Infection Control: OSHA, Bloodborne Pathogens, Hazard Communication

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Section 1: Infection Control in the Dental Setting

Section Description

This course begins with an historical overview of aseptic surgical techniques and early infection control. The course continues with a list of important terms the reader needs to know as defined within state and federal regulations and which are commonly used when discussing infection control. Infection control techniques for sterilizing instruments, surfaces, and work areas as well as the chain of infection are discussed, and brief narratives of tuberculosis, AIDS, and hepatitis follow. Finally, the course ends with a summary checklist dental personnel may find useful.

Objectives

Upon completion of the course, the student should be able to:

- List and define important terms in infection control.
- List standard precaution measures mandated by state and federal guidelines.
- Describe the chain of infection.
- Describe correct aseptic handwashing procedures.
- List disinfecting and sterilization techniques for non, semi and critical instruments, devices, and surfaces.
- List and describe PPEs for DHCP.

Howard J. Pactovis, DMD

Dr. Howard Pactovis, DMD is the founder and executive director of Dynamic Dental Safety (DDS), a safety and risk prevention company dedicated solely to bringing infection control services and programs to the dental community. He lectures nationally on OSHA compliance and infection control and has provided services to over 1,000 dental offices. Dr. Pactovis has been involved in numerous dental office OSHA inspections and has taken courses in voluntary compliance from OSHA. He has served as an expert witness in infection control litigation for State Boards of Registration in dentistry. Dr. Pactovis is dedicated to providing continual compliance with all federal and state guidelines.

Professional Memberships

- American Dental Association
- Massachusetts Dental Society
- North Shore District Dental Society
Introduction

Fundamental infection control techniques date back to the mid 1800’s with the pioneering work of Dr. Joseph Lister, a British surgeon. While working as professor of surgery at the University of Glasgow, Lister read a paper written by Louis Pasteur that indicated rotting and fermentation could occur under anaerobic conditions if microorganisms were present. Lister confirmed Pasteur’s conclusions with his own experiments and developed antiseptic techniques for wounds.

In August 1865 at Glasgow Infirmary, Lister applied lint dipped in carbolic acid onto the wound of an eleven year old boy suffering from a compound fracture after a cart wheel had run over his leg. After four days, Lister changed the dressing and discovered no infection had developed, and after six weeks, Lister was amazed to find the boy’s bones had fused back together. He subsequently published his results in The Lancet in a series of five articles, running from March through July 1867, entitled: “On a New Method of Treating Compound Fracture, Abscess, etc.: with Observation on the Conditions of Suppuration”. Later, on August 9, 1867, he read a paper before the British Medical Association in Dublin, on the “Antiseptic Principle of the Practice of Surgery”, which was reprinted in The British Medical Journal.

Lister successfully introduced carbolic acid (now known as phenol) to sterilize surgical instruments and to clean wounds, which reduced postoperative infections and made surgery safer for patients.

Lister left Glasgow in 1869, and returned to Edinburgh as Professor of Surgery at the university. He continued to develop methods of antisepsis and asepsis. Lister’s fame spread, and audiences of more than 400 people came to hear him lecture. As the germ theory of disease became more widely accepted, it was realized infection could be better controlled by prevention. Some consider Lister the father of modern antisepsis. In 1879, Listerine mouthwash was named after him for his work in antisepsis. Also named in his honor is the bacteria genus Listeria, typified by the food borne pathogen Listeria monocytogenes. Aseptic techniques and hospital quality sterilization and disinfection are commonplace in dental offices today. (Wikipedia)
CDC Recommendations

Infection control is concerned with preventing nosocomial or healthcare associated infection, a practical (rather than academic) sub discipline of epidemiology. Infection control and hospital epidemiology are akin to public health practice, practiced within the confines of healthcare delivery systems. Infection control addresses factors related to the spread of infections within the healthcare setting whether from patient-to-patient, patient-to-staff, staff-to-patient, or among staff members. Infection control includes prevention through hand hygiene/hand washing, cleaning/disinfection/sterilization, vaccination, surveillance and outbreak investigation, monitoring/investigation of demonstrated or suspected spread of infection, and management of outbreaks.

CDC Recommendations

- Improve effectiveness and impact of public health interventions.
- Inform clinicians, public health practitioners, and the public.
- Are developed by advisory committees, ad hoc groups, and CDC staff.
- Are based on a range of rationale and form systematic reviews of expert opinions.

The CDC develops a broad range of guidelines which are intended to improve the effectiveness and impact of public health interventions and inform key audiences, most often clinicians, public health practitioners, and the public.

Guidelines can be developed by formal advisory committees, ad hoc work groups, and CDC staff. Development processes can vary, depending on the topic, available scientific data, urgency, resources, etc. and are based on a range of rationale, depending on the availability of scientific evidence.

The 2003 Guidelines identify infection control practices the CDC recommends for all settings where dental treatment is provided. Although CDC recommendations are not regulatory, some practices are mandated by federal, state, or local regulations. These are identified in the recommendations section of the CDC guidelines.

The basic aim of infection control is to reduce the number of pathogenic microbes in the field of operation to a level where the body's normal resistance can prevent infection.

Terminology and Definitions

Consider the following definitions from The Webster's New World Dictionary:

- **Clean** Free from dirt and impurities; unsoiled.
- **Sterile** Free from living microorganisms.
Disinfect  To destroy harmful bacteria, viruses; to sterilize.

Unfortunately, this is not an acceptable definition of disinfect. Disinfection is not the same as sterilization. For the precise needs of the dental environment:

- An item is clean if all visible soil (organic and inorganic) debris and OPIM are removed by manually or mechanically using water with detergents or enzymatic products.
- True sterilization involves killing all microorganisms including hardy bacterial spores on a surface or instrument.
- Disinfection lies somewhere in between these two. Disinfection may kill all kinds of disease producing microorganisms but cannot kill bacterial spores.

Terminology

Standard Precautions is a set of combined precautions that include major components of universal precautions (designed to reduce the risk of transmission of blood borne pathogens) and body substance isolation (designed to reduce the risk of transmission of pathogens from moist body substances). They are a group of infection prevention practices that apply to all patients, regardless of suspected or confirmed infection status, in any setting in which healthcare is delivered. These include hand hygiene, use of gloves, gowns, masks, eye protection, or face shields, depending on anticipated exposure, as well as, safe handling of sharps. Standard precautions must be used for care of all patients regardless of their diagnoses or personal infectious status.

Standard Precautions

- Apply to all patients.
- Integrate and expand universal precautions to include organisms spread by blood and body fluids, secretions, and excretions except sweat, whether or not they contain blood.

Elements of Standard Precautions

- Hand washing.
- Use of gloves, masks, eye protection, and gowns.
- Cleaning, disinfection, sterilization.
- Safe procedures for handling sharps.
- Infection control.

Universal Precautions Infection control procedures and barrier techniques are determined by exposure to blood and blood contaminated products, and are used on all patients, regardless of their disease state. The procedures are designed to prevent transmission of HIV, HBV, and other blood borne pathogens in health care settings.
Sterilization  Sterilization is a validated process used to render a product free of all forms of viable microorganisms including viruses, bacteria, fungi, and spores.

Disinfection  Destruction of most forms of microorganisms, but not bacterial and mycotic spores, which are highly resistant.

Sanitization  Using chemicals or procedures that reduce the microbial flora to a safe public health level.

Asepsis  Using techniques designed to keep all microorganisms out of the working field and from spreading to other areas.

Cleaning Agent  A surfactant used to remove debris on surfaces prior to disinfection.

Disinfectant  A chemical that can be applied on an inanimate object or surface that kills microorganisms.

Antiseptic  A chemical that can be applied on living tissues to kill or inhibit microorganism activity.

Cidal agents  Chemicals that completely kill microorganisms.

Germicide  Germicides are chemical agents that can be used to disinfect items and surfaces based on the level of contamination.

Static agents  Chemicals that inhibit the growth of microorganisms without killing them.

Cross infection  Passage of disease from one person to another.

Cross contamination  Passage of microorganisms from one person or inanimate object to another.

Personal Protective Equipment  Personal protective equipment (PPE) is specialized clothing or equipment worn or used for protection against a hazard. PPE items may include, but are not limited to, gloves, masks, respiratory devices, protective eyewear and protective attire which are intended to prevent exposure to blood, body fluids and OPIM, and chemicals used for infection control. General work attire such as uniforms, scrubs, pants and shirts, are not considered to be PPE.

Other Potentially Infectious Materials (OPIM): OPIM means any of the following:

- Human body fluids such as saliva in dental procedures and any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids.
- Any unfixed tissue or organ (other than intact skin) from a human (living or dead).
• Any of the following if known or reasonably likely to contain or be infected with HIV, HBV, or HCV.
• Cell, tissue, or organ cultures from humans or experimental animals.
• Blood, organs, or other tissues from experimental animals.
• Culture medium or other solutions.

**Dental Healthcare Personnel** (DHCP) are all paid and non paid personnel in the dental healthcare setting who might be occupationally exposed to infectious materials, including body substances and contaminated supplies, equipment, environmental surfaces, water, or air. DHCP includes dentists, dental hygienists, dental assistants, dental laboratory technicians (in office and commercial), students and trainees, contractual personnel, and other persons not directly involved in patient care but potentially exposed to infectious agents (administrative, clerical, housekeeping, maintenance, or volunteer personnel).

All DHCP shall comply with infection control precautions and enforce the following minimum precautions to minimize the transmission of pathogens in healthcare settings mandated by the California Division of Occupational Safety and Health (CalOSHA) and other state and federal guidelines.

• Standard precautions shall be practiced in the care of all patients.
• A written protocol shall be developed, maintained, and periodically updated for proper instrument processing, operatory cleanliness, and management of injuries. The protocol shall be made available to all DHCP at the dental office.
• A copy of this regulation shall be conspicuously posted in each dental office.

**The major components of infection control**

• Aseptic technique.
• Patient screening and evaluation.
• Personal protection.
• Instrument sterilization.
• Environmental surface disinfection.
• Equipment asepsis.
• Laboratory asepsis.

**Modes of disease transmission**

• Direct contact with an infectious lesion, blood, or saliva.
• Indirect transmission from contaminated objects.
• Aerosolization of infected blood, saliva, or nasopharyngeal secretion droplets.
Modes of Transmission

- Direct contact with blood or body fluids.
- Indirect contact with a contaminated instrument or surface.
- Contact of mucosa of the eyes, nose, or mouth with droplets or spatter.
- Inhalation of airborne microorganisms.

According to the Centers of Disease Control in a 2016 release titled, *Summary of Infection Prevention Practices in Dental Settings*, “Transmission of infectious agents among patients and dental health care personnel (DHCP) in dental settings is rare. However, from 2003 to 2015, transmissions in dental settings, including patient to-patient transmissions, have been documented. In most cases, investigators failed to link a specific lapse of infection prevention and control with a particular transmission. However, reported breakdowns in basic infection prevention procedures included unsafe injection practices, failure to heat sterilize dental handpieces between patients, and failure to monitor (e.g., conduct spore testing) autoclaves. These reports highlight the need for comprehensive training to improve understanding of underlying principles, recommended practices, their implementation, and the conditions that have to be met for disease transmission.”


Dental patients and dental healthcare personnel (DHCP) may be exposed to a variety of disease causing microorganisms that are present in the mouth and respiratory tract. These organisms may be transmitted in dental settings through several routes, including:

- Intact or non-intact skin in direct contact with blood, oral fluids, or other potentially infectious patient materials.
- Indirect contact with a contaminated object.
- Contact of mucous membranes of the eyes, nose, or mouth with droplets containing microorganisms generated from an infected person and propelled a short distance.
- Inhalation of airborne microorganisms that can remain suspended in the air for long periods of time.
Chain of Infection

Infection through any of these routes requires that all of the following conditions be present:

- An adequate number of pathogens, or disease-causing organisms, to cause disease (infectious agent).
- A reservoir or source that allows the pathogen to survive and multiply (reservoir such as blood).
- A portal of exit from the reservoir or source to new host (aerosol droplets from cough).
- A mode of transmission from the source to the host (contaminated instrument).
- An entrance through which the pathogen may enter the host (broken skin).
- A susceptible host (one who is not immune).

