and waterlines; radiology; aseptic technique for parenteral medications; disposable devices; oral surgical procedures; handling biopsy specimens; infection control for the dental laboratory; tuberculosis in dentistry; and program evaluation. The document also discusses pre-procedural mouthrinses, laser/electrosurgery plumes and surgical smoke, and prion diseases such as Creutzfeldt-Jakob disease. However, because of insufficient scientific evidence or lack of consensus regarding the efficacy of potential interventions, CDC currently designates these topics as “unresolved issues” and provides no recommendations. As such, these areas of the 2003 guidelines are not covered in this course.

Although this course provides an overview of current CDC recommendations for minimizing the potential for disease transmission during the delivery of dental care, all dental healthcare personnel are encouraged to review the complete guidelines. It includes a wealth of valuable background information and references that promote understanding the need for a comprehensive dental infection control program. “*Guidelines for Infection Control in Dental Health-Care Settings — 2003*” is available free of charge and in its entirety through the CDC website.

### Learning Objectives

**Upon the completion of this course, the dental professional should be able to:**

- Differentiate between OSHA standards and CDC guidelines as they relate to dental infection control.
- Outline the objectives and goals in establishing an infection control program in the dental healthcare setting.
- Differentiate between universal precautions and standard precautions.
- List infectious diseases relevant to dentistry.
- Identify and describe methods of disease transmission.
- Discuss occupational exposures to bloodborne pathogens, including prevention, post-exposure management, and prophylaxis.
- Summarize how to establish and manage an infection control program.
- Identify infectious hazards in the dental setting.
- Evaluate the practice setting’s infection control program.

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### Glossary A-D

**administrative controls** – Policies, procedures, and enforcement measures targeted at reducing the risk of occupational exposure to infectious persons: examples include postponing non-emergency treatment of patients suspected of having active tuberculosis.

**aerosols** – Particles of respirable size (<10µm) generated by both humans and environmental sources that can remain viable and airborne for extended periods in the indoor environment; commonly generated in dentistry during use of handpieces, ultrasonic scalers, and air/water syringes.

**aseptic** – Describing the absence of contamination, infectious materials, or agents.

**bacteria** – A group of one-celled vegetative microorganisms found in nature or in the bodies of plants and animals.

**biofilm** – A complex colony of microorganisms, most notably bacteria, that forms on surfaces that are bathed in water.

**biological indicator** – Device that monitors the sterilization process by using a standardized population of resistant bacterial spores; verifies that all the parameters necessary for sterilization were present. Also called “spore test.”

**bloodborne disease** – An illness transmitted by exposure to pathogens in the blood.

**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 and C viruses and HIV.

**carrier** – An individual, immune or recovered from a disease, who harbors and can transmit the infectious agent.

**chemical indicator** – Device that monitors the sterilization process by changes in color or form with exposure to one or more sterilizing conditions (e.g., temperature, steam); intended to detect potential sterilization failures due to incorrect packaging, incorrect sterilizer loading, or equipment malfunction.

**clinical contact surface** – Environmental surfaces that come into direct contact with hands or instruments during patient care; examples include light handles, countertops, and device control switches.

**contamination** – The presence of microorganisms (usually those capable of causing disease or infection) on living or nonliving surfaces.

**critical** – The category of medical devices or instruments that cut or otherwise penetrate bone or soft tissues, providing access to the bloodstream or normally sterile tissue; examples

include anesthetic needles, surgical burs, and scalpel blades.

**date-related instrument storage** – A storage practice that distributes sterile instrument packs to chairside on a “first in, first out” basis.

**direct contact** – Physical transfer of microorganisms between an infected or colonized person and a susceptible host.

**disinfection** – Destruction of most pathogenic and other kinds of microorganisms (but not spores) by physical or chemical means.

**droplet nuclei** – Microscopic particles (5 microns or less in diameter) formed by the dehydration of airborne droplets containing microorganisms. These particles can remain suspended in the air for long periods of time.

## Glossary E-I

**engineering controls** – Devices that isolate or remove the risk of exposure to bloodborne pathogens in a workplace; examples include sharps containers, needle recapping devices, and self-sheathing needles.

**environmental surface** – Surfaces within a dental or medical treatment area that are not directly involved in patient care, such as countertops, drawer handles, floors and walls, and instrument control panels, which may or may not become contaminated during the course of treatment. Also see *clinical contact surfaces* and *housekeeping surfaces*.

**event-related instrument storage** – A storage practice that recognizes that a package and its contents should remain sterile until some event causes the item(s) to become contaminated.

**fluid infusion system** – System for delivering intravenous fluids to patients; includes IV bags, flowmeter, tubing, and an intravenous catheter.

**flushing** – The act of running water through waterlines and/or the devices attached to them.

**fomite** – An inanimate object (as a keyboard, drawer handle, pen, doorknob, or clothing) that may be contaminated with infectious organisms and serve in their transmission.

**fungi** – Group of microorganisms that includes yeasts, molds, and mildews and is a source of opportunistic infections for immunocompromised individuals.

**hand hygiene** – General term that describes the removal of debris and organic matter from the hands by washing and/or the use of an antiseptic agent.

**HBV** – See *hepatitis B virus*.

**heat sterilization** – Temperature-driven process that destroys all microbial life, including bacterial endospores.

**hepatitis** – An inflammation of the liver caused by viruses, bacteria, parasites, or toxic reactions to drugs, alcohol, or chemicals; primary symptoms include jaundice and liver enlargement.

**hepatitis B virus** – A highly transmissible bloodborne viral agent that may cause inflammation of and damage to the liver. Abbreviated “HBV.”

**hepatitis C virus** – Virus that can cause very serious liver disease (acute and chronic). Abbreviated “HCV.”

**high-level disinfection** – The process that inactivates vegetative bacteria, mycobacterium, fungi, and viruses but not necessarily high numbers of bacterial spores.

**HIV** – The human immunodeficiency virus, the virus that can cause AIDS.

**hospital disinfectant** – A germicide registered by the U.S. Environmental Protection Agency that inactivates the test microbes *salmonella choleraesuis*, *staphylococcus aureus*, and *pseudomonas aeruginosa* for use on inanimate objects in dental and medical facilities.

**housekeeping surface** – Environmental surface that is not involved in the direct delivery of dental care but requires regular cleaning to remove soil and dust; examples include floors, sinks, and walls.

**immunization** – The process, through vaccination or natural exposure, by which a person becomes protected against a disease.

**indirect contact** – Contact between a susceptible host and a contaminated object that is not the original source of the contamination; examples of contaminated objects that can contribute to indirect contact include instruments, equipment, surfaces, or a healthcare worker’s hands when contaminated with patient materials.

**intermediate-level disinfection** – Process that inactivates vegetative bacteria, most fungi, mycobacterium, and most viruses but is ineffective against bacterial spores.

**intermediate-level disinfectant** – A liquid chemical agent registered by the Environmental Protection Agency as a hospital disinfectant that also has tuberculocidal activity.

## Glossary L-W

**low-level disinfection** – Process that inactivates most vegetative bacteria, some fungi, and some viruses but does not reliably inactivate resistant microorganisms such as mycobacterium or bacterial spores.

**mode of transmission** – Means by which pathogens are transferred from a source to a new host.

**other potentially infectious materials (OPIM)** – Occupational Safety and Health Administration term that refers to body fluids or tissues that (a) may contain bloodborne pathogens (in dentistry, this includes saliva) or (b) are visibly contaminated with blood. Abbreviated “OPIM.”

**parenteral** – Taken into the body or administered in a manner other than through the digestive tract, as by intravenous or intramuscular injection.

**pathogenic** – Capable of causing disease in a host.

**patient-care item(s)** – Instruments and supplies used to provide dental examinations, prophylaxis, or treatment; examples include handpieces, cotton rolls, sutures, and air-water syringes.

**percutaneous injury** – An injury that penetrates the skin, such as a needlestick or a cut with a sharp object.

**personal protective equipment (PPE)** – Required clothing or devices worn by workers for protection

against hazards; in dentistry: masks, gloves, protective apparel, and protective eyewear. Abbreviated “PPE.”

**qualified healthcare professional** – A physician or other healthcare professional who has the necessary and current training, expertise, and credentials to provide occupational health and post-exposure management care to dental team members.

**standard precautions** - Practices and procedures that integrate and expand the elements of universal precautions into a standard of care intended to protect healthcare workers and patients from pathogens that can be spread by blood or any other body fluids (except sweat), regardless of whether they contain blood; applies to contact with blood, all body fluids, all body secretions and excretions, non-intact skin, and mucous membranes.

**sterilant** – A liquid chemical germicide capable of destroying all forms of microbiological life, including high numbers of resistant bacterial spores.

**sterilization** – A physical or chemical process that destroys all microorganisms, including spores.

**universal precautions** – Series of practices and procedures designed to reduce the risk of disease transmission by assuming that all blood and other potentially infectious materials are indeed contaminated with bloodborne pathogens.

**vaccination** – Inoculation with a vaccine with the intent of producing immunity.

**vaccine** – A product administered through needle injections, by mouth, or by aerosol that produces immunity, therefore protecting the body against the disease.

**viruses** – Submicroscopic organisms that infect cells, possibly causing disease.

**work practice controls** – Procedures that reduce the likelihood of exposure to infectious materials by altering the manner in which a task is performed; for examples, recapping a needle using the one-handed scoop technique is safer than using two hands.

## Overview of Agency Roles in Dental Infection Control

A number of federal agencies play important roles in dental infection control, either directly or indirectly.

One of 13 branches of the U.S. Department of Health and Human Services, the CDC is the premier nation’s public health agency. As part of its mission to prevent and control infectious and chronic diseases, injuries, workplace hazards, and environmental health threats, CDC’s infection control guidelines seek to protect both healthcare providers and the patients they treat. Although CDC has no regulatory authority, its infection control recommendations are considered a standard of care and have been adopted by some state dental boards.

While CDC is concerned with public health (that is, the health of patients, healthcare providers, and the population at large), OSHA’s purview is limited to worker safety.

Under the Occupational Safety and Health Act of 1970, OSHA’s role is to protect the safety and health of America’s workers by establishing and enforcing legal standards that encourage occupational safety and health. All employers and their employees within the 50 states, the District of Columbia, Puerto Rico, and other U.S. territories must comply with OSHA regulations (under federal OSHA or under their OSHA-approved state job safety and health plan). Failure to comply can result in monetary penalties or even jail time.

**Always refer to the individual state OSHA regulations.**

Published in 1991 and updated in 2001, the OSHA Bloodborne Pathogens Standard requires employers to adopt practices and procedures that it deems reasonably necessary and appropriate to protect workers against occupational exposure to blood or other potentially infectious materials. The agency’s enforcement procedures for this standard are outlined in a directive published in November 2001, “*Enforcement Procedures for the Occupational Exposure to Bloodborne Pathogens*”.

Although the U.S. Food and Drug Administration (FDA) and the U.S. Environmental Protection (EPA) agency do not establish guidelines for dental

workers per se, these agencies regulate many of the products and procedures used to promote health and safety.