The occurrence of these events is considered the chain of infection. Effective infection control strategies prevent disease transmission by interrupting one or more links in the chain.

Chemical Agents that Kill Microorganisms

Chemical sterilizers Most effective method. Kills all microorganisms usually within 10 hours.

High level disinfection Kills some, but not necessarily all, bacterial spores. This process kills Mycobacterium tuberculosis var bovis, bacteria, fungi, and viruses.

Intermediate disinfectants Kills Mycobacterium tuberculosis var bovis indicating that many human pathogens are also killed, but does not necessarily kill spores. This process does not necessarily kill spores.
Low level disinfection is the least effective disinfection process. Kills some viruses, bacteria, and fungi, but not bacterial spores, or Mycobacterium tuberculosis var bovis, a laboratory test organism used to classify the strength of disinfectant chemicals or non lipid viruses and fungi.

Germicides are agents destructive to microbes. All germicides must be used in accordance with intended use and label instructions.

Classification of Common Dental Items

Critical instruments

All instruments, devices, and other items used to penetrate tissue or which contacts bone, blood, or other normally sterile tissues or touches broken skin including: needles, hand instruments, surgical instruments, probes, burs, scalers, ultrasonic scaler tips, curettes, and endodontic instruments. These must be sterile, and if reusable, sterilized after each use. Critical items confer a high risk of infection if they are contaminated with any microorganism.

Semi critical instruments

Semi critical items are instruments, devices and other items that are not used to penetrate soft tissue or bone, but contact oral mucous membranes, non intact skin or other potentially infectious materials (OPIM). Semi critical instruments include anything handled, such as mouth mirrors, amalgam condensers, and dental handpieces that during a procedure, contacts oral tissue but does not penetrate mucous membranes, and anything within the range of droplets from the air/water syringe, high-speed drill, or the patient coughing. These ideally should be sterilized and must be disinfected at a high level if they cannot be sterilized.

Non critical instruments and devices

Non critical items are instruments, devices, equipment, and surfaces that come in contact with soil, debris, saliva, blood, OPIM and intact skin, but not oral mucous membranes. Examples are x-ray heads, facebows, pulse oximeters, and blood pressure cuffs. Anything else in the operatory that does not come in contact with the patient's mucosa, like walls, floor, cabinets must be cleaned and disinfected at least with a low to intermediate level of disinfectant.

Tuberculosis

Tuberculosis is a lung infection caused by Mycobacterium tuberculosis. The bacterium is carried in airborne infective droplet nuclei by sneezing, coughing, speaking or singing. The nuclei can stay suspended in the air for hours. Prolonged
exposure to the disease is usually required for infection.

**Transmission of *Mycobacterium tuberculosis***

- Spread by droplet nuclei.
- Immune system usually prevents spread.
- Bacteria can remain alive in the lungs for many years (latent TB infection).

The dental team’s relatively brief interaction reduces the risk of tuberculosis transmission during treatment. Nevertheless, dental health care personnel can be exposed to persons with infectious TB, and should have a baseline two step test tuberculin skin test at the beginning of employment. Some strains of the disease are resistant to standard drug treatment regimens. Most adults with a properly functioning immune system are able to resist a tuberculosis infection. More than 90% of current TB cases occur in people who have been previously infected with the disease (reactivation rather than new onset). The CDC recommends the following protocol for treating dental patients with tuberculosis:

- Ask patients about TB symptoms and history of TB.
- Refer patients with symptoms of active TB to a physician for evaluation.
- Postpone elective dental treatment until diagnostic tests rule out active tuberculosis.
- Implement isolation protocol in a medical center if emergency dental care is required. Dental care providers must use HEPA filter masks during treatment.
- Limit treatment to relieve immediate pain.
- Refer any dental health care worker with TB symptoms to a physician for evaluation. The worker may return to practice after diagnostic tests rule out active tuberculosis or once therapy has eliminated infectivity.
AIDS

Acquired immune deficiency syndrome (AIDS) was identified and reported in the Morbidity and Mortality Weekly Report (MMWR) for the first time on June 5, 1981. It is caused by a retrovirus, called human immunodeficiency virus (HIV). This virus suppresses critical human T-cells in the immune system. Patients are susceptible to diseases that are harmless to a person with a normal immune system.

The patient may be completely asymptomatic for quite some time (even up to 7 years). Both a symptomatic AIDS patient and an asymptomatic HIV positive patient are equally infectious. Dr. Robert Siliciano from Johns Hopkins University conducted research using the blood of 50 Baltimore AIDS patients to measure the virus' resistance to treatment. “What HIV has done is tap into the most fundamental aspect of the immune system, and that is its immunological memory.” (Dr. Siliciano)

Siliciano said the virus lies silent inside resting memory T-cells, whose job is to store a record of the germs they encounter to keep the body ready for return battles. Inside these sleeping cells, HIV lies dormant but dangerous. AIDS cells die off very slowly. Based on data from his Baltimore patients, Siliciano estimated it takes 73 years for AIDS cells to die, and he can imagine no way to speed the process. Scientists now say this latent reservoir is the single biggest obstacle to curing AIDS.

Signs and symptoms of HIV infection include persistent generalized lymphadenopathy, fever lasting more than a month, involuntary weight loss of more than 10% of baseline body weight, diarrhea lasting more than a month, or any combination of these. This disease is called AIDS when the patient acquires what is known as an AIDS defining illness (Pneumocystis pneumonia, Kaposi's sarcoma and recurrent bacterial pneumonia are examples), or when their T-cell count drops below 200 or 14% of their total lymphocyte count.
Many patients who test positive for HIV infection may have been carrying the disease undiagnosed for a long time. It is currently not a legal requirement for anyone to disclose his or her HIV status in a health history. Many times patients do not disclose this information for fear of being denied treatment or discriminated against.

<table>
<thead>
<tr>
<th>Health Care Workers with Documented and Possible Occupationally Acquired HIV/AIDS</th>
<th>Documented</th>
<th>Possible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental Worker</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Nurse</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>Lab tech, clinical</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>Lab tech, non clinical</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Physician, non surgical</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>69</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>142</td>
</tr>
</tbody>
</table>

*3 dentists, 1 oral surgeon, 2 dental assistants

**Transmission of HIV from Infected Dentists to Patients**

- Only one documented case of HIV transmission from an infected dentist to a patient.
- No transmissions documented in the investigation of 63 HIV infected DHCP (including 33 dentists or dental students).
- Immediate (within 24 hrs) treatment with antiretroviral drugs is recommended for these situations in order to further reduce the likelihood of contraction. The course for these drugs is usually 4 weeks.

**Hepatitis**

Viral hepatitis is categorized in three types:

- Infectious: A
- Serum: B and D
- Non A or B: C, E
Hepatitis A and E are spread through food or water contaminated by infected human feces. Hepatitis B, C, and D are spread through percutaneous or permucosal contact with infected body fluids or blood. Hepatitis E is rare in the US and not encountered in the dental setting very often.

Hepatitis B virus (HBV) is transmitted either through percutaneous modes (IV drug use or prick wounds), by sexual contact, from mother to fetus or infant, and nonpercutaneous modes (transfer of infectious body secretions like saliva, blood, and crevicular fluid to mucous membranes or open wounds in the skin). Approximately 80% of all HBV infections are undiagnosed. HBV has been demonstrated to survive in dried blood at room temperature on environmental surfaces for up to one week. Hepatitis B virus damages liver cells and can be found in high numbers in the blood of an infected individual.

The symptoms of hepatitis B infection include: anorexia, malaise, nausea, vomiting, abdominal pain, fatigue, and jaundice in varying combinations. Other symptoms may be skin rashes, arthralgias, and arthritis. If left untreated, the patient may become a carrier or develop cirrhosis, acute hepatitis, or primary liver cancer.

The greatest concentration of HBV in an infected patient’s mouth is in the gingival sulcus. Inflammation may be present due to gingivitis. Probing or scaling will result in easy, profuse bleeding. The dental hygienist is at high risk for infection because of the bleeding associated with routine prophylaxis.

Other risky procedures include packing cord for crown impressions, oral surgery, needle sticks, injuries from contaminated sharps, blood and saliva contamination of cuts and cracks on the skin, and spraying of blood and saliva onto mucous membranes.
Transmission of HBV from Infected DHCP to Patients

- Eight dentists tested for HBeAg were positive.
- Lack of documented transmissions since 1987 may reflect increased use of gloves and vaccines.

The American Dental Association and The Centers for Disease Control recommend dental professionals vaccinate against hepatitis B. Employers should provide easy access to a qualified health care professional who can administer the vaccine and provide appropriate follow up testing. The plasma derived hepatitis B vaccine, "Heptavax-B" was introduced in the United States in 1982. Ninety-six percent of healthy adults seroconvert and have the correct antibody levels to prevent infection by the end of the series.

Two vaccines are currently available: Recombivax HB (Merck Sharp and Dohme), and Engerix B (SmithKline). They are made using recombinant DNA technology, and results in 99% of healthy adults seroconverting. Anyone who is hypersensitive to yeast should consult their personal physician before being immunized with these products.

The standard protocol for administration of the HBV vaccine is three doses in the deltoid muscle. The first dose should be given at baseline, the second, one month later, and the third, six months later. Test for anti HBs at one to two months after third dose. If an unvaccinated person is exposed to HBV, a single dose of hepatitis B immunoglobulin is given within 24 hours of exposure, and the first vaccine dose within seven days. If someone is exposed while in the middle of their series, one dose of immunoglobin is given immediately and then the series continues as scheduled.

Anyone who has been vaccinated and then exposed to HBV should have his blood tested. If he has a low antibody response, he should be given a booster dose of the vaccine and a dose of hepatitis B immunoglobulin. People who are exposed to HBV but have been unresponsive to the vaccine should have a dose of hepatitis B immunoglobin immediately, then another one month later. Everyone should have a blood test after completing the vaccine series to confirm its effectiveness. Currently, the CDC does not recommend boosters for vaccine responders.
**Personal Protective Equipment**

All DHCP must wear surgical facemasks in combination with either chin length plastic face shields or protective eyewear whenever there is potential for aerosol spray, splashing, or spattering or the following: droplet nuclei, blood, chemical or germicidal agents, or OPIM. Chemical resistant utility gloves and appropriate, task specific PPE must be worn when handling hazardous chemicals. After each patient treatment, masks must be changed and disposed.

Protective attire must be worn for disinfection, sterilization, and housekeeping procedures involving the use of germicides or handling contaminated items. All DHCP must wear reusable or disposable protective attire wherever there is a potential for aerosol spray, splashing, or spattering of blood, OPIM, or chemicals and germicidal agents. Protective attire must be changed daily or between patients if they should become moist or visibly soiled. All PPE used during patient care shall be removed when leaving laboratories or areas of patient care activities. Reusable gowns must be laundered in accordance with CalOSHA Bloodborne Pathogens Standards (Title 8, California Code Regulations, section 5193) or other state or federal regulations.

Gloves, eyewear, masks, face shields, and protective apparel are classified as medical devices and are regulated by the FDA. The employer is responsible for purchase of personal protective equipment.

**Handwashing**

All DHCP must thoroughly wash their hands with soap and water at the start and end of each workday. DHCP must wash contaminated or visibly soiled hands with soap and water and put on new gloves before treating each patient. If hands are not visibly soiled or contaminated, an alcohol rub may be used as an alternative to soap and water. Hands must be thoroughly dried before donning gloves in order to prevent bacterial growth and washed again immediately after glove removal. A DHCP must refrain from direct patient care if conditions are present that may render the DHCP or patients more susceptible to opportunistic infection or exposure.

All DHCP who have exudative lesions or weeping dermatitis of the hands must refrain from all direct patient care and from handling patient care equipment until the condition resolves.
Hand Hygiene Definitions

- **Handwashing** Washing hands with plain soap and water.
- **Antiseptic handwash** Washing hands with water and soap or other detergents containing an antiseptic agent.
- **Alcohol based handrub** Rubbing hands with an alcohol containing preparation.

According to the CDC in 2016, when using alcohol-based hand sanitizer:

- Put product on hands and rub hands together
- Cover all surfaces until hands feel dry
- This should take around **20 seconds**

- **Surgical antisepsis** Handwashing with an antiseptic soap or an alcohol based handrub before operations by surgical personnel.