The FDA's Center for Devices and Radiological Health (CDRH) is charged with regulating medical devices — that is, those products used by healthcare professionals in the delivery of medical or dental care. Infection control products such as gloves, face masks, safety syringes, sharps containers, sterilizers, waterline cleaners and other contamination-control devices, and automated instrument cleaners are all classified as medical devices. FDA's CDRH also must approve for market any chemical sterilant/high-level disinfectant made commercially available in the United States. FDA's Center for Drug Evaluation and Research assesses and approves vaccines as well as the drugs used in post exposure prophylaxis.

The EPA registers commercially available intermediate- and low-level disinfectants used on environmental surfaces as well as the chemical disinfectants for managing contamination in dental unit waterlines. Furthermore, EPA issues guidelines and regulations for proper management of solid and hazardous wastes under the Resource Conservation and Recovery Act (RCRA). It assigns “cradle to grave” responsibility to generators of hazardous waste, including dental offices.

### Principles of Disease Transmission

The nature of many dental procedures can place dental team members and patients in close contact with potential pathogens, especially those found in blood. Diseases can be transmitted from the patient to the dental worker, from the dental worker to the patient, or from one patient to another. In the dental setting, possible modes of transmission include:

- direct contact with blood, oral fluids, or other patient materials;
- indirect contact with contaminated objects (such as instruments, equipment, environmental surfaces, or a team member's contaminated hands);
- droplet contact, in which spray or spatter containing microorganisms travels a short distance before settling on the mucous membranes of the eyes, nose, or mouth; and

- inhalation of evaporated microorganisms (“droplet nuclei”) that can remain airborne for extended periods of time as aerosols.

For a disease to be transmitted, a number of conditions must be met, referred to as the “chain of infection”.

- **A pathogen must be present in sufficient numbers to cause infection.** The disease-causing agent may be a virus (such as the ones that cause hepatitis B, hepatitis C, or herpes) or bacteria like *staphylococci*, *streptococci*, or *Legionella* species.
- **The pathogen must have a reservoir where it can reside and multiply.** The bloodstream, mucous membranes, a laboratory culture, and a dental unit waterline are all examples of potential reservoirs for microorganisms.
- **The pathogen must have a mode of transmission from a source host.** A needlestick, a splash to the mucous membranes of the eyes, nose, or mouth, or inhalation of contaminated aerosols are examples of various modes of transmission.
- **The pathogen must have a proper portal of entry into a new host.** For example, for a bloodborne pathogen to cause infection in a new host, it must have a way to enter the bloodstream, such as through a break in the skin.
- **The new host must be susceptible to the pathogen.** If the individual is vaccinated against or has had prior exposure to the pathogen that resulted in immunity, exposure will not result in disease.

Infection control involves breaking one or more links in the chain.

### Standard Precautions

The concept of standard precautions has been a cornerstone of dental infection control since the mid-1980s. Encompassing a set of infection control and safety procedures intended to protect against bloodborne disease transmission, universal precautions includes handwashing, the use of personal protective equipment (gloves, eyewear, face protection, protective apparel), controls to prevent injuries, and proper handling of patient-care items and contaminated surfaces. As the word “universal” suggests, the precautions are applied when treating all patients, regardless of their health history or presumed risk of bloodborne disease.

Although OSHA's Blood borne Pathogens Standard still refers to universal precautions in 1996, the CDC changed its focus from universal precautions to "standard precautions." Intended to further reduce the risk of healthcare-associated infections, standard precautions expands the idea of which fluids are considered infectious. While universal precautions mainly prevent exposure to blood, standard precautions guard against exposure to all body fluids, secretions, and excretions, regardless of whether they contain blood. (The exception is sweat, which is not infectious.)

As explained in *From Policy to Practice: OSAF's Guide to the Guidelines*,<sup>10</sup> "For in-patient settings like hospitals, standard precautions expanded the set of infection control procedures required for safe patient care. In routine dentistry, however, there is little practical difference between universal precautions and standard precautions. All the precautions traditionally used to protect against blood and blood-contaminated saliva also protect against exposure to any other fluids that would typically be encountered in the dental setting."

For patients who present diseases that are transmitted through airborne, droplet, or contact transmission, standard precautions should be coupled with expanded or transmission-based precautions. To protect against diseases such as tuberculosis, influenza, or chickenpox, necessary transmission-based precautions might include patient placement (isolation), adequate room ventilation, enhanced respiratory protection (N95 respirators) for team members, or postponement of non-emergency dental procedures. Although patients who are acutely ill with these diseases typically do not seek routine outpatient dental care, dental team members should have a general understanding of precautions for diseases transmitted by all routes. Hospital-based dental team members may be called upon to treat such patients; patients infected with these diseases also may show up at outpatient dental facilities for emergency dental care.

### **CDC Guidelines for Infection Control in Dental Healthcare Settings**

In addition to vaccination, CDC considers engineering controls to be the healthcare professional's primary means of preventing or reducing exposure to blood and body fluids.

Engineering controls rely on the device's technology (rather than the user's technique) to reduce the potential for injuries that could result in disease transmission. Instrument cassettes, which minimize handling of contaminated instruments during processing, are an example of an engineering control. Automated instrument cleaners are another.

Where engineering controls are not available or appropriate, work-practice controls and use of personal protective equipment (PPE) become even more important in preventing exposure to blood and body fluids. Always perform tasks in the safest way possible. Passing instruments with sharp ends pointed away from all bodies and using a one-handed "scoop" technique to recap needles between injections are examples of work practice controls. Furthermore, dental team members should always use task-appropriate gloves, face protection, eye protection, and protective apparel to provide a physical barrier between themselves and the patient.

Dental practices should develop a written infection-control program to prevent or reduce the risk of disease transmission. The program should outline the policies, procedures, practices, technologies, and products used to prevent occupational injuries and illnesses among dental team members as well as healthcare-associated infections among patients.

### **Personnel Health Elements of an Infection Control Program**

As part of a dental facility's comprehensive infection control program, CDC encourages all practice settings to incorporate a plan for team-member health in the work setting. Such a plan should educate staff on the principles of infection control, identify work-related infection risks, institute preventive measures, and ensure prompt exposure management and medical follow-up.

The practice setting should establish a working relationship with a qualified healthcare professional/facility to provide dental team members with appropriate occupational health services like vaccinations (hepatitis B, influenza, measles, mumps, rubella, tetanus, and varicella-zoster) and postexposure evaluation and management. To ensure timely management of



injuries and exposures, such an arrangement should be set up before team members are placed at risk for exposure. “Qualified healthcare professionals” can be found in an occupational health program of a hospital, in educational institutions, or with healthcare facilities that offer personnel health services. Check with the State Department of Health for required and recommended vaccinations.

CDC’s administrative recommendations for personnel health elements of an infection control program are listed in Table 2.

### Preventing Occupational Transmission of Bloodborne Pathogens

Dental team members work in close contact with blood and blood-contaminated saliva, putting them at risk of exposure to bloodborne pathogens such as hepatitis B virus (HBV), hepatitis C virus (HCV), and the human immunodeficiency virus (HIV).

#### Vaccination

Vaccination can protect against the hepatitis B virus, but only if it results in seroconversion (development of antibodies). As such, CDC recommendations encourage dental settings to:

- Offer the HBV vaccination series to all dental healthcare personnel with potential

occupational exposure to blood or other potentially infectious material (IA, IC).

- Always follow U.S. Public Health Service/CDC recommendations for hepatitis B vaccination, serologic testing, follow-up, and booster dosing (IA, IC).
- Test dental healthcare personnel for antibodies one to two months after completion of the three-dose HBV vaccination series (IA, IC). If antibodies are present, the team member is immune. If no antibody response occurs to the primary vaccine series:
  - The team member should complete a second three-dose vaccine series, or be evaluated to determine if he/she is a carrier (IA, IC).
  - At the completion of the second vaccine series, retest for antibodies. If no response to the second three-dose series occurs, the non-responder should be tested to determine if he/she is a carrier (IC).
  - Counsel non-responders who are not carriers about their susceptibility to HBV infection and precautions they need to take (IA, IC).
- Provide employees appropriate education regarding the risks of HBV transmission and the availability of the vaccine. According to the 2011 OSHA Fact Sheet regarding Hepatitis B vaccination, employees who decline the vaccination series must sign a declination form to be kept on file with the employer (IC).

**Table 1. CDC Category Designations**

<b>Category IA</b>	Recommendations are strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.
<b>Category IB</b>	Recommendations are strongly recommended for implementation and supported by experimental, clinical, or epidemiologic studies and a strong theoretical rationale.
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* The omission of a Category IC designation in the CDC document should not be construed as a definitive absence of regulations. Always check with state and local authorities to ensure compliance with all laws that apply in your area.	

**Table 2. Personnel Health Elements of an Infection Control Program**

<p><b>A. General Recommendations</b></p> <ol style="list-style-type: none"> <li>1. Develop a written health program for dental health-care personnel 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 (IB).</li> <li>2. Establish referral arrangements with qualified health-care professionals to ensure prompt and appropriate provision of preventive services, occupationally related medical services, and postexposure management with medical follow-up (IB, IC).</li> </ol>
<p><b>B. Education and Training</b></p> <ol style="list-style-type: none"> <li>1. Provide dental health-care personnel 1) on initial employment, 2) when new tasks or procedures affect the employee's occupational exposure, and 3) at a minimum, annually, with education and training regarding occupational exposure to potentially infectious agents and infection-control procedures/protocols appropriate for and specific to their assigned duties (IB, IC).</li> <li>2. Provide educational information appropriate in content and vocabulary to the educational level, literacy, and language of dental health-care personnel (IB, IC).</li> </ol>
<p><b>C. Immunization Programs</b></p> <ol style="list-style-type: none"> <li>1. Develop a written comprehensive policy regarding immunizing dental health-care personnel, including a list of all required and recommended immunizations (IB).</li> <li>2. Refer dental health-care personnel to a prearranged qualified health-care professional or to their own health-care professional to receive all appropriate immunizations based on the latest recommendations as well as their medical history and risk for occupational exposure (IB).</li> </ol>
<p><b>D. Exposure Prevention and Postexposure Management</b></p> <ol style="list-style-type: none"> <li>1. Develop a comprehensive postexposure management and medical follow-up program (IB, IC).             <ol style="list-style-type: none"> <li>a. Include policies and procedures for prompt reporting, evaluation, counseling, treatment, and medical follow-up of occupational exposures.</li> <li>b. Establish mechanisms for referral to a qualified health-care professional for medical evaluation and follow-up.</li> <li>c. Conduct a baseline TST, preferably by using a two-step test, for all dental health-care personnel who might have contact with persons with suspected or confirmed infectious TB, regardless of the risk classification of the setting (IB).</li> </ol> </li> </ol>
<p><b>E. Medical Conditions, Work-Related Illness, and Work Restrictions</b></p> <ol style="list-style-type: none"> <li>1. Develop and have readily available to all dental health-care personnel comprehensive written policies regarding work restriction and exclusion that include a statement of authority defining who can implement such policies (IB).</li> <li>2. Develop policies for work restriction and exclusion that encourage dental health-care personnel to seek appropriate preventive and curative care and report their illnesses, medical conditions, or treatments that can render them more susceptible to opportunistic infection or exposures; do not penalize dental health-care personnel with loss of wages, benefits, or job status (IB).</li> <li>3. Develop policies and procedures for evaluation, diagnosis, and management of dental health-care personnel with suspected or known occupational contact dermatitis (IB).</li> <li>4. Seek definitive diagnosis by a qualified health-care professional for any dental health-care personnel with suspected latex allergy to carefully determine its specific etiology and appropriate treatment as well as work restrictions and accommodations (IB).</li> </ol>
<p><b>F. Records Maintenance, Data Management, and Confidentiality</b></p> <ol style="list-style-type: none"> <li>1. Establish and maintain confidential medical records (e.g., immunization records and documentation of tests received as a result of occupational exposure) for all dental health-care personnel (IB, IC).</li> <li>2. Ensure that the practice complies with all applicable federal, state, and local laws regarding medical recordkeeping and confidentiality (IC).</li> </ol>

## Exposure Prevention

CDC recommends the following general precautions for preventing exposures to bloodborne pathogens:

- Use standard/universal precautions for all patient encounters (IA, IC).
- Consider any sharp item (such as needles, scalers, burs, lab knives, and wires) that is contaminated with patient blood and saliva to be potentially infective, and establish engineering controls and work practices to prevent injuries (IB, IC).