The primary defense against infection and transmission of pathogens is healthy, unbroken skin. Keeping nails short is considered key, because the majority of flora on the hands are found under and around the fingernails. Hands are the most common mode of pathogen transmission. Hand hygiene reduces the spread of bacteria. Hand hygiene is considered the single, most critical measure reducing the risk of transmitting organisms to patients and health care personnel. Dental care workers should wash their hands thoroughly (for a minimum duration of 15 seconds) with an antimicrobial handwash at the beginning of the day and in between patients.

**The CDC Guideline for Hand Hygiene in Healthcare Settings recommends:**

- When cleaning your hands with soap and water, wet your hands first with water, apply the amount of
- product recommended by the manufacturer to your hands, and rub your hands together vigorously for at least 15 seconds, covering all surfaces of the hands and fingers.
• Rinse your hands with water and use disposable towels to dry. Use towel to turn off the faucet.
• Avoid using hot water, to prevent drying of skin.

Gloves

Medical exam gloves must be worn when there is contact with mucous membranes, blood, OPIM, and during all pre clinical, clinical, post clinical, and laboratory procedures. When processing contaminated sharp instruments, needles, and devices, DHCP must wear heavy duty utility gloves to prevent puncture wounds. Gloves must be discarded when torn or punctured, upon completion of treatment, and before leaving laboratories or areas of patient care activities. All DHCP must perform hand hygiene before donning gloves and after removing and discarding gloves. Gloves must not be washed before or after use.

Gloves are not a substitute for handwashing! Washing hands thoroughly with antimicrobial soaps disinfect hands, but will not make them sterile. Medical exam gloves must be worn when there is potential contact with mucous membranes, blood or OPIM. Properly fitting gloves should be snug but not restrictive and should cover the cuffs of a long sleeved gown. Gloves must be discarded upon completion of treatment and before leaving laboratories or areas of patient care activity. Wear a new pair of gloves for each patient.

Healthcare workers should wash their hands after removing and discarding gloves. Do not wash, disinfect or sterilize gloves for reuse. Do not touch your face, nose, or mouth with contaminated gloves. For most dental procedures, single use non sterile rubber gloves are acceptable. It is recommended that sterile surgical gloves be worn for surgical extractions and more invasive procedures. Sterile gloves will theoretically limit contamination of the surgical site.

Disinfectant chemicals can cause defects in latex gloves, so it is better to use heavy utility gloves when using or mixing chemicals. Do not use petroleum or oil based lotions before donning gloves, because these damage gloves and reduce their effectiveness. Store gloves according to manufacturer’s directions. If gloves are torn, cut, or punctured, change them as soon as possible. Wash hands thoroughly and replace gloves before continuing with a procedure. Sharp nail edges or broken nails are likely to increase glove failure. Long artificial or natural nails can make donning gloves difficult and can cause gloves to tear more readily. Gram negative organisms are more prevalent on artificial nails.

Any cuts should be covered with Band Aids. Use antibacterial ointment on cuts if indicated. Slip one layer of gauze between the Band Aid and glove to keep the Band Aid from becoming moist. Inexpensive plastic gloves can be worn over sterile gloves.
when writing data in charts or retrieving an item out of a drawer. These gloves may not be used alone as hand barriers or for intraoral patient care.

Gloves are available as ambidextrous or right and left specific. Ambidextrous gloves are less expensive, but right/left specific gloves are more comfortable on hands and wrists. In oral surgery, effectiveness of wearing two pairs of gloves to prevent disease transmission has not been demonstrated, but the majority of studies have demonstrated a lower frequency of inner glove perforation and visible blood on surgeon’s hands. Double gloving does not appear to substantially reduce manual dexterity or tactile sensitivity. Some health care workers have reported allergies to latex or the powder used in gloves. It is more common in 2016 that dental offices use Nitrile gloves to, not only protect clinicians from any latex sensitivities or allergies, but also, to avoid latex reactions with patients!

**Latex Allergy**

- Type I hypersensitivity to natural rubber latex proteins.
- Reactions may include nose, eye, and skin reactions.
- More serious reactions may include respiratory distress, rarely shock or death.

**Personal Protective Equipment**

**Gowns**

Health care workers must wear reusable or disposable protective attire when clothing or skin is likely to be in contact with blood or OPIM. Gowns should be fluid resistant, high necked, and provide coverage to the knees. Gowns must be changed in between patients and when they are visibly soiled or moist. They must be removed and placed in laundry or disposal bags when leaving laboratories and after patient care.

Wash uniforms in hot soapy water and bleach. Reusable gowns must be laundered in accordance with Cal-DOSH Blood borne Pathogens Standards, Title 8, California Code Regulations Section 5193 or other applicable state and federal regulations.
Machine dry reusable gowns at 100°F. Cost analyses will reveal the most economical protective apparel choice for your office.

**Masks**

Wear surgical masks in combination with either chin length plastic face shields or protective eyewear to protect the face, mouth, and nasal cavity when blood, OPIM, or other body fluid splatter is expected. Masks should be well constructed. Pleated, soft masks have better filtration than cup masks. A tight seal at the bridge of the nose on the mask will minimize eyewear fogging. Use a mask with at least a filtration rate of 95% of particles three to five microns.

Masks must be changed after each patient and during patient treatment (if applicable). Microbes pass more easily through moisture, so change your mask if it becomes wet or visibly soiled. Some professionals change masks after one hour. Be careful not to touch your mask with soiled gloves if it is to be reused. After each patient, face shields and protective eyewear must be cleaned, and if visibly soiled, disinfected.

**Protective Eyewear**

Debris can be irritating to the eye, and microorganisms can enter the body through the eye’s mucous membrane. Wear protective eyewear to shield your eyes from blood, OPIM, or other body fluid spatter. Wrap around goggles or face shields are recommended. Face shields used during air abrasion deflects aluminum oxide particles.

Protective eyewear also keeps healthcare workers from touching their eyes during procedures and when mixing chemicals. After each patient, face shields and protective eyewear must be cleaned, and if visibly soiled, disinfected. The patient can also wear protective eyewear. Some offices provide sunglasses to patients to reduce overhead light glare and protect the patient’s eyes from spatter.
Loupes

Follow the manufacturer’s guidelines when it comes to cleaning loupes but, a good approach is to first carefully use compressed air to remove any matter from the lenses and mounting, to prevent scratching. Some recommend rinsing under warm water while others make special disinfecting clothes. To prevent contamination to yourself or patient, not to mention to preserve the integrity of the loupes, make sure to know how to best clean them in between patients.

Personal Hygiene

The staff should wear clean, fresh uniforms every day. Wear a long sleeved fluid resistant lab coat (or a disposable gown) over your uniform when any spatter is possible (even during cleaning). Do not wear the lab coat or uniform out of the office. Wash uniforms in hot soapy water and bleach. Machine dry at 100°F. Clean uniforms on site or by a third party. Pull longer hair back away from the face. False fingernails can lift at the edge, creating an area for fungi and microorganisms to breed. Keep fingernails trimmed, so they do not stress or puncture gloves. Keep cuts and sores covered. Do not touch your face, nose, or mouth with contaminated gloves.

Surfaces and Waste Disposal

Surface Covers

Many surfaces in the dental operatory become contaminated, and they are difficult to clean or cannot be autoclaved. Cover chair buttons, control buttons on the air/water syringe, switches on the unit, light handles, hoses, handpieces, and air/water syringe holders with plastic wrap, aluminum foil, or other disposable material that is impervious to water. Replace with fresh covers after each patient. Covers are faster and easier to remove and throw away than cleaning and disinfecting these areas. Make sure not to contaminate underlying surfaces by touching them or removing covers.

Surface Cleaning

Countertops should be disinfected after each patient. Surface barriers can be used and changed between patients OR dental practitioners should clean and disinfect all clinical contact surfaces not protected by impervious barriers using an EPA registered, hospital grade low to intermediate level disinfectant after each patient.
Low level hospital disinfectants must be effective against HBV and HIV; intermediate level hospital disinfectants are effective against TB.

When using disinfectants, follow manufacturer’s instructions. Routinely clean all housekeeping surfaces (floors, walls, sinks) with a detergent and water or an EPA registered, hospital grade disinfectant. Preclean surfaces with a detergent cleaner before disinfecting. Disinfectants that have detergent properties can be used for this step. Prepare cleaning and disinfecting solutions daily. Use water, not alcohol, to dilute concentrates or other chemicals.

Wear utility gloves, a mask, protective eyewear, and protective clothing during surface cleaning and disinfection to reduce skin, mucous membrane, or eye contamination. Generously spray cleaner onto surfaces, and wipe or scrub with paper towels or brush. If possible, rinse over a sink. After precleaning surfaces, spray disinfectant and leave undisturbed for ten minutes or by the amount of time given by manufacturer’s directions. (Spray - Wipe - Spray) Clean mops and cloths and dry them thoroughly before reusing.

**Spilled Blood**

Absorb any spilled blood with paper towels, saturate the area with bleach, and place soiled cleaning supplies in appropriate containers. Always wear utility gloves when cleaning up spilled blood.

**Disposal of Contaminated Wastes**

Contaminated, solid waste must be disposed of according to applicable local, state, and federal environmental standards. Local ordinances vary from area to area in regard to waste management. Check with local authorities for specific regulations.

**Regulated Medical Waste Management**

- Properly label waste containers to prevent injuries and leakage.
- Medical wastes are treated in accordance with state and local EPA regulations.
- Processes for regulated waste include autoclaving and incineration.

**Limiting Contamination**

Perform dental procedures by conscientiously limiting the amount of droplet nuclei, spatter, and aerosols. Use high speed evacuation, proper patient positioning, and a rubber dam if appropriate. Use over gloves if it is necessary to make a chart entry during treatment. Anything used in the patient's mouth must be sterile. Put all instruments for a patient on a sterile tray with a cover, and place all instruments back
onto this tray after use. Wipe down the area where the tray rests with disinfectant after each patient. Use of any irrigating solution should be delivered using a sterile delivery system.

**Preprocedural Mouth Rinsing**

It is an excellent idea to use a pre-procedural mouth rinse to reduce microbial levels in the patient’s mouth. There is no mouthwash currently available that is a perfect preprocedural mouthrinse. Chlorhexidine gluconate seems to be the best wide spectrum mouthrinse currently available.

The American Heart Association recommends chlorhexidine rinses as an adjunct to antibiotic prophylaxis, especially if patients are high risk or have poor oral hygiene. Much research regarding CHG indicates it reduces the patient’s chances of developing infections during procedures. CHG helps to control opportunistic infections in compromised patients who have bone marrow transplants, cancer, or HIV infection.

**Needles**

Strict guidelines need to be followed for handling and disposing of sharps. Use a new, sterile disposable needle and fresh carpule of anesthetic for every patient requiring anesthesia. Handle needles and sharps like scalpels and scalers carefully, because they easily puncture gloves and injure skin. Recap needles using the scoop technique or a protective device. One safe recapping method uses forceps to steady the cap. Whatever technique is used, do not direct the needle point toward any part of the body. Needles must not be bent or broken for the purpose of disposal.

Contaminated needles, disposable needles, syringes, scalpel blades, and other sharp items and instruments must be placed into sharps containers for disposal as close as possible to the point of use according to all applicable local, state, and federal regulations. They must be disposed of as soon as possible after use. They should be placed in color coded, puncture resistant, leakproof containers until they can be properly processed. Continue to watch for new needle safety technology.
**Disinfection**

Disinfection will kill disease producing microorganisms but not bacterial spores. Office disinfection procedures employ a liquid chemical at room temperature to kill microorganisms. If the chemical used is not sporicidal, it is called a disinfectant (for example, iodophors, synthetic phenolics, phenols, alcohol/phenolics, sodium hypochlorite, low concentration glutaraldehyde) and will not completely sterilize surfaces.

Liquid glutaraldehydes (at concentration levels for immersion sterilization) are not acceptable as surface disinfectants because of dangerous vapors. Properly diluted iodophor, sodium hypochlorite, and complex phenol preparations have been shown to be superior in comparison with other disinfectants for initial precleaning.

An ideal disinfectant should:

- Have a wide spectrum of antibacterial activity.
- Be tuberculocidal, effective against hepatitis B and HIV.
- Be effective in the presence of bioburden and debris.
- Be compatible with soaps and other chemicals.
- Be non corrosive, non staining, and non toxic.
- Have a residual effect.
- Be odorless, economical, and easy to use.
- Be registered with the EPA.

Each dental office must take its own needs into account when selecting an appropriate surface disinfectant. Is it easy to use, economical, and compatible with materials in the office? Is it tuberculocidal within a reasonable period of time at room temperature? What are the disposal requirements, and will it cause allergic reactions in patients or staff? If it needs to be diluted, can it mix with common tap water or will you need to purchase distilled water? When comparing product costs, take into account shelf life and mixing time.

**Sterilization and Disinfection**

All germicides must be used in accordance with intended use and label instructions.

Cleaning must precede any disinfection or sterilization process. Products used to clean items or surfaces prior to disinfection procedures must be used according to all label instructions.

Critical instruments, items and devices must be discarded or precleaned, packaged or wrapped and sterilized after each use. Methods of sterilization must include steam
under pressure (autoclaving), chemical vapor, and dry heat. If a critical item is heat sensitive, it must, at minimum, be processed with high level disinfection and packaged or wrapped upon completion of the disinfection process. These instruments, items, and devices must remain sealed and stored in a manner so as to prevent contamination and must be labeled with the date of sterilization and the specific sterilizer used if more than one sterilizer is utilized in the facility.

Semi critical instruments, items, and devices must be precleaned, packaged or wrapped and sterilized after each use. Methods of sterilization include steam under pressure (autoclaving), chemical vapor and dry heat. If a semi critical item is heat sensitive, it must, at minimum, be processed with high level disinfection and packaged or wrapped upon completion of the disinfection process. These packages or containers must remain sealed and must be stored in a manner so as to prevent contamination, and must be labeled with the date of sterilization and the specific sterilizer used if more than one sterilizer is utilized in the facility.

According to Mary Govoni, CDA, RDA, RDH, MBA, in volume 9, issue 2 of DentistryIQ in an article titled, ‘A Look At The New CDC Guidelines,’ “It is interesting to note that the "spray-wipe-spray" technique that we were encouraged to use for environmental infection control in the past is not mentioned in the new guidelines. Cleaning, which was accomplished by the first "spray-wipe," can be done by wiping with a gauze or paper towel saturated with disinfectant, or a pre-moistened wipe. The second "spray" can be accomplished by applying the disinfectant again, after cleaning, with another gauze, towel, or wipe saturated with the same product. There is some research that suggests that continuous exposure to cleaners and disinfectants, especially in sprays, can cause respiratory problems. For information about this research, consult www.chm.msu.edu/oem and click on the resources link. You will see a link for occupational asthma, which will explain the possible problems associated with spraying disinfectants.”

Non critical surfaces and patient care items must be cleaned and disinfecte with applicable state, federal or California Environmental Protection Agency (CalEPA) registered hospital grade disinfectants (low level disinfectants) labeled effective against HBV and HIV. When an item is visibly contaminated with blood or OPIM, a state, federal or California Environmental Protection Agency (CalEPA) registered hospital grade intermediate level disinfectant with a tuberculocidal claim must be used.

All high speed dental handpieces, low speed handpieces, rotary components and dental unit attachments such as reusable air/water syringe tips and ultrasonic scaler tips, must be packaged, labeled and heat sterilized in a manner consistent with the same sterilization practices as a semi critical item.
Single use disposable items such as prophylaxis angles, prophylaxis cups and brushes, tips for high speed evacuators, saliva ejectors, air/water syringe tips, and gloves shall be used for one patient only and discarded.

Proper functioning of the sterilization cycle of all sterilization devices must be verified at least weekly through the use of a biological indicator (such as a spore test). Test results must be documented and maintained for 12 months.

**Irrigation**

Sterile coolants/irrigants must be used for surgical procedures involving soft tissue or bone. Sterile coolants/irrigants must be delivered using a sterile delivery system.

**Facilities**

If non critical items or surfaces likely to be contaminated are manufactured in a manner preventing cleaning and disinfection, they must be protected with disposable impervious barriers. Disposable barriers must be changed when visibly soiled or damaged and between patients.

Clean and disinfect all clinical contact surfaces that are not protected by impervious barriers using a state, federal or California Environmental Protection Agency (CalEPA) hospital grade low to intermediate level disinfectant after each patient. The low level disinfectants used must be labeled effective against HBV and HIV.

Use disinfectants in accordance with the manufacturer's instructions. Clean all housekeeping surfaces (floors, walls, sinks) with a detergent and water or a state, federal or California Environmental Protection Agency (CalEPA) registered hospital grade disinfectant. Products used to clean items or surfaces prior to disinfection procedures must be clearly labeled, and DHCP must follow all material safety data sheet (MSDS) handling and storage instructions.

Dental unit water lines must be anti retractive. At the beginning of each workday, dental unit lines and devices must be purged with air or flushed with water for at least two (2) minutes prior to attaching handpieces, scalers, air water syringe tips, or other devices. The dental until lines and devices must be flushed between each patient for a minimum of twenty (20) seconds.

Contaminated solid waste must be disposed of according to applicable local, state, and federal environmental standards.

**Lab Areas**

Splash shields and equipment guards must be used on dental laboratory lathes. Fresh pumice and a sterilized or new ragwheel must be used for each patient.
Devices used to polish, trim, or adjust contaminated intraoral devices must be disinfected or sterilized, properly packaged, or wrapped and labeled with the date and the specific sterilizer used if more than one sterilizer is utilized in the facility. If packaging is compromised, the instruments must be recleaned, packaged in a new wrap, and sterilized again. Sterilized items must be stored in a manner so as to prevent contamination.

All intraoral items such as impressions, bite registrations, and prosthetic and orthodontic appliances must be cleaned and disinfected with an intermediate level disinfectant before manipulation in the laboratory and before placing in the patient’s mouth. The Dental Board of California and Dental Hygiene Committee of California shall review this regulation annually and establish a consensus.

Iodophor Solutions

Iodophors are probably the most commonly used surface disinfectants. They have low toxicity, no offensive odor, and are not irritating to the skin. However, they do not produce a residual effect on the treated surface. Iodophors are rated by the EPA as a tuberculocidal hospital disinfectant. Some solutions are poor detergents, so the surface must be precleaned with another product. Residual effects are cumulative with each treatment. Longer lasting disinfection results if surfaces are allowed to dry completely. Follow manufacturer’s directions for mixing and contact time.

Complex Phenolics

Some complex or synthetic phenols are excellent for surface disinfection. They have a good detergent effect, so the same solution can be used for precleaning and disinfection.

Alcohol-Quaternary Ammonium Compounds

Alcohol combined with quaternary ammonium compounds enhances the antimicrobial spectrum. Alcohol quaternary compounds are appropriate disinfectants.

Sodium Hypochlorite (Bleach)

Bleach should be mixed with water in a dilution of 1:10 or 1:100 of a 5.25% solution. Use a 1:100 solution (approximately ¼ cup of 5.25% household chlorine bleach to one gallon of water) when cleaning blood and debris. Make a fresh solution every day, and wear heavy utility gloves when cleaning with bleach. A bleach and water mixture is not recommended as a surface disinfectant after every patient because of its odor and corrosive nature. It is a good solution for applying to contaminated paper products before their disposal. Any instruments that may have been sprayed
with bleach should be rinsed well before soaking in detergents or disinfectants.

**Unacceptable Solutions**

**Quaternary Ammonium Compounds**

The Council for Dental Therapeutics of The American Dental Association has declared all older quaternary ammonium compounds unacceptable for use in dentistry. They are not tuberculocidal, sporicidal, or virucidal and will not kill all gram negative bacteria. They are inactivated by soap, hard water, and organic debris.

**Alcohol**

Alcohol (both types: ethyl and isopropyl) is ineffective against bacterial spores, not consistently effective in killing viruses, evaporates rapidly, has no residual effect, and is inactivated by organic matter. Alcohol is not EPA approved for instrument or surface disinfection.

**Steps in Instrument Processing**

**Instrument Processing Area**

Use a designated processing area to control quality and ensure safety. Divide processing areas into work areas such as:

- Receiving, cleaning, and decontamination.
- Preparation and packaging.
- Sterilization.
- Storage.

**Storage of Sterile and Clean Items and Supplies**

- Use date or event related shelf life practices.
- Examine wrapped items carefully prior to use.
- When packaging of sterile items is damaged, reclean, rewrap, and resterilize.
- Store clean items in dry, closed, or covered containers.

**Presoaking**

Soak contaminated instruments in a mild detergent to prevent blood, saliva, and debris from drying on the instruments. Presoaking for longer than a few hours may cause corrosion of some instruments. Employees should not reach into trays or containers holding sharp instruments that cannot be seen (sinks filled with soapy water in which sharp instruments have been placed).
Work practice controls should include use of a strainer type basket to hold instruments and forceps to remove the items. If possible, use an ultrasonic cleaner basket set in a pan of presoak, so instruments can be directly immersed in ultrasonic cleaner without additional handling. Always wear heavy utility gloves, protective eyewear, a mask, and protective clothing when handling contaminated instruments.

Precleaning

Preclean debris and blood from instruments and surfaces after the presoak and before a sterilization cycle, because this bioburden will prevent chemicals or heat from contacting the instruments. Clean instruments by hand or by submerging in an ultrasonic cleaner. If hand scrubbing is the only option, wear heavy utility gloves, a mask, protective eyewear, and protective clothing. Be especially careful of spatter during hand scrubbing, and keep sterile instruments away from the scrubbing area. If safe, try to scrub instruments while submersed in a sink of water and use careful, light motions. Always rinse and dry instruments.

Ultrasonic cleaners are very effective and greatly reduce the risk of puncture injury to health care workers. Arrange the cleaning area so the ultrasonic cleaner is on one side, a sink is in the middle, and the sterilizer is on the other side. Use solutions designed specifically to aid in cavitation. These solutions are generally not disinfectants, so the instruments will emerge free from bioburden but will still be contaminated.

Match the cleaning activity with the type of instruments being cleaned (a light purpose cleaner for lightly soiled instruments, heavy duty for more heavily soiled instruments). Place the instruments in the basket before submersion to avoid spatter and keep them off the bottom of the ultrasonic cleaner. Use bur blocks, and be careful of overloading sharp instruments that may be dulled by contact with other items. Check manufacturer’s directions regarding burs, because some cannot be cleaned ultrasonically.

Make sure the lid is securely in place before turning the unit on. Instruments should be free of debris before removing them from the ultrasonic cleaner. Increase ultrasonic cleaning time for instruments contained in plastic or resin type cassettes. Visually inspect the tips of instruments to make sure the bioburden is removed. Use heavy utility gloves for handling instruments from the ultrasonic since they are still contaminated.

Instruments must be rinsed and dried before sterilization. Wet instruments may corrode in chemical vapor sterilizers and cause paper wraps to burst making the packaged instruments open to air and contamination after the sterilization process. Always follow the manufacturer’s directions for use, care, and cleaning of ultrasonic
devices. Change solutions in the ultrasonic cleaner daily.

Use heavy utility gloves, mask, protective eyewear, and protective clothing when changing the solution. The inside of the chamber should be disinfected, rinsed, and dried. Fill the container with fresh solution. Occasionally test the ultrasonic by suspending a piece of aluminum foil in the chamber and cavitate for 10 minutes. There should be a “peppering” effect on the foil from the ultrasonic action. Keep the foil pieces for comparison.

**Corrosion Control and Lubrication**

Rust inhibitors are available to protect non stainless instruments in steam autoclaves. If the manufacturer recommends lubrication before sterilization, be sure to remove excess lubricant so it does not bleed on the bags.

**Packaging**

**Preparation and Packaging**

- Critical and semi-critical items that will be stored should be wrapped or placed in containers before heat sterilization.
- Hinged instruments opened and unlocked.
- Place a chemical indicator inside the pack.
- Wear heavy-duty, puncture resistant utility gloves.