In addition, CDC strongly supports the use of several specific engineering and work-practice controls. Practice settings should:

- Identify, evaluate, and select devices with engineered safety features at least annually and as they become available on the market. Such devices include safer anesthetic syringes, blunt suture needles, retractable scalpels, and needleless IV systems) (IC).
- Place used disposable syringes and needles, scalpel blades, and other sharp items in appropriate puncture-resistant containers. Sharps containers should be located as close to the sharps' point of use as possible (IA, IC).
- Avoid using both hands to recap used needles. Likewise, steer clear of any other technique that involves directing the sharp end of a needle toward any part of the body. Do not bend, break, or remove needles before disposal (IA, IC).
- Use either a one-handed scoop technique or a mechanical device designed for holding the needle cap when recapping needles between multiple injections or before removing from a non-disposable aspirating syringe (IA, IC).

## Post-Exposure Management and Prophylaxis

Although infection control precautions are highly effective when used routinely, accidents can happen. When sharps injuries or unexpected spills or splashes to nonintact skin or mucosa occur, tend to them *immediately*. Exposure incidents are medical emergencies. Ensuring prompt evaluation and treatment gives the occupationally exposed team member the best chance of avoiding infection.

When an exposure occurs:

- Follow CDC recommendations after

percutaneous, mucous membrane, or nonintact skin exposure to blood or other potentially infectious material (IA, IC).

- First perform basic first aid to cleanse the wound or affected area.
- Then report the injury to the employer or infection control coordinator for the practice setting. Providing as much information as possible about the incident will help the physician or other qualified healthcare professional evaluate and manage the exposure.
- Follow instructions for obtaining IMMEDIATE and APPROPRIATE medical care from the healthcare professional who handles the facility's occupational health program.

Managing Occupational Exposures to Bloodborne Pathogens (see Appendix I).

## Hand Hygiene

Proper handwashing, hand antisepsis, or surgical hand antisepsis are simple acts that help reduce the risk of disease transmission. Transient microorganisms can come to rest on the hands following direct contact with patients or contaminated environmental surfaces. These microorganisms, which colonize the top layers of the skin, are most frequently associated with healthcare-acquired infections. Fortunately they generally can be removed with routine handwashing.

Lapses in hand hygiene among hospital workers have resulted in major disease outbreaks, numerous healthcare-associated infections, and the spread of antibiotic-resistant infections.

Recently, alcohol-based hand rubs have been gaining popularity in hospital settings. These agents provide persistent antimicrobial activity on the skin and can be very useful in certain circumstances (for example, during boil-water advisories, when providing humanitarian aid in remote areas without a clean water supply). These agents are not recommended for routine hand hygiene as these agents are not effective cleaners. As such, CDC recommends:

- Perform hand hygiene with soap and water when hands are visibly dirty or contaminated with blood or other potentially infectious material. The soap used can be either antimicrobial, or non-antimicrobial. If hands are

not visibly soiled, an alcohol-based hand rub can also be used. Follow the manufacturer's instructions (IA).

Indications for hand hygiene include:

- when hands are visibly soiled (IA, IC);
- after barehanded touching of inanimate objects likely to be contaminated by blood, saliva, or respiratory secretions (IA, IC);
- before and after treating each patient (IB);
- before donning gloves (IB); and
- immediately after removing gloves (IB, IC).

The CDC recommends the following steps to properly wash hands:

1. Wet your hands with clean, running water and apply soap.
2. Rub your hands together to make a lather and scrub them well; be sure to scrub the backs of your hands, between your fingers and under your nails using a nail stick.
3. Continue rubbing your hands for at least 20 seconds. As a 20 second timer, sing "Happy Birthday" or "Mary Had a Little Lamb" twice to the end.
4. Rinse your hands well under running water.
5. Dry hands using a clean towel or allow them to air dry.

The World Health Organization (WHO) created a poster to show hand washing recommendations (see Appendix II).

To reduce the risk of postoperative infections, oral surgical procedures require more stringent hand-hygiene measures that incorporate the use of an antimicrobial agent.

- For oral surgical procedures, perform surgical hand antisepsis before donning sterile surgeon's gloves. Follow the manufacturer's instructions by using either a.) an antimicrobial soap and water handwash, or b.) a soap and water handwash followed by drying of the hands and application of an alcohol-based surgical hand-scrub product with persistent activity (IB).

To prevent contamination of hand-hygiene products:

- 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 (IA). Studies have found that bacteria grow on the layer between the old and new product.

Frequent handwashing can compromise the skin's integrity. Because breaks in the skin can provide a portal of entry for bloodborne pathogens:

- Use hand lotions to prevent skin dryness associated with handwashing (IA).

Some emollients and antiseptics can degrade glove material. As such, CDC encourages dental team members to consider the compatibility of lotion and antiseptic products as well as the effect of petroleum or other oil emollients on the integrity of gloves during product selection and glove use (IB).

Other recommendations for hand hygiene include:

- Keep fingernails short with smooth, filed edges to allow thorough cleaning and prevent glove tears (II).
- Do not wear artificial fingernails or extenders when having direct contact with patients at high risk (e.g., those in intensive care units or operating rooms) (IA). In fact, the use of artificial fingernails is usually not recommended (II).
- Avoid wearing hand or nail jewelry if it makes donning gloves more difficult or if it compromises the fit and integrity of the glove (II).

### **Personal Protective Equipment**

As part of standard precautions, dental team members who are at risk of exposure to potentially infectious materials must wear task-appropriate personal protective equipment (PPE). The dental employer is responsible for supplying all PPE. The PPE that is chosen should fit well and be as comfortable as possible. Should the wearer develop any sensitivity or allergy, the employer must provide options.

### **Masks, Protective Eyewear, and Face Shields**

To protect the mucous membranes of the eyes, nose, and mouth:

- Wear a surgical mask and eye protection with solid side shields or a 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 (IB, IC).
- Change masks between patients or during

- patient treatment if the mask becomes wet (IB).
- Clean reusable facial protective equipment (protective eyewear or face shields) with soap and water between patients. If visibly soiled, clean and disinfect (II).

### Protective Clothing

Protective garments are worn over street clothes to protect them from contamination.

- Wear protective clothing that covers personal clothing and skin likely to be soiled with blood, saliva, or other potentially infectious materials (IB, IC). Protective clothing can include a reusable or disposable gown, laboratory coat, or uniform. For dental procedures that generate spatter, ensure that forearms are covered.
- OSHA does require employers to launder any reusable PPE such as employee uniforms. Contaminated laundry should be placed and transported in bags or containers labeled or color-coded as hazardous. Standard precautions must be followed while handling contaminated clothing, including the use of protective gloves and other appropriate PPE should be worn. If the office utilizes an off-site facility, the laundry must be placed in marked bags or containers so the laundry facility knows to use standard precautions.
- Change protective clothing if visibly soiled. Change the garment immediately (or as soon as feasible) if it is penetrated by blood or other potentially infectious fluids (IB, IC).

### Gloves

Patient-care, sterile surgical, and utility gloves are offered in a variety of sizes, colors, and materials.

- Wear patient-care gloves when a potential exists for contacting blood, saliva, other potentially infectious materials, or mucous membranes (IB, IC).
- Wear a new pair of patient-care gloves for each patient, remove them promptly after use, and wash hands immediately to avoid transfer of microorganisms to other patients or environments (IB).
- Wear sterile surgeon's gloves when performing oral surgical procedures (IB).
- Remove gloves that are torn, cut, or punctured as soon as feasible. Wash hands before regloving (IB, IC).

- Never wash surgeon's or patient-care gloves before use. Never wash, disinfect, or sterilize gloves for reuse (IB, IC).
- Ensure that appropriate gloves in the correct sizes are readily accessible (IC).
- Use appropriate puncture, and chemical, resistant utility gloves when cleaning instruments and performing housekeeping tasks that involve contact with blood or other potentially infectious materials (IB, IC).
- Consult with glove manufacturers regarding the chemical compatibility of glove material and dental materials used (II).

CDC examined the issue of double-gloving for oral surgical procedures. Although the majority of studies show a lower frequency of inner glove perforation and visible blood on a surgeon's hands when double gloves are worn, the effectiveness of wearing two pairs of gloves in preventing disease transmission has not been demonstrated. As such, the agency makes no recommendation for or against the practice of double-gloving.

To limit the spread of contamination from PPE:

- Remove barrier protection, including gloves, mask, eyewear, and gown before leaving the work area (IC). Work areas include operatories, instrument processing areas, and laboratories.

### Contact Dermatitis and Latex Hypersensitivity

The benefits of gloving and handwashing are undeniable, but some adverse skin conditions can result from frequent and repeated handwashing, exposure to chemicals, and glove use.

A very common condition among dental workers, irritant contact dermatitis is caused by the physical irritation of the skin. It presents as dry, itchy, irritated skin around the area of contact with the offending agent. Irritant contact dermatitis is not an allergic reaction.

Allergic contact dermatitis (also called type IV hypersensitivity) results from exposure to methacrylates, glutaraldehyde, and chemicals used in rubber manufacturing. It often appears as a rash beginning several hours after contact. It usually is confined to the area of contact but can extend slightly beyond.

True latex hypersensitivity is a potentially life-threatening allergy to the proteins contained in natural rubber latex, a common glove material. Also referred to as a type I immediate allergy, this more serious, systemic allergy typically presents within minutes of exposure but also can occur hours later. 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 symptoms, and in rare cases, anaphylaxis. In especially severe reactions that are not medically managed, a type I allergy can result in death.

Any condition that causes cracks or breaks in the skin increases a dental worker's risk of exposure to blood and other body fluids. Furthermore, an unrecognized, untreated type I allergic reaction to latex in a patient or dental team member can result in serious morbidity or mortality. For these reasons, CDC includes the following recommendations in its 2003 guidelines.

- Educate dental healthcare personnel regarding the signs, symptoms, and diagnoses of skin reactions associated with frequent hand hygiene and glove use (IB).
- Screen all patients for latex allergy. Take a thorough health history, and when latex allergy is suspected, refer the patient for medical consultation (IB).
- Ensure a latex-safe environment for patients and dental team members with latex allergy (IB).
- Have emergency treatment kits with latex-free products available at all times (II).

### **Sterilization and Disinfection of Patient-Care Items**

OCDC categorizes patient-care items based on the degree of contact they have with patients. Their degree of contact with the patient suggests their risk of disease transmission. In turn, their risk of disease transmission indicates how they should be processed for reuse.

**Critical items** cut bone or penetrate soft tissue. These instruments carry the highest risk of disease transmission.

- Clean and heat-sterilize critical dental instruments before each use (IA).

**Semi-critical items** touch only mucous membranes. They have a lower risk of transmission than critical items.

- Clean and heat-sterilize semi-critical items before each use (IB).
- Use heat-stable semi-critical items instead of those that are heat-sensitive whenever possible (IB).
- For heat-sensitive critical and semi-critical instruments, reprocess using FDA-cleared sterilant/high-level disinfectants or an FDA-cleared low-temperature sterilization method (such as ethylene oxide). Follow the manufacturer's instructions for use of chemical sterilants/high-level disinfectants (IB).
- Single-use disposable instruments are acceptable alternatives if they are used only once and disposed of correctly (IB, IC).

**Noncritical items** only contact intact skin. As such, they have the lowest risk of disease transmission.

- 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. If visibly contaminated with blood, use an EPA-registered hospital disinfectant with a tuberculocidal claim (i.e., an intermediate-level disinfectant) (IB).

With regard to heat sterilization:

- Use only FDA-cleared medical devices for sterilization and follow the manufacturer's instructions for correct use (IB).
- Allow packages to dry in the sterilizer before they are handled to avoid contamination (IB).

Caution also is required when using chemical sterilants.

- Do not use liquid chemical sterilants/high-level disinfectants for environmental surface disinfection or as holding solutions (IB, IC).
- Inform dental healthcare personnel of all OSHA guidelines for exposure to chemical agents used for disinfection and sterilization (for more information, review OSHA's Hazard Communication Standard).
- Identify areas and tasks that have potential for exposure (IC).

### **The Instrument Processing Area**

To limit the spread of contamination, CDC recommends using a separate instrument

processing area and further dividing the space into designated “dirty” and “clean” areas.

- Designate a central instrument 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.
- Train dental healthcare personnel to employ work practices that prevent contamination of clean areas (II).
- Do not store sterilized instruments in an area where contaminated instruments are held or cleaned (II).

### **Receiving, Cleaning, and Decontamination Work Area (The Dirty Side)**

When collecting, transporting, and cleaning contaminated instruments:

- Minimize handling of loose contaminated instruments during transport to the instrument processing area. Use work-practice controls to minimize exposure potential (for example, carry instruments in a covered container) (II). Clean all visible blood and other contamination from dental instruments and devices before sterilizing or disinfecting them (IA).
- Use automated cleaning equipment such as an ultrasonic cleaner or instrument washer-disinfector to remove debris, improve cleaning effectiveness, and decrease the potential for team member exposure to blood (IB).
- If manual cleaning is necessary, use work-practice controls that minimize contact with sharp instruments (for example, use a long-handled brush held away from the bristles) (IC).
- Wear puncture, and chemical, resistant/heavy-duty utility gloves for instrument cleaning and decontamination procedures (IB).
- Wear appropriate personal protective equipment when splashing or spraying is anticipated during cleaning. Appropriate equipment would include a mask, protective eyewear, and gown. (IC).

### **Preparation and Packaging**

Although the instruments have been cleaned to remove debris, they are not sterile. Wear puncture-resistant utility gloves when inspecting and packaging instruments.

- Use an internal chemical indicator in each package. If the internal indicator cannot be seen from outside the package, also use an external indicator (II).
- Use a container system or wrapping material that is compatible with the specific type of sterilization process (that is, steam autoclave, chemical vapor, dry heat, or ethylene oxide). Be sure that the packaging has received FDA clearance (IB).
- Before sterilization of critical and semicritical items, inspect the instruments for cleanliness, then wrap or place them in containers that will allow them to remain sterile during storage. Cassettes and organizing trays are appropriate for this purpose (IA).

### **Sterilization of Unwrapped Instruments**

Immediate-use steam sterilization, formerly known as “flash” sterilization, when performed correctly and when deemed appropriate, is an effective way to sterilize critical devices. However, the steps must be followed exactly and there is no margin for error. Improper technique can lead to process failure and cross contamination.

Because they do not remain sterilized after the cycle like wrapped instruments, CDC discourages the use of “flash” cycles for routine instrument processing.

- Do not sterilize implantable devices unwrapped (IB).
- Do not store critical instruments unwrapped (IB).

However, immediate-use steam sterilization cycles may be warranted when there is an urgent need for an instrument that will be used immediately after the cycle (for example, the instrument is dropped during treatment and no replacement is available). As such, CDC suggests the following steps to assuring sterility.

- Clean and dry instruments before using a sterilization cycle designated for “unwrapped” instruments (IB).
- Use mechanical and chemical indicators for each unwrapped sterilization cycle. Place an internal chemical indicator among the instruments or items to be sterilized (IB), and monitor cycle time and temperature during the sterilization sequence.
- Allow unwrapped instruments to dry and cool in the sterilizer before they are handled to avoid contamination and thermal injury (II).
- Semi-critical 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 (II).

- Critical instruments intended for immediate reuse can be sterilized unwrapped if the instruments remain sterile during removal from the sterilizer and transport to the point of use (for example, transported in a sterile covered container) (IB).

### **Sterilization Monitoring**

Proper monitoring of sterilization processes involves the use of mechanical techniques, chemical indicators, and biological indicators (spore tests). While biological monitoring provides the best assurance that sterilization equipment and procedures are working as they should, mechanical or chemical monitoring may provide the first indications of a sterilizer malfunction.

- Use mechanical, chemical, and biological monitors according to the manufacturer's instructions to ensure the effectiveness of the sterilization process (IB).
- Monitor each load with mechanical (time, temperature, pressure) and chemical indicators (II).
- Place a chemical indicator on the inside of each package. If the internal indicator is not visible from the outside, also place an exterior chemical indicator on the package (II).
- Place items/packages correctly and loosely into the sterilizer so as not to impede penetration of the sterilant (IB).
- Do not use instrument packs if mechanical or chemical indicators indicate inadequate processing (IB).
- Monitor sterilizers at least weekly by using a biological indicator with a matching control (i.e., biological indicator and control from same lot number) (IB).
- Use a biological indicator for every sterilizer load that contains an implantable device. Verify results before using the implantable device, whenever possible (IB).
- Maintain sterilization records (mechanical, chemical, and biological) in compliance with state and local regulations (IB).

In the case of a positive spore test, CDC recommends:

1. Remove the sterilizer from service and review

sterilization procedures (for example, work practices and use of mechanical and chemical indicators) to determine whether operator error could be responsible (II).

2. Retest the sterilizer by using biological, mechanical, and chemical indicators after correcting any identified procedural problems (II).
  - If the repeat spore test is negative and mechanical and chemical indicators are within normal limits, put the sterilizer back in service (II).
  - If the repeat spore test is positive, do not use the sterilizer until it has been inspected or repaired, or until the exact reason for the positive test has been determined. Recall, to the extent possible, and reprocess all items that had been run through the sterilizer since the last negative spore test. Before placing the sterilizer back in service, rechallenge the sterilizer with biological indicator tests in three consecutive empty chamber sterilization cycles after the cause of the sterilizer failure has been determined and corrected (II).

### **Storage Area for Sterilized Items and Clean Dental Supplies (The Clean Side)**

Store sterile instrument packs to maintain sterility until they are needed.

- Use either date- or event-related shelf-life for storage of wrapped, sterilized instruments, and devices (IB).
- At a minimum, place the date of sterilization and identify the sterilizer used (if multiple sterilizers are used in the facility) on the outside of the packaging material. This facilitates the retrieval of processed items in the event of a sterilization failure (IB).
- Store sterile items and dental supplies in covered or closed cabinets, if possible (II).
- Examine wrapped packages of sterilized instruments before opening them at chairside to ensure the barrier wrap has not been compromised during storage (II).
- If packaging material has been compromised (that is, if it is torn, punctured, wet, or open), reclean, repack, and resterilize any instruments that were inside (II).

### **Environmental Infection Control**

Environmental infection control encompasses two main themes: managing contaminated surfaces and proper handling and disposal of medical waste.



## Surface Management

Environmental surfaces in the dental operator – surfaces of equipment, furniture, walls, and flooring – are all considered noncritical. Because they carry the lowest risk of disease transmission, they can be managed using methods that are less rigorous than those used for patient-care items.

Environmental surfaces are further categorized as either clinical contact surfaces or housekeeping surfaces. Clinical contact surfaces are those surfaces that are directly contacted by contaminated instruments, devices, hands, or gloves. Housekeeping surfaces are not directly touched during the delivery of dental care.

To manage operatory surfaces, barrier-protection or intermediate – or low-level disinfection is used.

Low-level disinfectants (designated by EPA as “hospital disinfectants”) kill the test microorganisms *Salmonella cholerae-suis*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*. For clinical contact surfaces, efficacy against hepatitis B virus (HBV) and HIV also is desirable. These disinfectants are used for cleaning and disinfecting clinical contact surfaces that are not visibly soiled with body fluids.

Intermediate-level disinfectants kill the same test microorganisms as low-level (hospital) disinfectants but they also are tuberculocidal (that is, they inactivate *Mycobacterium tuberculosis*). These agents are used for cleaning and disinfecting clinical contact surfaces with or without visible blood or body fluids.

CDC offers these general guidelines for managing environmental surfaces:

- Follow the manufacturers’ instructions for correct use of cleaning and EPA-registered hospital disinfecting products (IB, IC).
- Never use liquid chemical sterilants/high-level disinfectants for disinfection of environmental surfaces (IB, IC). (Some of these agents present a respiratory hazard and should not be used outside of a closed container.)
- Wear appropriate personal protective equipment when cleaning and disinfecting environmental surfaces. Such equipment may include puncture – and chemical-resistant utility gloves; a protective gown, jacket, or lab

coat; and protective eyewear or face shield worn with a mask (IC).

For maintaining clinical contact surfaces:

- Use surface barriers to protect clinical contact surfaces and change surface barriers between patients (II). Barrier protection is preferred for surfaces that are difficult to clean (for example, switches on dental chairs).
- After each patient, clean and disinfect clinical contact surfaces that are not barrier-protected. Use an EPA-registered hospital disinfectant with low – to intermediate-level activity. Use an intermediate-level disinfectant if visibly contaminated with blood (IB).