Always use the correct type of instrument packaging for the sterilizing system you use. Wraps that may work fine in a dry heat sterilizer (like closed metal or glass, and aluminum foil) can prevent penetration by steam or chemicals in other systems. Sterility will not be achieved if the sterilizing agent does not contact the surface of the instruments for the correct amount of time.

Plastics may melt in dry heat, causing damage to the sterilizing unit and the instruments. When using paper, make sure it is strong enough to hold the sharp tips of instruments within the bag to avoid contamination and possible injury. Use transparent materials or mark the contents clearly on the paper to avoid opening packages needlessly.

Use self-sealing bags, autoclave tape, heat-sealing, or double fold the open end of the bags to contain the instruments. Staples and paper clips rust easily and are not reliable for sealing bags. Use containers of some type, because loose instruments will become easily contaminated between the sterilizer and the operatory, especially if stored in a drawer then sorted out later. Bag instruments in sets to be used on individual patients, and open them in front of the patient.
Backflow Prevention

A majority of state and local health departments require backflow prevention devices in dental offices. Agencies are concerned about the potential for aspiration of oral fluids through high speed handpieces or air/water syringes. Risk of aspiration is nearly impossible, because the instruments are not immersed in oral fluids. Any incident would be precipitated by a pause in the water flow, which would signal the dental professional to discontinue the procedure.

High Speed Handpiece Asepsis

The American Dental Association, the Food and Drug Administration, and the Center for Disease Control recommend heat sterilization for intraoral use of handpieces and prophy angles between each patient with an acceptable method that assures internal as well as external sterility.

These agencies also stress running the handpiece waterline after use for 20 to 30 seconds to flush the internal lines. The Food and Drug Administration requires air/water syringes and ultrasonic scaler tips to be sterilized between each patient. Most states have laws requiring heat sterilization of all reusable hand instruments, handpieces, and prophy angles.

If you do not have directions and information regarding a handpiece’s tolerance to heat or the recommended sterilization and lubrication regimen, contact the manufacturer with the model number and request a written copy. Always follow the handpiece manufacturer’s directions for proper maintenance, cleaning, sterilization, disinfection, and compatibility with chemical agents. Each handpiece is different. Some must be lubricated before and after sterilization. Some do not need lubrication at all.

Slow Speed Handpieces, Contra Angles, and Prophy Angles

If used intraorally, low speed handpieces and their components must be heat sterilized between each patient. Follow manufacturer’s directions for cleaning, lubricating and sterilizing. Use heat sterilizable or disposable prophy angles and contra angles. If treating an immunocompromised patient, a sterile angle is recommended. Some disposables can be autoclaved prior to first use; check manufacturer’s directions. Never reuse a disposable prophy angle.

Air/Water Syringes and Ultrasonic Scalers

Units that dispense water into the patient's mouth should be flushed for 30 seconds into a vacuum line between each patient. The tips of both air/water syringes and ultrasonic scaler tips must be removable and heat sterilized if possible. Plastic
disposable tips are available for air/water syringes.

**Lasers, Curing Lights, Electrocautery Devices**

Follow manufacturer’s directions for all devices. Use barrier protection when possible, and preclean removable tips before sterilization.

**Laser/Electrosurgery Plumes and Surgical Smoke**

- Destruction of tissue creates smoke that may contain harmful byproducts.
- Infectious materials (HSV, HPV) may contact the nose mucous membranes.
- There is no evidence of HIV/HBV transmission.
- There is a need for further studies.

Throw away all items (such as prophylaxis angles, prophylaxis cups and brushes, tips for high speed evacuators, saliva ejectors, and air/water syringe tips) designed by the manufacturers to be disposable after a single use. Do not try to disinfect or reuse items like disposable air/water syringes, plastic prophy angles, saliva ejector tips, prophy cups, or brushes and paper products.

**Saliva Ejectors and High Speed Evacuation Systems**

The saliva ejector tip is disposable and should be thrown away after every patient. However, if the interior of the vacuum line is not disinfected, it is contaminated with microorganisms and debris. Many health care workers incorrectly instruct the patients to close their lips around the ejector tip, which causes a suck back effect. A study of saliva ejectors by Watson and Whitehouse published in 1993, clearly demonstrated this phenomenon. They thoroughly disinfected suction lines with a bleach/water solution, and then added a red disclosing solution. Patients were suctioned with the mouth open and no red dye was found in the oral cavity. The same patients were then told to make a seal around the tip, and red dye was seen coming back up the clear ejector, with a significant number of patients receiving red dye into their mouths (evidenced by the patient expectorating into a white tissue).

Out of 97 tests using 15 different dental units at 9 different locations, 20 cases of red dye aspiration into participants’ mouths were documented. Several times the red dye was observed to come up the clear saliva ejector towards the patient's mouth, but these were not counted as positive results.

Since many offices do not decontaminate their suction lines after every patient, it is likely that some patients will aspirate bacteria and even debris from infected suction lines if they seal off the saliva ejector. More effective methods of preventing accidental suck back are currently being investigated (like safety valves and
changing the construction of the saliva ejector).

Patients should be directed not to close their mouths around the suction tips. Flush the high speed evacuation system after every patient with a 2% glutaraldehyde or any other non-foaming agent recommended by the manufacturer for disinfecting lines. At the end of the day, flush with a disinfectant that will remain in the vacuum system overnight to help reduce the number of microorganisms. Handle evacuation system traps with utility gloves, empty into the toilet, and clean the traps with a high-level disinfectant every day.

**X-Ray Equipment, Sensors and Film**

Heat sterilize heat tolerant radiographic accessories. Cover or disinfect collimating tubes between each patient. Once film or barrier-covered sensor is inserted into a patient’s mouth, it is considered contaminated. While gloved up pull the plastic disposable barrier off of the sensor and dispose of plastic barrier. Follow sensor manufacturer to disinfect cord and sensor, accordingly. Dismantle any RINN© holders and run through sterilization in the autoclave between each patient while disposing of any parts that are single use. For film, use disposable gloves in the darkroom to open the packets. Remove films from the packets without touching them, and collect contaminated packets on a disposable paper towel. When all films are out of the packets, discard the towel and the packets, and remove the gloves. After washing hands, process the films as usual; the darkroom equipment will not be contaminated. Film packets can also be decontaminated by wiping them with bleach before taking them into the darkroom.

**Impression Materials**

Due to diversity of impression materials used today, there is no clear cut protocol for their disinfection. Each material has different properties that may be affected by the disinfection process. Furthermore, studies have shown a lack of communication between dental offices and labs regarding disinfection of impressions. This is an area that needs to be addressed.

The CDC recommends when an impression is sent to the lab, information should be included pertaining impression disinfection (type of disinfectant used and time of exposure). Cleaning and disinfecting impressions should be done as soon as possible after removing them from the patient’s mouth. The Organization of Safety and Asepsis Procedures (OSAP) recommends the following: “Cleaning and disinfecting impressions before pouring in stone is an important aspect of laboratory asepsis. Different materials require different handling techniques. In general, impressions should be gently scrubbed with a camel hair brush (artists brush, one-
half inch bristle) and a liquid detergent to remove bioburden.

Scrubbing gently with dental stone sprinkled into the impression will remove stubborn materials. Always consult the impression material manufacturer or instructions for use for advice on using compatible disinfectants. Hydrocolloid and polyether impression materials generally are sprayed to saturate for the required time with an intermediate level disinfectant and placed in a plastic bag or sealed container to prevent evaporation of the agent.

More stable silicone (vinyl polysiloxane) or rubber based impression material typically may be immersed for disinfection. Studies have shown that when submerging elastomer impression materials (polyether, polysulfide, addition silicone and condensation silicone) in either 5.25% NaOCl for ten minutes or 2% glutaraldehyde for 30 minutes, there is no negative effect on dimensional accuracy.

Any disinfection procedure should be, at worst, tuberculocidal. It is possible to adequately disinfect alginate impressions in only ten minutes, thereby preserving their dimensional stability. As impression material technology is rapidly changing, it is wise to contact the manufacturer concerning proper disinfection of any new type of material.
# Methods of Sterilization

<table>
<thead>
<tr>
<th>Method</th>
<th>Standard Sterilizing Conditions*</th>
<th>Advantages</th>
<th>Precautions</th>
<th>Spore Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steam autoclave</td>
<td>20-30 min at 250 F 3-10 min at 273 F</td>
<td>Time efficient; Good penetration; Sterilize water-based liquid</td>
<td>Do not use closed containers; May damage plastic and rubber items; non-stainless steel metal items corrode; Use of hard water may leave deposits</td>
<td><em>Bacillus stearothermophilus strips, vials, or ampules.</em></td>
</tr>
<tr>
<td>Unsaturated chemical vapor</td>
<td>20 min at 270 F (20-40 psi)</td>
<td>Time efficient; No corrosion; Items dry quickly after cycle</td>
<td>Do not use closed containers; May damage plastic and rubber items; Must use special solution; Predry instruments or dip in special solution; Provide adequate ventilation; <strong>cannot sterilize liquids.</strong></td>
<td><em>Bacillus stearothermophilus strips</em></td>
</tr>
<tr>
<td>Dry heat oven</td>
<td>60-120 min at 320 F</td>
<td>No corrosion; Can use closed containers; Large capacity per cost; items are dry after cycle</td>
<td>Longer sterilization time; cannot sterilize liquids; May damage plastic and rubber items; Do not open door before end of cycle</td>
<td><em>Bacillus subtilis strips</em></td>
</tr>
<tr>
<td>Rapid Heat</td>
<td>Transfer 12 min at 375 F (for wrapped items) 6 min at 375 F (for unwrapped items)</td>
<td>No corrosion; Short cycle; items are dry after cycle.</td>
<td>Predry instruments; Cannot sterilize liquids; May damage plastic and rubber items; Do not open door before end of cycle; Small capacity per cost; unwrapped items quickly contaminated after cycle.</td>
<td><em>Bacillus subtilis strips</em></td>
</tr>
</tbody>
</table>

* These conditions do not include warm-up time and they may vary depending upon the nature and volume of the load. Sterilizing conditions in your office sterilizer should be defined by results of routine spore-testing.

The Centers for Disease Control and the American Dental Association recommend sterilization of any instruments, burs, and handpieces that come into contact with oral tissue, or penetrate soft tissue or bone after each use. Heat stable critical and semi critical instruments must be cleaned and sterilized before use by using steam under pressure (autoclaving), dry heat, or unsaturated chemical vapor. FDA cleared chemical sterilants/disinfectants must be used for sterilization of heat sensitive critical items and for high level disinfection of heat-sensitive semi critical items.

**Sterilization Monitoring--Types of Indicators:**

- Mechanical.
- Measure time, temperature, pressure.
- Chemical.
- Change in color when physical parameter is reached.
- Biological (spore tests).
- Use biological spores to assess the sterilization process directly.

Precleaned instruments submerged in glutaraldehyde solution at 2% or 3.2% concentration for ten hours will kill bacterial spores, but there is no test to verify the results. Currently, no single system will work for all the items used in a dental office. Most offices use at least two: a steam autoclave and glutaraldehyde chemical sterilization. The best and safest approach to preventing disease transmission from patient to patient via instruments is to sterilize all reusable instruments that are contaminated with blood or saliva instead of sterilizing some and disinfecting others. Many states require the sterilization of all reusable dental instruments. Sterilizers must be used correctly to achieve sterilization with every load of instruments.

**Examples of common mistakes include:**

- Overloading sterilizer chamber.
- Lack of separation between packs or trays in the chamber.
- Incorrect packaging material for method of sterilization.
- Excessive layering of wrap, inhibiting penetration.
- Closed container not penetrated by steam or chemical vapor.
- Insufficient time or temperature.
- Dry heat sterilizer door opened to add more items without starting sterilization time over.
- Sterilizer timer malfunction.
- Sterilizer malfunction.
- Improper cleaning of items to be sterilized.
When purchasing a sterilizer, take into account the needs of the office as well as the quality of support from the manufacturer. Any sterilizer purchased should be FDA approved for use in a dental office.

**Sterilization Monitoring**

Two part systems of sterilization monitoring using both biological and chemical indicators help assure patient safety and sterilizer effectiveness. Biological monitoring (also called spore tests) ensures correct use of heat sterilizers (including operation, packaging, loading and timing) by demonstrating the sterilizer’s ability to kill live spore samples. The spore test should be specific for the type of sterilizer used.