OSAP Surface Disinfectant Reference Chart 2013 (see Appendix III)

For periodic maintenance of housekeeping surfaces:

- Clean floors, walls, sinks, and other housekeeping surfaces with a detergent and water (or an EPA-registered hospital disinfectant/detergent) on a routine basis. Consider the nature of the surface, the type and degree of contamination it receives, and its location in the facility. Decontaminate when visibly soiled (IB).
- Clean mops and cloths after use and allow them to dry before reuse. Alternatively, use single-use, disposable mop heads or cloths (II).
- Prepare fresh cleaning or EPA-registered disinfecting solutions daily and as instructed by the manufacturer (II).
- Clean walls, blinds, and window curtains in patient-care areas when they are visibly dusty or soiled (II).

For managing spills of blood and body substances:

- Clean spills of blood or other potentially infectious materials and decontaminate the 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 the size of spill and surface porosity (IB, IC).

Carpet and cloth furnishings provide an ideal breeding ground for microorganisms. These surfaces also are more difficult to clean than nonporous surfaces. As such, CDC recommends that dental facilities:

- Avoid using carpeting and cloth-upholstered furnishings in dental operatories, laboratories, and instrument processing areas (II).

### Regulated Medical Waste

Although any item that has been in contact with blood or body fluids may be infective, not all such waste requires special disposal. Federal, state, and local guidelines and regulations identify the specific categories of medical waste that are subject to regulation – that is, which categories of waste require special disposal by law. They also outline any requirements associated with treatment and disposal.

Examples of regulated waste found in a dental office include solid waste that is soaked or saturated with blood or body fluids (for example, gauze saturated with blood following surgery), extracted teeth as well as surgically removed hard and soft tissues, and contaminated sharp items such as needles, scalpel blades, and orthodontic wires.

Consult waste management regulations, and:

- Develop a medical waste management program (IC).
- Ensure that dental team members who handle and dispose of regulated medical waste are trained in appropriate handling and disposal methods. Make sure they understand the possible health and safety hazards (IC).

From *Policy to Practice: OSAP's Guide to the Guidelines*<sup>10</sup> describes management of regulated medical waste in the dental facility as a matter of “divide and conquer.”

- Use a color-coded or labeled container that prevents leakage (e.g., a biohazard bag) to collect and contain nonsharp regulated medical waste (IC).
- Place sharp items such as needles, scalpel blades, orthodontic bands, broken metal instruments, and burs in a puncture resistant, color-coded, leak proof sharps container. Close the container immediately before removal or replacement to prevent spills and to keep contents from protruding during handling, storage, transport, or shipping (IC).
- In areas served by a sanitary sewer system, pour blood, suctioned fluids, and other liquid waste carefully into the drain (provided local

sewage discharge requirements are met and the state considers this an acceptable disposal method). Be sure to wear appropriate PPE to protect against exposures (IC).

### Dental Unit Waterlines, Biofilm, and Water Quality

It is well established the inside surface of dental waterlines served by municipal water supplies becomes colonized with a variety of microorganisms. Bacteria, fungi, and protozoa reside inside a polysaccharide slime layer that protects and feeds them.

Although biofilm can form in all environments that are bathed in water, the narrow-bore of dental tubing and the typical way dental unit water is used in the practice setting further encourages bacterial growth and the development of biofilm. In the output water of untreated dental units, microbial counts can reach as high as 200,000 colony-forming units per milliliter (CFU/ml) within five days of installing new dental unit waterlines, and counts greater than 1,000,000 CFU/ml have been reported.

Dental waterlines hold only a small volume of water, almost all of which is in contact with the interior surfaces of the tubing. This allows any microorganisms present in the water to latch on to the internal surface of the tubing, where they multiply to create a biofilm. Once formed, the biofilm serves as a reservoir that can increase the number of microorganisms in water used for dental treatment.

Although oral flora and human pathogens such as *Pseudomonas aeruginosa*, *Legionella* species, and non-tuberculous mycobacterium species have been found in dental water systems, most of the microorganisms in dental unit biofilms are common water bacteria that pose limited threat to persons with healthy immune systems. Regardless, CDC contends that exposing patients or dental members to water “of uncertain microbiological quality... is inconsistent with accepted infection-control principles.”

Dental unit water that remains untreated or unfiltered is likely to contain high numbers of microorganisms. As such, CDC recommends that dental practice settings take steps to improve dental unit water quality. Used and maintained according to the manufacturer’s instructions, available technologies (such as self-contained water systems,

chemical treatments, and filters) can greatly improve the quality of treatment water.

- 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 (IB, IC).

Dental units can vary greatly in material composition, and some biofilm interventions may not be compatible with all materials in every commercially available dental unit. As such, CDC stresses the importance of obtaining input from the dental unit manufacturer for compatible waterline treatment methods.

- Consult with the dental unit manufacturer for appropriate methods and equipment to maintain the recommended quality of dental water (II).

To ensure that efforts to improve dental unit water quality are working as expected:

- Follow recommendations for monitoring water quality provided by the manufacturer of the unit or waterline treatment product (II).
- Consult with the dental unit manufacturer on the need for periodic maintenance of antiretraction mechanisms (IB).

Because its effects are only transient, flushing is not a recommended dental water-quality control method. However, briefly flushing lines between patients can help remove contaminants that may have been retracted during treatment.

- After each patient, discharge water and air for at least 20 to 30 seconds from any device that is connected to the dental water system and that enters the patient's mouth. (Such devices include handpieces, ultrasonic scalers, and air/water syringes.) (II).

For additional information refer to the ADA's Positions & Statements: ADA Statement on Dental Unit Waterlines.

### **Boil Water Advisories**

A boil-water advisory is a public health announcement directing residents to boil tap water before drinking it because the water supply has become unsafe to drink. Advisories are issued when water treatment equipment or processes fails; the public supply tests positive for pathogens or violates the Total Coliform Rule or other standards; the distribution system has

been compromised (such as in the case of a water main break) and a health hazard is indicated; or a natural disaster such as a flood, hurricane, or earthquake compromises the public supply.

For dental offices undergoing a boil-water advisory, CDC offers the following counsel:

- Do not deliver water from the public water system to the patient through the dental unit, ultrasonic scaler, or any other dental equipment that receives its water from the public water system (IB, IC).
- Do not use water from the public water system for dental treatment, patient rinsing, or handwashing (IB, IC).
- For handwashing, use antimicrobial-containing products that do not require water (for example, alcohol-based hand rubs). If hands are visibly contaminated, use bottled water, if available, and soap for handwashing. Alternatively, use an antiseptic towelette (IB, IC).

When the boil-water advisory is cancelled, dental practice settings should:

- Follow guidance given by the local water utility regarding adequate flushing of waterlines. If no guidance is provided, flush dental waterlines and faucets for one to five minutes before using the unit for patient care (IC).
- Disinfect dental waterlines as recommended by the dental unit manufacturer (II).

### **Dental Handpieces and Other Devices Attached to Airlines and Waterlines**

Dental handpieces and other devices that are used in the patient's mouth and attach to dental airlines and waterlines are semi-critical instruments and should be processed accordingly.

- Clean and heat-sterilize handpieces and other intraoral instruments that can be removed from the airlines and waterlines of dental units between patients (IB, IC).
- Follow the manufacturer's instructions for cleaning, lubrication, and sterilization of handpieces and other intraoral instruments that can be removed from the airlines and waterlines of dental units (IB).
- 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 (IC).

Because suctioned fluids can be pulled into the patient's mouth when a seal is created around the saliva ejector:

- Do not advise patients to close their lips tightly around the tip of the saliva ejector when evacuating oral fluids (II).

### Dental Radiology

The activities involved in taking and developing x-ray films provide many opportunities for cross-contamination. All surfaces that contact contaminated x-ray film also become contaminated. Even with digital (filmless) x-rays, clinical contact surfaces such as the keyboard, mouse, sensor cords, and portable x-ray cart can become contaminated.

To limit the spread of contamination during dental radiography procedures:

- Wear gloves when exposing radiographs and handling contaminated film packets. Use other PPE (e.g., protective eyewear, mask, and gown) as appropriate if spattering of blood or other body fluids is likely (IA, IC) (Figure 1).
- Use heat-tolerant or disposable intraoral film-holding and positioning devices whenever possible. Clean and heat-sterilize heat-tolerant devices between patients. At a minimum, high-level disinfect semi-critical heat-sensitive devices according to manufacturer's instructions (IB) (Figure 2 and 3).
- Transport and handle exposed radiographs in an aseptic manner to prevent contamination of developing equipment (II).

CDC recommends the following when using digital radiography sensors:

- Use FDA-cleared barriers (IB) to protect the sensor against contamination (Figure 4).
- Clean and heat-sterilize (or high-level disinfect) semi-critical items between patients, even if they were barrier-protected during use. If the item cannot tolerate heat or chemical immersion, at a minimum, use an FDA-cleared barrier during intraoral use, and clean and disinfect with an intermediate-level disinfectant (that is, an EPA-registered hospital disinfectant with tuberculocidal activity) between patients. Consult with the manufacturer for methods of disinfection and sterilization of digital radiology sensors and for protection of associated computer hardware (IB).



Figure 1.

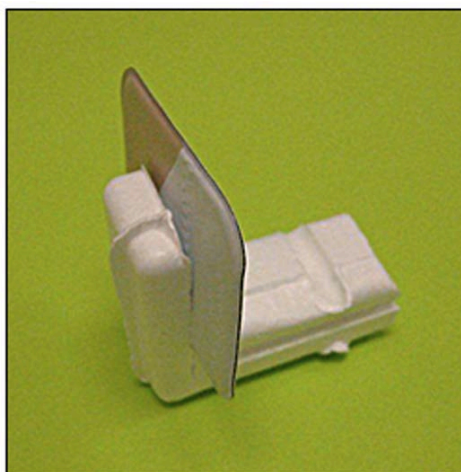


Figure 2. Disposable Bite Block

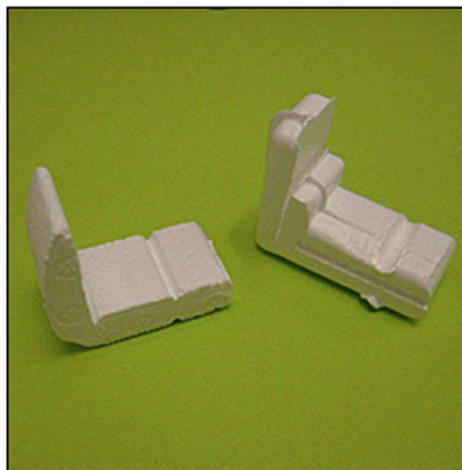


Figure 3. Disposable Film Holders

### Aseptic Technique for Parenteral Medications

Parenteral medications (supplied as single-dose ampoules, vials, or prefilled syringes, or in multi-dose vials for use on more than one patient) and fluid infusion systems (such as IV bags, tubing, and connections) must be safely handled to prevent healthcare-associated infections among patients undergoing conscious sedation.