The test should be placed in the same type of container normally used for instruments, then run through a normal cycle with other instruments. The time, temperature, and pressure are recorded. The test is then sent back to the lab along with a control strip that has not been sterilized. Spores should grow on the control sample but not on the test. Spore survival in the test sample indicates sterilization failure and inactivation of spores is verification of successful sterilization. The laboratory notifies the office of the results. Weekly spore testing with a biological indicator (such as a spore test) is required by the Centers for Disease Control, the American Dental Association, the Association for Advancement of Medical Instrumentation, and the OSAP Research Foundation.

There are many spore testing services for steam, dry heat, unsaturated chemical vapor, and ethylene oxide gas sterilizers. They send the appropriate biological indicator strips, instructions, and return envelopes. Some personnel have expressed concern that delays caused by mailing specimens might cause false negatives. But studies have determined mail delays have no substantial effect on final test results. They call immediately for failures, and send written reports for each test.

**Glutaraldehyde as a Sterilant**

Always wear gloves, masks, protective eyewear and protective clothing when preparing, using, or discarding glutaraldehyde. It is very harmful to skin, mucous membranes, and eyes. Check the Material Safety Data Sheet (MSDS) for this product. Follow the manufacturer's label directions to prepare and activate properly. Mark containers of activated solutions with the date of mixing to accurately assess shelf life. Mark used containers or pans with the word "Glutaraldehyde," the brand name, and the expiration date.

Monitors are commercially available to test the concentration of glutaraldehyde, but
they do not assure instrument sterility. Preclean, rinse, and dry instruments to prevent sterilant dilution. Completely submerge instruments for proper contact time, usually ten hours. All glutaraldehyde solutions should be discarded and replaced with fresh solution when indicated. After correct processing time, thoroughly rinse instruments with water. Use sterile water if the item may penetrate tissue during use.

Instruments must be handled aseptically to prevent contamination from hands, aerosols, and dust before placing at chairside. Use sterile forceps to handle items and put them in bags or covers. Glutaraldehyde sterilants are indicated for immersion use only and are not recommended for use as a surface disinfectant. They should be kept in a closed container and in a well ventilated room, because repeated exposure to the fumes can cause breathing difficulties and dizziness. Some instruments will dull or corrode if soaked in glutaraldehyde for too long. Remember to start timing the sterile cycle after the addition of the last instrument is added to the solution, because each new addition contaminates the whole batch.

Summary Checklist

In outline form, here are some of the main points of infection control for the dental office.

Before the patient is seated for treatment:

- All health care workers in direct contact with patients should be immunized against the hepatitis B virus.
- Each patient should fill out a thorough medical health history form and this should be updated at each appointment.
- Prostheses and appliances to be delivered to the patients should be disinfected before fitting.
- Disposable coverings should be placed prior to seating each patient in operatory, and all surfaces should be disinfected.
- Take a few seconds to look over the setup to see if anything is missing.

During patient treatment:

- Treat all patients as potentially infectious.
- Use protective wear and barrier techniques such as gloves, mask, protective eyewear, and gowns, lab coats, or uniforms when in contact with body fluids or mucous membranes.
- X-ray films that are contaminated should be opened for processing in the darkroom with gloves, being careful not to touch the film. Then, remove the gloves to place film in the developer.
• Conduct procedures with the minimum amount of droplets, spatters, and aerosols. Use a rubber dam when appropriate. Use a high volume aspirator.
• Use gloves correctly to protect hands. Wash hands before and after gloving.
• Change gloves in between each patient. Change gloves that are torn, cut, or punctured.
• Avoid injury to hands by being careful with sharp items, placing disposable needles in an appropriate receptacle, and recapping needles using a recommended technique.
• Try not to leave the treatment room if at all possible during a procedure.
• Use an overglove if answering the phone, writing or going into a drawer.
• Don't touch your face or hair.
• At end of treatment: discard mask and gloves, wash hands, and remove gown.
• Change gown between patients, and clean face shields and protective eyewear.
• Make notes in chart and dismiss patient.

After the patient leaves:

• Wear heavy rubber gloves while disinfecting surfaces after each patient and handling instruments.
• Clear off all instruments that can be soaked, and put them in a container.
• Clean all debris from instruments.
• Sterilize instruments that penetrate soft tissue or bone. Also sterilize, when possible, all instruments that come in contact with oral mucous membranes, body fluids, or any contaminated secretions of patients. High level of disinfectant must be used if item is heat sensitive or oddly sized.
• Run air/water syringe, ultrasonic scaler, and/or handpiece for 30 seconds to flush lines.
• Clean suction lines with disinfectant by aspirating an acceptable, non foaming solution.
• Dispose of all disposable items after one use.
• Clean and sterilize handpieces if possible but must be sterilized for intraoral use of handpieces; follow manufacturer’s directions.
• Use caution when handling sharps, especially disposable needles and scalpels.
• Place them in a puncture resistant container before disposal.
• Decontaminate all environmental surfaces. Use absorbent paper toweling and a detergent type disinfectant to preclean surface and remove debris. Dispose of towels appropriately. Spray area liberally with disinfectant and leave wet for
the time indicated by the directions. Dispose of and replace any protective coverings on switches, light handles, x-ray unit head.

- Decontaminate all outgoing materials such as impressions, bite registrations, and appliances being sent to a laboratory.
- Use only small individual amounts of pumice in a disposable container for each patient, and discard any unused portion.
- Appropriately dispose of wastes. Any blood, suctioned fluids, or other liquid waste should be, if your state allows it, poured in a drain connected to a sanitary sewer system. Solid wastes contaminated with blood or saliva, including tissue, extracted teeth, and bloody (dripping) gauze should be sealed in a sturdy impervious bag and disposed of according to local, state and federal government regulations.
- Wash hands after removing gloves.

**Timetable Checklist**

**Daily**

- Clean and disinfect floors, work surfaces, door knobs, sink handles, drawer pulls, and anything else that may have been touched but not disinfected after each patient. Clean sterilizing area, disinfect brushes, and wipe down heat sterilizers.

**Weekly**

- Clean and disinfect lower areas of walls, front office areas, phones, and other areas not disinfected daily. Check stock and supplies to make certain you have an adequate amount of barrier products, chemicals, solutions, and supplies for the next week. Check the expiration date on all chemicals like glutaraldehyde. Test heat sterilizer with biological test strips.

**Monthly**

- Clean out drawers and storage spaces, disinfect with a product that has a long lasting effect.

**Annually**

- Review cross infection control system. Check that your hepatitis B vaccine is up to date (usually needs a booster every 5 years). Communicate with the laboratory regarding infection control of incoming/outgoing cases.
The Absolute Bottom Line

- Be vaccinated against hepatitis B.
- Treat all patients as if they were infectious.
- Have patients use an antiseptic mouthrinse before invasive procedures.
- Use an antiseptic handwash.
- Wear a disposable mask or face shield.
- Wear disposable latex gloves any time you touch mucous membranes.
- Wear protective eyewear.
- Wear a disposable gown or lab coat when spatter is expected.
- Wear clinical attire at all times.
- Use a rubber dam when appropriate.
- Put needles and other sharps in a puncture resistant container.
- Use sterilizable handpieces.
- Use an ultrasonic cleaner instead of hand scrubbing instruments.
- Correctly package instruments for sterilization.
- Use a heat sterilizer.
- As a general rule of thumb, if an instrument goes into a patient’s mouth, it needs to be either discarded or sterilized before being used on another patient.
- Monitor the sterilizer with appropriate spore tests weekly.
- Use glutaraldehyde for items that cannot be heat sterilized for the appropriate time recommended.
- Use an appropriate surface precleaner.
- Use an appropriate surface disinfectant for the time recommended by the manufacturer.
- Use surface covers.
- Have an adequate waste disposal system according to local regulations.
- Review scientific literature for technology at least annually to find safer devices to use in your practice.
- Keep your dental unit water cleaner than 200 CFU/mL for regular procedures and use sterile water for surgical procedures.

Conclusion

Infection control began with Dr. Joseph Lister and his pioneering efforts in sterilization techniques. As the chain of infection began to be understood, effective infection control strategies to prevent disease transmission were developed, and state and federal guidelines were written and mandated to control infection in all public health settings. Infection control, disinfection, and sterilization techniques, designed to protect patients and DHCP, were developed to stop the spread of pathogens between patients and DHCP, DHCP and patients, and from patient to patient. From these procedures and
techniques, daily, weekly, monthly, and annual cleaning and disinfection schedules were developed and should be implemented in all dental practices to achieve infection control goals. In addition, personal protection equipment should be made available to all DHCP and sharps containers. By adhering to state and federal infection control guidelines and regulations, the spread of disease producing pathogens will be minimal, and the health and safety of patients and DHCP protected.

Section 2: Bloodborne Pathogens Standard Annual Review

Section Description

This course meets and exceeds the minimum requirements for an OSHA Bloodborne Pathogens Standard Annual Review and for an Infection Control course in the clinical dental setting for all US state dental boards. ADA CERP Recognized Provider approved for credit in all 50 states. Many state dental licensing boards require that licensed and non-licensed dental professionals must meet the minimum requirements of their individual state's laws and regulations in infection control. You are responsible for knowing your state’s requirements for licensing. The purpose of this course is to protect the safety and of the general public and the dental clinician. And this ADA CERP provider approved course on bloodborne pathogens with an OSHA perspective, provides employers a recognized standard of information for their employees.

Objectives

• Understand the OSHA Bloodborne Pathogens Standard training requirements and study materials in this course.
• Review important terms and concepts in management of bloodborne pathogens in the clinical setting per OSHA guidelines.
• Know Standard Precaution measures mandated by state and federal OSHA guidelines.
• Identify strategies to prevent occupational exposures to bloodborne pathogens.
• Know post-accidental exposure protocols per OSHA.
• Identify Personal Protection Equipment (PPE) for dental personnel per OSHA.

Introduction

For dental health care personnel (DHCP) infection and communicable disease can lead to illness, disability, and loss of work time. In addition, patients, family members, and community contacts can become exposed and may become ill or suffer permanent after effects. Infection control from bloodborne pathogens in the clinical dental setting is regulated by OSHA and mandated for many healthcare professions, including dentistry. The emphasis of training is prevention of infection from the clinical and practical
knowledge of bloodborne pathogen management. Blood and bodily fluids are part of the clinical experience so a strong knowledge base for the dentist, hygienist, and assistant, as well as office staff, creates a safe and confident environment which protects both patient and clinician. This course reviews basic OSHA guidelines, discusses major categories of bloodborne pathogens, and offers practical clinical support to use best available practices.

**Infection Control: Regulations and Guidelines**

The Occupational Safety and Health Administration (OSHA) regulate workplace safety in the United States either through federal regulation or state-sponsored OSHA programs. In dentistry, one of the areas covered by the Bloodborne Pathogens Rule 1 is the use of personal protective equipment (PPE). There are no specific requirements regarding the types of materials for PPE. Rather, the regulations require that the employer assess the potential for exposure based on the nature of procedures typically done in a particular practice and select the appropriate protective attire.

The intention of PPE in dentistry is to prevent workers’ skin, eyes, nose, mouth, and other mucous membranes from coming into contact with a patient’s blood or other potentially infectious materials (OPIM), including saliva. Other requirements include providing PPE in appropriate sizes, replacing when necessary, and maintaining and laundering items as needed. All responsibility for providing and maintaining PPE and ensuring its use lies with the employer. The dentist / employer may not allow an employee to decline the use of PPE when there is a potential for exposure. For instance, the employer may not allow an assistant or hygienist to skip wearing a mask during procedures where there will be spray or spatter because they find it uncomfortable.

**What are bloodborne pathogens?**

Bloodborne pathogens are infectious microorganisms in human blood that can cause disease in humans. These pathogens include, but are not limited to, hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV). Needlesticks and other sharps-related injuries may expose workers to bloodborne pathogens. Workers in many occupations, including first aid team members, housekeeping personnel in some industries, nurses and other healthcare personnel may be at risk of exposure to bloodborne pathogens.
What can be done to control exposure to bloodborne pathogens?

In order to reduce or eliminate the hazards of occupational exposure to bloodborne pathogens, an employer must implement an exposure control plan for the worksite with details on employee protection measures. The plan must also describe how an employer will use a combination of engineering and work practice controls, ensure the use of personal protective clothing and equipment, provide training, medical surveillance, hepatitis B vaccinations, and signs and labels, among other provisions. Engineering controls are the primary means of eliminating or minimizing employee exposure and include the use of safer medical devices, such as needleless devices, shielded needle devices, and plastic capillary tubes.

What is the Bloodborne Pathogens standard?

OSHA's Bloodborne Pathogens standard (29 CFR 1910.1030) as amended pursuant to the Needlestick Safety and Prevention Act of 2000, prescribes safeguards to protect workers against the health hazards caused by bloodborne pathogens. Its requirements address items such as exposure control plans, universal precautions, engineering and work practice controls, personal protective equipment, housekeeping, laboratories, hepatitis B vaccination, post-exposure follow-up, hazard communication and training, and recordkeeping. The standard places requirements on employers whose workers can be reasonably anticipated to contact blood or other potentially infectious materials (OPIM), such as unfixed human tissues and certain body fluids.

What is the Needlestick Safety and Prevention Act?

The Needlestick Safety and Prevention Act (the Act) (Pub. L. 106-430) was signed into law on November 6, 2000. Because occupational exposure to bloodborne pathogens from accidental sharps injuries in healthcare and other occupational settings continues to be a serious problem, Congress required modification of OSHA's Bloodborne Pathogens standard (29 CFR 1910.1030) to set forth in greater detail (and make more specific) OSHA's requirement for employers to identify, evaluate and implement safer medical devices such as needleless systems and sharps with engineered sharps protections. The Act also mandated additional requirements for maintaining a sharps injury log and for the involvement of non-managerial healthcare workers in identifying, evaluating and choosing effective engineering and work practice controls. These are workers who are responsible for direct patient care and be potentially exposed to injuries from contaminated sharps.

How does the Needlestick Safety and Prevention Act apply to OSHA’s Bloodborne Pathogens standard?

The Act directed OSHA to revise its Bloodborne Pathogens standard (29 CFR
1910.1030). OSHA published the revised standard in the Federal Register on January 18, 2001; it took effect on April 18, 2001. The requirement to implement the use of engineering controls, which includes safer medical devices, has been in effect since 1992.

**How does the standard affect states that operate their own federally-approved occupational safety and health programs?**

States and territories that operate their own OSHA-approved state programs are required to adopt a Bloodborne Pathogens standard that is at least as effective as the Federal OSHA standard.

**Does the standard apply to public sector (state and local government) employees?**

The 25 states and two territories that operate OSHA-approved state plans are required to enforce an "at least as effective" standard in the public sector. In the remaining states where Federal OSHA has jurisdiction, hospitals in the public sector are required to comply with the Bloodborne Pathogens standard with enforcement by the Centers for Medicare and Medicaid Services (42 U.S.C. 1395cc(a)(1)(V) and (b)(4)).

**Do the Bloodborne Pathogens standard and the Needlestick Safety and Prevention Act apply to me?**

OSHA's Bloodborne Pathogens standard, including its 2001 revisions, applies to all employers who have an employee(s) with occupational exposure (i.e., reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials (OPIM) that may result from the performance of the employee’s duties). These employers must implement the requirements set forth in the standard. Some of the new and clarified provisions in the standard apply only to healthcare settings, but other provisions, particularly the requirements to update the Exposure Control Plan and to keep a sharps injury log, apply to non-healthcare as well as healthcare settings.

**What does the standard say about the use of safer medical devices?**

The standard states, "Engineering and work practice controls shall be used to eliminate or minimize employee exposure." The 2001 revision defines engineering controls as "controls (e.g., sharps disposal containers, self-sheathing needles, safer medical devices, such as sharps with engineered sharps injury protections and needleless systems) that isolate or remove the bloodborne pathogens hazard from the workplace." Employers who have employees exposed to contaminated sharps must consider and implement appropriate commercially available and effective safer medical devices.
designed to eliminate or minimize occupational exposure. Also, employees with occupational exposure must be trained in the use and limitations of methods that will prevent or reduce exposure, including appropriate engineering controls, work practices and personal protective equipment. Therefore, training must include instruction on any new techniques and practices associated with new engineering controls.

If I've never had an employee experience a needlestick, do I still need to use safer devices?

Yes. OSHA standards are intended to be implemented as a means to prevent occupational injuries and illnesses. To most effectively avoid percutaneous injuries from contaminated sharps, employers must implement engineering controls, including safer medical devices, so that employees have them available to use.

How many non-managerial employees do I need to include in the process of choosing safer medical devices?

Small medical offices may want to seek input from all occupationally exposed employees when making their decisions. Larger facilities are not required to request input from all exposed employees; however, the employees selected should represent the range of exposure situations encountered in the workplace (e.g., pediatrics, emergency department, etc.). Regardless of the number chosen, in order to be included in the process the workers must be responsible for direct patient care and be potentially exposed to injuries from contaminated sharps. The solicitation of employees who have been involved in the input and evaluation process must be documented in the Exposure Control Plan.

Does OSHA have a list of available safer medical devices?

No. OSHA does not approve or endorse any product. It is the employer’s responsibility to identify and implement appropriate, commercially available and effective safer medical devices for the specific medical procedures being conducted.

What if a safer option is not available for the medical device that I use?

A key element in choosing a safer medical device, other than its appropriateness to the procedure and its effectiveness, is its availability on the market. If there is no safer option to the medical device that you are using for a particular procedure, you are not required to adopt a device different from the one currently being used. During your annual review of devices, you must consider new or prospective safer options and document this fact in your written Exposure Control Plan. With advances in medical technology, more devices are becoming available for different procedures. If no engineering control is available, work practice controls shall be used and, if
occupational exposure still remains, personal protective equipment must also be used.

**Do I have to keep a sharps injury log? Does it have to be confidential?**

If, as an employer, you are required to maintain a log of occupational injuries and illnesses under 29 CFR Part 1904, you must also establish and maintain a sharps injury log for recording percutaneous injuries from contaminated sharps. The sharps injury log must contain, at a minimum, the type and brand of device involved in the injury (if known), the department or work area where the exposure incident occurred, and an explanation of how the incident occurred. The log must be recorded and maintained in a manner that protects the confidentiality of the injured worker (e.g., removal of personal identifiers).

**Does the revised Bloodborne Pathogens standard apply to medical or dental offices that have fewer than 10 employees?**

OSHA's Bloodborne Pathogens standard applies to all employers with employees who have occupational exposure to blood or other potentially infectious materials (OPIM), regardless of how many workers are employed. However, the offices and clinics of medical doctors and dentists are exempt from the requirement to keep a log of occupational injuries and illnesses and thus exempt from maintaining a sharps injury log. (See Appendix A to Subpart B of 29 CFR Part 1904.) All other applicable provisions of the Bloodborne Pathogens standard still apply.

**What information do I need to include in my written Exposure Control Plan (ECP)? How often do I need to update it?**

The required elements of an ECP are:

- The exposure determination which identifies job classifications with occupational exposure and tasks and procedures where there is occupational exposure and that are performed by employees in job classifications in which some employees have occupational exposure;
- The procedures for evaluating the circumstances surrounding exposure incidents;
- A schedule of how other provisions of the standard are implemented, including methods of compliance, HIV and HBV research laboratories and production facilities requirements, hepatitis B vaccination and post-exposure evaluation and follow-up, communication of hazards to employees, and recordkeeping. Methods of compliance include:
  - Universal Precautions
  - Engineering and work practice controls, e.g., safer medical devices, sharps disposal containers, hand hygiene;
- Personal protective equipment;
- Housekeeping, including decontamination procedures and removal of regulated waste.

- Documentation of:
  - The annual consideration and implementation of appropriate commercially available and effective safer medical devices designed to eliminate or minimize occupational exposure, and
  - The solicitation of non-managerial healthcare workers (who are responsible for direct patient care and are potentially exposed to injuries from contaminated sharps) in the identification, evaluation, and selection of effective engineering and work practice controls.

The ECP must be reviewed and updated at least annually, and whenever necessary to reflect new or modified tasks and procedures which affect occupational exposure and to reflect new or revised employee positions with occupational exposure.

**Are employers responsible for providing sharps containers for employees who are diabetic and need insulin shots in a non-healthcare related facility?**

The employer would not be required to provide a sharps container to an employee using insulin syringes for personal therapeutic reasons. To eliminate potential exposures to other workers; however, the employer could require that the employee provide his or her own workplace sharps container.

**What does OSHA currently accept as "appropriate" disinfectants to prevent the spread of HIV and HBV?**

OSHA's position is that EPA-registered tuberculocidal disinfectants, diluted bleach solutions and EPA-registered disinfectants that are labeled as effective against both HIV and HBV as well as Sterilants/High-Level Disinfectants cleared by the FDA, meet the requirement in the standard and are "appropriate" disinfectants to clean contaminated surfaces, provided that such surfaces have not become contaminated with agent(s) or volumes of or concentrations of agent(s) for which higher level disinfection is recommended.

It is important to emphasize the EPA-approved label section titled *SPECIAL INSTRUCTIONS FOR CLEANING AND DECONTAMINATION AGAINST HIV-1 AND HBV OF SURFACES/OBJECTS SOILED WITH BLOOD/BODY FLUIDS*. These instructions require:

- That personal protective equipment be provided for the worker performing the task;
• That all the blood must be cleaned up thoroughly before applying the disinfectant;
• That the disposal of infectious waste be in accordance with federal, state, or local regulations; and
• That the surface be left wet with the disinfectant for 30 seconds for HIV-1 and for 10 minutes for HBV.

Is a Hepatitis B (HBV) post-vaccination titer required?

29 CFR 1910.1030(f)(1)(ii)(D) takes into consideration the changing nature of medical treatment relating to hepatitis B. OSHA requires use of the U.S. Public Health Service (USPHS) guidelines current at the time of the evaluation or procedure. The most current guidelines regarding hepatitis B is the Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis in MMWR, Vol. 50, No.11, June 29, 2001. The hepatitis B vaccination must be given in the standard dose and through the standard route of administration, as recommended in the guidelines. Employees who have ongoing contact with patients or blood and are at ongoing risk for percutaneous injuries must be tested for antibody to hepatitis B surface antigen, one to two months after the completion of the three-dose vaccination series. Employees who do not respond to the primary vaccination series must be revaccinated with a second three-dose vaccine series and retested. Non-responders to the second series must be medically evaluated.

Are workers who administer the vaccines in emergency situations (e.g., in a pandemic response) covered by the Bloodborne Pathogens standard?

The Bloodborne Pathogens standard covers all workers in the private sector as well as civilian employees of federal entities. State and local government employees are covered if they are in one of the 25 states and two territories that operate their own OSHA-approved state plans. In the remaining jurisdictions, where Federal OSHA has authority, hospitals operated by state, territorial or local governments are required to provide the protection of the Bloodborne Pathogens standard to their employees with enforcement by the Centers for Medicare and Medicaid Services (42 U.S.C. 1395cc(a)(1)(V) and (b)(4)).

Additionally, the CDC recommends that all vaccination clinics comply with the Bloodborne Pathogens standard’s provisions.

Where can I get information about what is expected of me?

There are several resources available for employers and employees with regard to occupational exposures to blood and OPIM. First is the OSHA Bloodborne Pathogens
Standard (29 CFR 1910.1030). Also available are CPL 2-2.69 (November 2001) Enforcement Procedures for the Occupational Exposure to Bloodborne Pathogens, and many other related documents. This information can be found on OSHA’s Bloodborne Pathogens and Needlestick Prevention web page. You may access additional information, such as information from OSHA’s Consultation and State Plan State Offices, via OSHA’s website or by phone at 1-800-321-OSHA (6742). CDC and the National Institute for Occupational Safety and Health (NIOSH), a CDC agency, also have documents related to the prevention of occupational exposure to blood and OPIM available.