To limit the potential for contamination and patient-to-patient disease transmission, CDC recommends the following precautions for handling and administering parenteral medications supplied in single-use packaging:

- Never administer medication from a syringe to multiple patients, even if the needle on the syringe is changed (IA).
- Use single-dose vials for parenteral medications whenever possible (II).
- Do not combine the leftover contents of single-use vials for later use (IA).

If multi-dose vials are used:

- Cleanse the access diaphragm with 70% alcohol before inserting a device into the vial (IA).
- 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 multi-dose vial should be sterile. Never reuse a syringe even if the needle is changed (IA).
- Keep multi-dose vials away from the immediate patient treatment area to prevent inadvertent contamination by spray or spatter (II).
- Discard the multi-dose vial if sterility is compromised (IA).

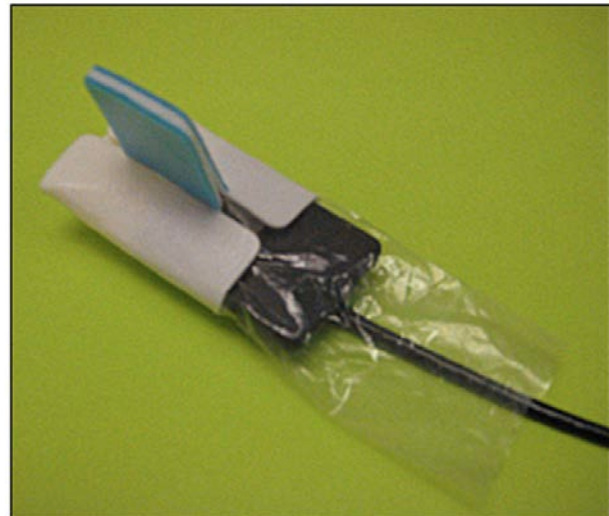
When using fluid infusion and administration sets:

- Use IV bags, tubing, and connections for one patient only and dispose of appropriately (IB).

### Single-Use (Disposable) Devices

A single-use (“disposable”) device should be used on only one patient and then discarded, not cleaned, disinfected, or sterilized for use on another patient. Single-use devices (for example, needles, prophylaxis cups and brushes, and plastic orthodontic brackets) are usually not heat-tolerant and cannot be reliably cleaned.

Some items such as prophylaxis angles, saliva ejectors, high-volume evacuator tips, and air/water syringe tips are now commonly available



**Figure 4.** Digital Sensor with Disposable Barrier

in disposable form; they should be appropriately discarded after each use. Single-use devices and items for use during oral surgical procedures (for example, cotton rolls, gauze, and irrigating syringes) should be sterile at the time of use.

- Use single-use devices for one patient only and dispose of them appropriately (IC).

The physical construction of devices like burs, endodontic files, and broaches can make cleaning difficult. In addition, deterioration can occur on the cutting surfaces of some of these instruments during processing, raising the potential for instrument breaks during patient treatment. Because burs and endodontic instruments also exhibit signs of wear during normal use, CDC suggests that these items might practically be considered single-use devices.

### Oral Surgical Procedures

For the purpose of its guideline, CDC defines oral surgical procedures as those that involve “the incision, excision, or reflection of tissue that exposes normally sterile areas of the oral cavity.” Such procedures include periodontal surgery, apical surgery, implant surgery, and surgical extractions of teeth in which erupted or nonerupted teeth require elevation of the mucoperiosteal flap, removal of bone or a section of tooth, and sometimes suturing.

Because the level of exposure during oral surgical procedures is so great, these procedures pose

an increased potential for localized or systemic infection. As such, CDC recommends the use of the following more stringent infection control precautions:

- Before donning sterile surgeon's gloves, perform surgical hand antisepsis by using an antimicrobial product (antimicrobial soap and water, or a soap and water wash followed by an application of an alcohol-based hand scrub with persistent activity) (IB).
- Wear sterile surgeon's gloves during oral surgical procedures (IB).
- Use sterile saline or sterile water as a coolant/irrigant when performing oral surgical procedures. Because dental unit waterlines cannot deliver sterile water (see above section on "Dental Unit Waterlines, Biofilm, and Water Quality"), use a bulb syringe, single-use disposable products, sterilizable tubing devices, and/or other devices specifically designed for delivering sterile irrigating fluids. (IB)

### Handling of Biopsy Specimens

To protect persons handling and transporting biopsy specimens, CDC recommends that dental team members:

- Place biopsy specimens in a sturdy, leak proof container labeled with the biohazard symbol for transport (IC).

If a biopsy specimen container becomes visibly contaminated:

- Clean and disinfect the outside of a container to remove external contamination, or place the container in an impervious bag labeled with the biohazard symbol (IC).

### Extracted Teeth

Extracted teeth that are being disposed of are regulated waste, and they are subject to the containerization and labeling provisions outlined by OSHA's Bloodborne Pathogens Standard.<sup>9</sup> OSHA considers extracted teeth to be a potentially infectious material that should be disposed of in medical waste containers. However, extracted teeth can be returned to patients on request, at which time provisions of the standard no longer apply. Because high temperatures release mercury vapor from dental amalgam, extracted teeth containing this restorative material should not be placed in a medical waste container that uses incineration for final disposal (as sharps

containers routinely are). Consult and comply with state and local regulations for proper disposal of the amalgam.

- Dispose of extracted teeth as regulated medical waste. Alternatively, they may be returned to the patient (IC).
- Do not dispose of extracted teeth containing amalgam in regulated medical waste intended for incineration (II).

For extracted teeth sent to an educational setting or to a dental laboratory for shade or size comparisons:

- Clean surface using an intermediate-level disinfectant (that is, an EPA-registered hospital disinfectant with a tuberculocidal claim), and place extracted teeth in a leak proof container labeled with a biohazard symbol. Maintain hydration for transport to educational institutions or the dental laboratory (IC).
- Heat-sterilize teeth that do not contain amalgam before they are used for educational purposes (IB).

### The Dental Laboratory

Dental prostheses, appliances, and items used in their fabrication (for example, impressions, occlusal rims, and bite registrations) can be sources of cross-contamination, so they should be handled in a manner that prevents exposure of dental team members, patients, or the office environment to infectious agents. Effective communication and coordination between the laboratory and dental practice can ensure that appropriate cleaning and disinfection procedures are performed in the dental office or laboratory, materials are not damaged or distorted because of disinfectant overexposure, and effective disinfection procedures are not unnecessarily duplicated.

In the dental lab:

- Use personal protective equipment when handling items until they have been decontaminated (IA, IC).
- Before they are handled in the laboratory, clean, disinfect with an EPA-registered hospital disinfectant with tuberculocidal activity, and rinse all impressions, bite registrations, occlusal rims, extracted teeth, and other dental prostheses and prosthodontic materials (IB).
- Follow manufacturers' instructions for cleaning and sterilizing or disinfecting items that become

contaminated but do not normally contact the patient (e.g., burs, polishing points, rag wheels, articulators, case pans, and lathes). If manufacturer instructions are unavailable, clean and heat-sterilize heat-tolerant items or clean and disinfect them with an EPA-registered hospital disinfectant with low – (HIV, HBV effectiveness claim) to intermediate-level (tuberculocidal) activity, depending on the degree of contamination (II).

To ensure that impressions are not compromised from exposure to disinfectant chemicals:

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

In the dental practice setting:

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

To ensure good communication between the dental practice and the laboratory:

- Include specific information on the disinfection techniques used (e.g., solution used and duration), when laboratory cases are sent off-site and on their return (II).

### **Tuberculosis and Dentistry**

Patients infected with *Mycobacterium tuberculosis* occasionally seek urgent dental treatment at outpatient dental settings. Symptoms of active tuberculosis (TB) disease include a productive cough, night sweats, fatigue, malaise, fever, and unexplained weight loss. Although the overall risk of TB transmission in dentistry is likely very low, policies should be in place to help dental team members detect and refer patients with active tuberculosis for immediate medical care.

Recommendations for expanded precautions to prevent transmission of *M. tuberculosis* and other organisms that can be spread by airborne, droplet, or contact routes have been detailed in other CDC and Hospital Infection Control Practices Advisory Committee (HICPAC) guidelines (“Guideline for infection control in health care personnel, 1998”; “Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-Care Settings, 2005”; and “Guideline for Isolation Precautions: Preventing Transmission of Infectious

Agents in Healthcare Setting 2007”).

- Follow CDC recommendations for:
  1. developing, maintaining, and implementing a written TB infection-control plan;
  2. managing a patient with suspected or active TB;
  3. completing a community risk-assessment to guide employee tuberculin skin tests and follow-up; and
  4. managing dental team members with TB disease (IB).

To ensure appropriate patient screening and if necessary, referral:

- Educate all dental team members on recognizing of signs and symptoms of TB as well as on how TB is transmitted (IB).
- Assess each patient for a history of TB as well as symptoms indicative of TB and document findings on the medical history form (IB).

For all dental team members who might have contact with persons with suspected or confirmed active TB:

- Conduct a baseline tuberculin skin test, preferably by using a two-step test (IB).

The following CDC recommendations apply for patients who are known or suspected to have active TB:

- Evaluate the patient away from other patients and dental team members. When he or she is not being evaluated, the patient should wear a surgical mask or be instructed to cover his/her mouth and nose when coughing or sneezing (IB).
- Defer elective dental treatment until the patient is noninfectious (IB) as confirmed by a physician.
- Refer patients requiring urgent dental treatment to a previously identified facility (such as a hospital) with TB engineering controls and a respiratory protection program (IB).

### **Program Evaluation**

The goal of the dental infection-control program is to provide a safe working environment that reduces the risk of both healthcare-associated infections among patients and occupational exposures among dental team members. Program evaluation offers an opportunity to improve the effectiveness of both the infection-control program and dental-practice protocols. If deficiencies or problems are identified, further steps can be taken to eliminate the problems. Furthermore, routinely evaluating

practices and protocols provides a specific time for review and consideration of any newly available technologies that could enhance patient and dental team member safety.

Strategies and tools that dental team members can use to evaluate the facility's infection-control program include periodic observational assessments, checklists to document procedures, and routine review of occupational exposures to bloodborne pathogens.

To ensure that the practice setting's infection control procedures are useful, feasible, ethical, and accurate:

- Establish routine evaluation of the infection-control program, including evaluation of performance indicators, at an established frequency (II).

### Conclusion

Although the 2003 CDC guidelines provide more detail on dental infection control policies, practice, and procedures than previous documents, the ideas behind them break down to four basic principles for practical infection control.

### Take action to stay healthy

An individual must be susceptible for exposure to result in disease transmission. Dental workers who are up to date on recommended vaccinations are not susceptible to these transmissible illnesses and therefore cannot acquire (or transmit) the diseases.

- Get vaccinated against hepatitis B and other vaccine preventable diseases.
- Report occupational injuries and exposures immediately.
- Follow the advice of the medical care provider evaluating your occupational exposure.

### Avoid contacting blood/body fluids

A number of potentially serious diseases are spread by blood; other diseases are spread through contact with other body fluids. Because it is impossible to know for certain which patients are infected, avoid direct contact with blood, body fluids, non-intact skin, and mucous membranes. Always use standard precautions – handwashing, personal protective equipment, controls to prevent injuries, and proper management of patient care

items and environmental surfaces – and treat every patient as if infectious.

- Wear gloves, protective clothing, and face and eye protection.
- Handle sharps with care.
- Use safety devices as appropriate.
- Use mechanical devices to clean instruments whenever possible.

### Limit the spread of contamination

Blood and other patient fluids can be spread by spatter, by touching contaminated supplies and



Figure 5.



Figure 6.



surfaces, or by laying contaminated items down on operatory surfaces. Any contaminated item is a potential exposure source, so by taking care to limit contamination to the greatest extent possible, dental team members limit the risk of exposure to infectious materials and in turn, the potential for disease transmission.

- Set up the operatory before beginning treatment.
- Cover surfaces that will be contaminated (Figures 5 and 6).
- Minimize splashes and spatter.
- Properly dispose of all waste.

### **Make objects safe for use**

The nature of oral health procedures makes it

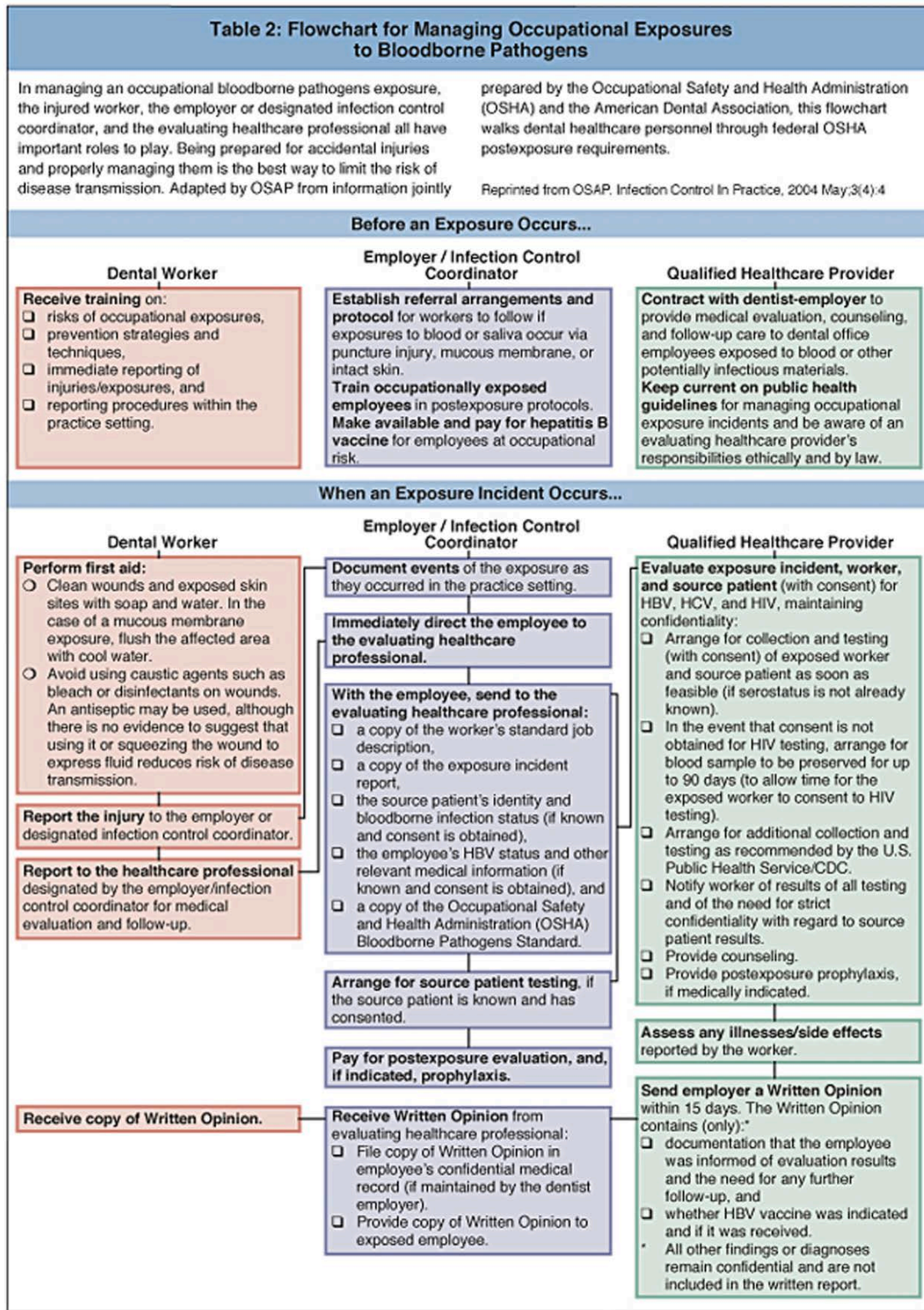
impossible to completely eliminate contamination. Dental team members must use instruments, activate equipment, and contact the mucous membranes of the patient's oral cavity. As such, properly processing contaminated instruments and surfaces remains an important part of a comprehensive infective control program.

- Know the different decontamination processes.
- Read chemical germicide labels.
- Monitor processes to make sure they are working as they should.

Dental team members who use these guiding principles to direct their workday activities are likely to find that infection control efforts may not be as complex as they seem.

## Appendix I

### Managing Occupational Exposures to Bloodborne Pathogens




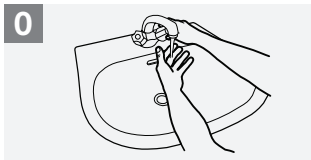
## Appendix II

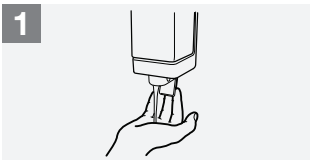
### “How to Handwash” Poster


# How to Handwash?

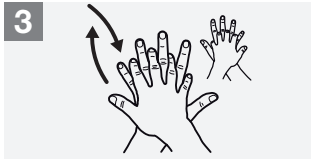
WASH HANDS WHEN VISIBLY SOILED! OTHERWISE, USE HANDRUB

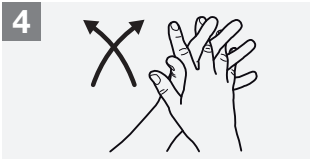
 **Duration of the entire procedure: 40-60 seconds**


**0**  **Wet hands with water;**


**1**  **Apply enough soap to cover all hand surfaces;**

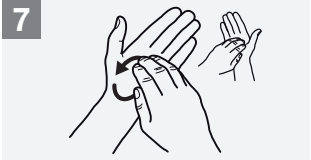
**2**  **Rub hands palm to palm;**

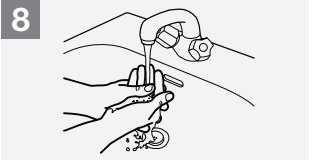
**3**  **Right palm over left dorsum with interlaced fingers and vice versa;**

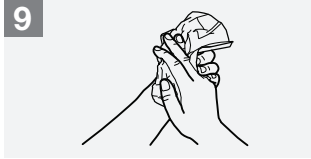
**4**  **Palm to palm with fingers interlaced;**

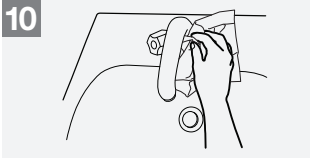
**5**  **Backs of fingers to opposing palms with fingers interlocked;**

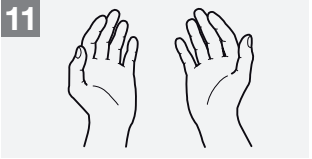
**6**  **Rotational rubbing of left thumb clasped in right palm and vice versa;**


**7**  **Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;**

**8**  **Rinse hands with water;**

**9**  **Dry hands thoroughly with a single use towel;**

**10**  **Use towel to turn off faucet;**

**11**  **Your hands are now safe.**

 **World Health Organization**

**Patient Safety**  
A World Alliance for Safer Health Care

**SAVE LIVES**  
Clean Your Hands

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May 2009

Image source: World Health Organization (WHO)

## Appendix III

### OSAP Surface Disinfectant Reference Chart - 2013

Product Classification	Product Brand Information				
Category	Brand (packaged as)	EPA #	Dilution	TB Claim	Manufacturer or Distributor
<b>Accelerated Hydrogen Peroxide</b>	Optim 33 TB	74559-1-83259	RTU	5 min	SciCan
<b>Phenolics (Dual) Water-Based</b> Phenylphenol and benzylchlorophenol or tertiary amyphenol	Birex SE Concentrate	1043-92-51003	1:256	10 min	Biotrol
	Birex Disinfectant Wipes	46851-10-51003	RTU	10 min	Biotrol
	DisCide Germicidal Foaming Cleaner	33176-6	RTU	10 min	Palmero Health Care
	ProSpray C-60 Conc. Surface Disinfectant	46851-1-50611	1:32	10 min	Certol International
	ProSpray Surface Disinfectant Spray	46851-5-50611	RTU	10 min	Certol International
	ProSpray Wipes	46851-10	RTU	10 min	Certol International
<b>Phenolics (Dual) Alcohol-Based</b> Tertiary amyphenol and/or phenylphenol + ethyl alcohol or isopropyl alcohol	DisCide Disinfectant Spray	706-69-10492	RTU	10 min	Palmero Health Care
<b>Quaternaries Dual or Synergized Plus Alcohol</b> Diisobutylphenoxyethoxyethyl dimethylbenzyl ammonium chloride; isopropanol or ethanol; alkyldimethyl benzyl ammonium chloride	CaviCide Spray	46781-6	RTU	3 min	TotalCare/Pinnacle/Metrex
	CaviWipes	46781-8	RTU	3 min	TotalCare/Pinnacle/Metrex
	CetylCide II Broad Spectrum Disinfectant	61178-1-3150	2 oz/gal	NOL	Cetylite Industries
	Clorox Disinfecting Spray	67619-3	RTU	10 min	Harry J. Bosworth Co.
	DisCide ULTRA Spray	10492-5	RTU	1 min	Palmero Health Care
	DisCide ULTRA Wipes	10492-4	RTU	1 min	Palmero Health Care
	DisCide V Detergent Disinfectant	1839-83-10492	RTU	5 min	Palmero Health Care
	Lysol IC Disinfectant Spray	777-72-675	RTU	10 min	Sultan Healthcare
	Maxispray Plus	46781-6-10597	RTU	5 min	Henry Schein Dental
	Maxiwipe Germicidal Cloth	9480-4-10597	RTU	5 min	Henry Schein Dental
	Opti-Cide-3 Spray	70144-1-51003	RTU	3 min	Biotrol
	OptiCide-3 Wipes	70144-2-51003	RTU	3 min	Biotrol
	PDCare Surface Disinfectant Spray	46781-6-43100	RTU	3 min	Patterson Dental
	PDCare Wipes	46781-8-43100	RTU	5 min	Patterson Dental
	Sanitex Plus Spray	1130-150-64285	RTU	6 min	Crosstex International
	Sanitex Plus Wipes	9480-4-64285	RTU	5 min	Crosstex International
	Sani-Cloth HB Wipes	61178-4-9480	RTU	10 min	PDI (Professional Disposables Intl)
	Sani-Cloth Plus Wipes	9480-6	RTU	5 min	PDI (Professional Disposables Intl)
	Super Sani-Cloth Wipes	9480-4	RTU	2 min	PDI (Professional Disposables Intl)
	Z3 Surface Disinfectant/Decontaminant Cleaner	46781-6-35659	RTU	3 min	Benco Dental Co.
Z3 Wipes	59894-10-67454	RTU	2 min	Benco Dental Co.	

## OSAP Surface Disinfectant Reference Chart - 2013 (continued)

<b>Quaternary Ammonium</b> No alcohol	Lysol IC Disinfectant Wipes	1839-174-675	RTU	10 min	<a href="#">Sultan Healthcare</a>
	Sani-Cloth AF (Wipes)	9480-5	RTU	3 min	<a href="#">PDI (Professional Disposables Intl)</a>
<b>Sodium Hypochlorite</b>	Clorox Germicidal Spray	67619-13	RTU	30 sec	<a href="#">Harry J. Bosworth Co.</a>
	Clorox Germicidal Wipes	67619-12	RTU	2 min	<a href="#">Harry J. Bosworth Co.</a>
<b>Sodium Bromide &amp; Chlorine</b>	Microstat 2 Tablets	70369-1	2 tabs/ qt. water	5 min	<a href="#">Septodont</a>
<p><b>Important Information:</b> Listing does not imply endorsement, recommendation or warranty. Other products are available. Only OSAP member Hospital Disinfectants are represented in this chart. Purchasers are legally required to consult label and package insert for changes in formulation and recommended use. Check compatibility of material before use on dental/medical equipment.</p>					
<p><b>Key:</b> <b>RTU</b> = Ready to Use; <b>NOL</b> = Not on label, e.g., one or both of the HIV/HBV claims is not provided on the label. OSAP is using the CDC guidelines. Be sure to use a disinfectant with a TB claim if there is any blood or OPIM present.</p>					
<p><b>This chart is a publication of the Organization for Safety, Asepsis and Prevention (OSAP). OSAP assumes no liability for actions taken based on the information herein. Copyright 2006-2012. All rights reserved.</b></p>					

## Course Test Preview

To receive Continuing Education credit for this course, you must complete the online test. Please go to: [www.dentalcare.com/en-us/dental-education/continuing-education/ce90/ce90-test.aspx](http://www.dentalcare.com/en-us/dental-education/continuing-education/ce90/ce90-test.aspx)

1. **An example of an engineering control is \_\_\_\_\_.**
  - a. the one-handed scoop technique for recapping needles
  - b. postponement of routine dental treatment for patients suspected of having active TB
  - c. instrument cassettes used to process instruments for reuse
  - d. replacing sharps containers when they are full
  
2. **An example of a work practice control is \_\_\_\_\_.**
  - a. the one-handed scoop technique for recapping needles
  - b. postponement of routine dental treatment for patients suspected of having active TB
  - c. instrument cassettes used to process instruments for reuse
  - d. a color-coded, puncture-resistant sharps container
  
3. **An example of an administrative control is \_\_\_\_\_.**
  - a. the one-handed scoop technique for recapping needles
  - b. postponement of routine dental treatment for patients suspected of having active TB
  - c. instrument cassettes used to process instruments for reuse
  - d. a color-coded, puncture-resistant sharps container
  
4. **According to the CDC \_\_\_\_\_ carry the highest risk of disease transmission.**
  - a. non-critical items
  - b. critical items
  - c. semi-critical items
  - d. None of the above.
  
5. **Universal precautions minimize the risk of exposure to \_\_\_\_\_.**
  - a. blood and bloody fluids
  - b. all body fluids except sweat
  - c. all body secretions and excretions
  - d. All of the above.
  
6. **Standard precautions minimize the risk of exposure to \_\_\_\_\_.**
  - a. blood and bloody fluids
  - b. all body fluids except sweat
  - c. all body secretions and excretions
  - d. All of the above.
  
7. **Vaccines are recommended for healthcare workers to protect against \_\_\_\_\_.**
  - a. HBV
  - b. influenza
  - c. MMR (measles, mumps, and rubella)
  - d. All of the above.
  
8. **\_\_\_\_\_ contact surfaces are those surfaces that are directly contacted by contaminated instruments, devices, hands or gloves.**
  - a. Clinical
  - b. Housekeeping
  - c. Environmental
  - d. All of the above.

9. **According to OSHA regulations and CDC guidelines, employees who decline vaccination against \_\_\_\_\_ must sign a declination form that the employer keeps on file.**
- HBV
  - HCV
  - influenza
  - MMR (measles, mumps, and rubella)
10. **Sharps containers should be located \_\_\_\_\_.**
- at the front desk
  - near all exits from the facility
  - as close to the point of use as possible
  - All of the above.
11. **CDC guidelines specifically recommend against \_\_\_\_\_.**
- two-handed needle recapping
  - handling needles with the sharp end pointed toward a team member's body
  - bending, breaking, or removing needles before disposal
  - All of the above.
12. **Occupational injuries should be reported, evaluated, and otherwise managed \_\_\_\_\_.**
- as soon as it happens
  - after all the patients of the day have been treated and sent home
  - on the first day the practice is closed for business so the employee won't miss work
  - immediately before office hours the next morning
13. **If hands are not visibly dirty or contaminated with blood or other potentially infectious materials, \_\_\_\_\_.**
- wash hands with an antimicrobial soap and water
  - wash hands with a non-antimicrobial soap and water
  - use an alcohol-based hand rub according to the manufacturer's instructions
  - Any of the above.
14. **When assisting during a cavity preparation using a high-speed handpiece, \_\_\_\_\_ constitute appropriate personal protective equipment.**
- utility gloves, face mask, protective eyewear, and gown
  - sterile surgeon's gloves, face mask, protective eyewear, gown, and shoe covers
  - exam gloves, face mask, protective eyewear, and gown
  - exam gloves, face mask, and gown
15. **\_\_\_\_\_ is a common skin condition among dental healthcare personnel that is often mistaken for an allergic reaction.**
- Type I hypersensitivity
  - Type IV hypersensitivity
  - Irritant contact dermatitis
  - Anaphylaxis

16. \_\_\_\_\_ is reaction to allergens such as methacrylates, glutaraldehydes, and chemicals used in the manufacturing of gloves.
- Type I hypersensitivity
  - Type IV hypersensitivity
  - Irritant contact dermatitis
  - Anaphylaxis
17. The “dirty” side of the instrument processing area is used for \_\_\_\_\_.
- receiving, cleaning, and decontamination
  - sterilizing
  - recording entries in the sterilizer monitoring log
  - storing instruments before distribution to chairside
18. Immediate-use steam sterilization cycles are considered acceptable for \_\_\_\_\_.
- routine instrument sterilization
  - processing implantable devices
  - faster sterilization of a device that will be used immediately
  - critical instruments that will be stored indefinitely before use
19. Use a biological indicator \_\_\_\_\_.
- weekly
  - to monitor every load that contains an implantable device
  - to retest a sterilizer that failed its previous spore test
  - All of the above.
20. For clinical contact surfaces that are visibly contaminated with blood, clean the surfaces and disinfect using a \_\_\_\_\_.
- a low-level disinfectant
  - a hospital disinfectant
  - an intermediate-level hospital disinfectant with tuberculocidal activity
  - a high-level disinfectant/sterilant
21. With regard to parenteral medications, CDC recommends \_\_\_\_\_.
- using single-dose vials whenever possible
  - using multi-dose vials whenever possible
  - combining leftover contents of vials to save money
  - changing needles so an anesthetic syringe can be reused on another patient
22. Surgical hand antisepsis involves handwashing using an antimicrobial soap and water. Surgical hand antisepsis can also be accomplished with plain (non-antimicrobial) soap and water, followed by application of an alcohol-based hand rub.
- Both statements are true.
  - Both statements are false.
  - The first statement is true. The second statement is false.
  - The first statement is false. The second statement is true.
23. Extracted teeth containing amalgam should be disposed of \_\_\_\_\_.
- in a sharps container
  - according to state and local regulations
  - in a waste container
  - after soaking for one hour in a high level disinfection



**24. Routinely evaluating the practice setting's infection control program ensures \_\_\_\_\_.**

- a. compliance with OSHA's Hazard Communication Standard
- b. that it remains effective and up to date with current technology
- c. that new regulations need not be incorporated
- d. that disinfectant inventories do not contain expired products

**25. Within the dental setting, reducing risk of disease transmission entails \_\_\_\_\_.**

- a. avoiding contact with blood and body fluids
- b. limiting the number of "high-risk" patients treated in the practice
- c. double gloving
- d. ensuring that most patients are vaccinated against infectious diseases

## References

1. Bebermeyer RD, Dickinson SK, Thomas LP. Guidelines for Infection Control in Dental Health Care Settings--a review. *Tex Dent J.* 2005 Oct;122(10):1022-1026.
2. Bebermeyer RD, Dickinson SK, Thomas LP. Personnel health elements of infection control in the dental health care setting--a review. *Tex Dent J.* 2005 Oct;122(10):1028-1035.
3. CDC. Guidelines for Infection Control in Dental Health-Care Settings – 2003; *MMWR* 2003;52(No. RR-17). Accessed July 7, 2009.
4. CDC. Handwashing: Clean Hands Saves Lives. January 11, 2013. Accessed January 31, 2013.
5. CDC. Recommended infection-control practices for dentistry, 1993. *MMWR* 1993;42(No. RR-8). Last modified October 1998.
6. CDC. Updated U.S. Public Health Service guidelines for the management of occupational exposures to HBV, HCV, and HIV and recommendations for postexposure prophylaxis; *MMWR* 2001;50(No. RR-11).
7. Cleveland JL, Barker L, Gooch BF, Beltrami EM, et al. Use of HIV postexposure prophylaxis by dental health care personnel: an overview and updated recommendations. *J Am Dent Assoc.* 2002 Dec;133(12):1619-1626.
8. Department of Energy. Resource Conservation and Recovery Act. Accessed July 7, 2009.
9. Occupational Safety and Health Administration. Bloodborne Pathogens (29 CFR 1910.1030). Accessed July 7, 2009.
10. Ortolano K, Organization for Safety and Asepsis Procedures. From Policy to Practice: OSAP's Guide to the Guidelines. Annapolis:OSAP, 2004.
11. OSHA Fact Sheet; Hepatitis B Vaccination Protection. Accessed January 29, 2013.
12. OSHA Safety and Health Topics Dentistry. Accessed July 7, 2009.
13. Recommended Infection Control Practices for Dentistry. Last modified June 24, 2006.
14. U.S. Department of Labor, Office of Compliance Assistance Policy. The Occupational Safety and Health Act of 1970 (OSH Act) (29 USC §651 et seq.; 29 CFR Parts 1900 to 2400). Accessed July 7, 2009.

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