**Bloodborne Pathogens Clinical Review**

**Standard Precautions**

Medical histories and symptomology, whether written or verbal, physical examinations, and laboratory tests may not always reveal the presence of an infectious process, disease, carrier state or pre-symptomatic phases of disease in an individual. Thus, the same infection prevention and control protocols should be used for all patients, regardless of known or suspected infectious status.

This concept is known as Standard Precautions. Previous infection control recommendations from the US Centers for Disease Control and Prevention (CDC) were focused on the risk of transfer of the blood-borne pathogens like HIV and HBV, and the term universal precautions was used. The all-inclusive term is standard precautions.

Standard precautions applies to contact with:

- Blood
- All body fluids, secretions, and excretions (except sweat), regardless of whether they contain blood
- Non-intact skin
- Mucous membranes

**Hepatitis B**

Hepatitis B virus (HBV) is a bloodborne virus of major concern in dental infection control. HBV transmission in a dental health care setting is rare, particularly since standard precautions and routine vaccinations for dental workers were adopted (1985 and 1987, respectively). There have been no reported transmissions from a dental worker to a patient since 1987.
Hepatitis B Vaccination, Screening, and Employees

All dental healthcare providers (DCHP) who are exposed to blood or other potentially infectious materials (OPIM) should receive the Hepatitis B vaccine according to current CDC recommendations and per OSHA regulations. Vaccination (3-dose series) should be followed by assessment of Hepatitis B surface antibody to determine vaccination immunogenicity and, if necessary, revaccination.

Federal OSHA regulations require that all employees who may become exposed to certain chemicals or who interact with patients, either in the front office or any aspect of treatment, must be offered a Hepatitis B vaccination within 10 days of employment. The dentist is required to provide the Hepatitis B vaccination to employees at no charge. If an employee declines to have the vaccination, a form must be signed as proof; if the employee decides later to have the vaccination, the dentist is then required to follow the same guidelines.

Healthcare personnel who have received Hepatitis B vaccine and developed immunity to the virus are at virtually no risk for infection. For a susceptible person, the risks from a single needle stick or cut exposure to HBV-infected blood ranges from 6-30% and depends on the Hepatitis B antigen (HBeAg) status of the source individual.

Hepatitis C

Hepatitis that could not be classified as Hep A or Hep B was classified as Hepatitis C (HCV)—and is now recognized as the most common chronic bloodborne infection, and is the most frequent indication for liver transplantation. There is no vaccine for Hep C, so behavior modification for risk factors, including strict adherence to standard infection control procedures, is advised.

The transmission is by percutaneous exposure to contaminated blood and plasma derivatives, contaminated needles and syringes, transfusion, or accidental needle stick. HCV has been demonstrated in saliva. Non-percutaneous routes include sexual transmission and perinatal exposure.

Although only 849 cases of confirmed acute Hepatitis C were reported in the United States in 2007, CDC estimates that approximately 17,000 new HCV infections occurred that year, after adjusting for asymptomatic infection and underreporting. Persons newly infected with HCV are usually asymptomatic, so acute Hepatitis C is rarely identified or reported. Approximately 3.2 million persons in the United States have chronic HCV
infection. Infection is most prevalent among those born during 1945–1965, the majority of whom were likely infected during the 1970s and 1980s when rates were highest (CDC, 2012).

**HIV / AIDS**

The human immunodeficiency virus (HIV) is the virus that can lead to AIDS. HIV transmission can occur when blood, semen, pre-seminal fluid, vaginal fluid, or breast milk from an infected person enters the body of an uninfected person.

HIV can enter the body through a vein (e.g., injection drug use), the lining of the anus or rectum, the lining of the vagina and/or cervix, the opening to the penis, the mouth, other mucous membranes (e.g., eyes or inside of the nose), or cuts and sores. Intact, healthy skin is an excellent barrier against HIV and other viruses and bacteria.

HIV also can be transmitted through receipt of infected blood or blood clotting factors. However, since 1985 all donated blood in the United States has been tested for HIV. Therefore, the risk of infection through transfusion of blood or blood products is extremely low. The U.S. blood supply is considered to be among the safest in the world.

Despite the tremendous public health education efforts at HIV prevention, the number of people with HIV infection continues to grow, with approximately 56,000 newly diagnosed HIV infections in the US annually (CDC, 2012).
Recommended Immunizations for Dental Personnel

Immunizations substantially reduce both the number of DHCP susceptible to infectious diseases and the potential for disease transmission to other DHCP and patients.

All dental care workers should be adequately immunized against:

- Hepatitis B
- Measles
- Mumps
- Rubella
- Varicella
- Influenza

DHCP Exposure to Bloodborne Pathogens

Reducing bloodborne pathogen exposures helps provide a safe and healthful workplace for dental employers and employees. In addition, reducing exposures can help reduce costs and increase productivity and employee morale.

Clinical Frequencies of Transmission

Percutaneous injuries and blood splashes to the eyes, nose or mouth occur frequently during dental treatment. A study of practicing Canadian dentists reports an average of 3 percutaneous injuries and 1.5 mucous-membrane exposures per year. The highest frequencies of percutaneous injuries were reported by orthodontists (4.9 per year) and the highest frequencies of blood splashes to the eyes, nose or mouth were reported by oral surgeons (1.8 per year). In a one-year period, 0.5% of dentists in Canada reported exposure to HIV and an additional 14% were uncertain if the source patient was HIV zero-positive; similarly, 0.8% reported exposure to HBV (15% uncertain) and 1.9% reported exposure to the blood of a high-risk patient (17% uncertain). These frequencies of known exposure to HIV and HBV are likely to be underestimates as a result of uncertainty related to the zero-status of the patient and non-reporting bias (Canadian Dental Association, 2008).

Summary of risks of transmission of HBV, HCV and HIV with a contaminated needle are approximately:

- 30% (HBV when the source is e-antigen positive) – Hepatitis B Virus
• 3.0% (HCV) – Hepatitis C Virus
• 0.3% (HIV) – Human Immunodeficiency Virus

Infection Exposure Control in the Clinical Setting

Blood Exposure: Clinical Considerations

The CDC guidelines for infection control in dentistry emphasize the importance of Standard Precautions. Standard Precautions include not only blood and body fluids suspected of containing blood, but all body fluids, excretions, and secretions with the exception of sweat. The infection control precautions taken by the office team should be consistent for all patients and not based on the infectious status of the patient.

Dental Healthcare Personnel (DHCP)

Exposure to blood through percutaneous injury, or by contact with mucous membranes of the eye, nose or mouth, or by contact with non-intact skin is the primary method DHCP are exposed to blood-borne pathogens, such as HBV, HCV, and HIV, in dental health-care settings. Percutaneous exposures involve the greatest risk for transmission, and would include needle-sticks or cuts with contaminated sharp objects. Non-intact skin includes all exposed skin that is chapped, abraded or has dermatitis.

The majority of exposures in a dental health-care setting are preventable by using:

Personal Protection Equipment (PPE)

PPE is a major component of Standard Precautions. Exposure control refers to all procedures during clinical care necessary to provide top-level protection from exposure to infectious agents for members of the dental team and their patients.

Engineering Controls

Engineering controls are technology-based safer designs for equipment, and devices intended to reduce percutaneous exposures. Examples: needle guards, self-sheathing anesthetic needles, dental units designed to shield burs on hand pieces.

Work-Practice Controls

Work-practice controls are those practices established to avoid handling, using, assembling or cleaning contaminated sharp instruments, equipment or appliances, and the use of sharps containers. Sharps would include all needles, scalers, laboratory knives, burs, explorers and endodontic files and reamers.
Personal Protection Equipment (PPE) for the Dental Team

The continuing health and productivity of DHCP depend, to a large degree, on the control of cross-contamination. Loss of work time, personal suffering, long-term systemic effects, and even exclusion from continued practice in dentistry are possible results from communicable disease. The ONLY safe practice is to act defensively at all times, and in a professional manner, and with specific precautions for personal protection.

PPE is designed to protect the skin and the mucous membranes of the eyes, nose, and mouth of dental health-care personnel from exposure to blood or other potentially infectious material. OSHA mandates that dental health care workers wear gloves, surgical masks, protective eyewear, and protective clothing in specified circumstances to reduce the risk of exposures to bloodborne pathogens.

Clinical Attire

The wearing of apparel by clinicians and their assistants is vulnerable to contamination from splash, spatter, aerosols, and patient contact. The recommended uniform is designed and cared for in a manner that minimized cross-contamination.

Various types of protective clothing (e.g., gowns, jackets) are worn to prevent contamination of street clothing and to protect the skin of personnel from exposure to blood and body fluids. When the gown is worn as personal protective equipment (i.e., when spatter and spray of blood, saliva, or other potentially infectious material is anticipated), the sleeves should be long enough to protect the forearms. Protective clothing should be changed daily or sooner if visibly soiled. Personnel should remove protective clothing before leaving the work area.

Gown or Uniform

Gowns or uniforms are expected to be clean and maintained as free as possible from contamination. Clinical clothing over street clothes is not recommended because of exposure to infectious material while seeing clinical patients.

- Solid Closed Front
- Length
• No Pockets

Commercial laundering services are preferred for gowns or uniforms. If laundering at home, separate the office laundry from home clothing. Wash with hot water and bleach. Exercise great diligence.

**Use of Face Mask and Respiratory Protection**

Basic personal protection is composed of face mask, protective eyewear, and gloves. The face mask is placed first. Protective eyewear is placed second. Then hands are washed prior to gloving.

Dental health-care personnel should wear a surgical mask that covers both their nose and mouth during procedures and patient-care activities that are likely to generate splashes or sprays of blood or body fluids. When a surgical mask is used, it should be changed between patients or during patient treatment if it becomes wet.

The ideal mask:

- Has no contact with nostrils or lips
- Has a high bacterial filtration efficiency rate
- Fits snugly around the entire edges of the mask
- Does not fog eyewear
- Is convenient to put on and remove
- Is made of non-irritating, non-allergic material
- Does not collapse during wear
- Is easily disinfected

**Protective Eyewear**

Eye protection for DHCP and patients is necessary to prevent physical injuries and infections of the eye. Protective eyewear is worn for all procedures. Protective eyewear for patients is also strongly recommended.
Examples of Protective Eyewear

Sharps

Contaminated sharps must be placed immediately (or as soon as possible after use) in sharps disposal containers. Sharps containers must be labeled and easily accessible to employees. They must be located as close as feasible to the immediate area where the sharps are used or can be reasonably anticipated to be found (e.g., dental operatory).

Sharps containers must be:

- rigid
- closeable and sealable
- puncture resistant
- leak proof
- portable
- kept in an upright position
- closed immediately prior to their removal or replacement
- placed in a secondary container if leakage is possible
- replaced as needed to prevent overfilling

Exposure Prevention and Personnel Safety per OSHA & CDC

In addition, the Occupational Safety and Health Administration (OSHA) says, “The
The Centers for Disease Control and Prevention (CDC) states that, “Contaminated instruments should be handled carefully to prevent exposure to sharp instruments that can cause percutaneous injury. Instruments should be placed in an appropriate container at the point of use to prevent percutaneous injuries during transport to the instrument processing area.”

**Occupational Accidental Exposure Management**

**Percutaneous Injury**

Exposure to blood or saliva by percutaneous injury is the greatest risk for acquiring a blood-borne pathogen in the dental health-care setting. Every effort should be made by all DHCP to avoid percutaneous injury.

- Significant exposures should be dealt with immediately. A significant exposure exists whenever any of the following events occurs:
  - Percutaneous injury, where the skin of the DHCP is punctured.
  - Blood, saliva or other body fluid is splashed onto non-intact skin (dermatitis, cuts or abrasions).
  - Blood, saliva or other body fluid is splashed onto mucosa of the eyes, the mouth or the nose.

The steps in managing a significant exposure are:

1. Remove gloves or immediate clothing, if necessary, to assess the extent of the injury.
2. First-aid should be administered, if necessary, for percutaneous exposures.
   a. Immediately wash the area, including the puncture or wound using antimicrobial soap and water. Exposed eye, mouth or nose mucosa should be flushed with copious amounts of water. The application of caustic agents such as bleach, or the injection of antiseptic agents into the wound is not advisable.
3. Report the injury to the Office Infection Prevention and Control Officer.

**Biohazardous Material**

**Biopsy Specimens**

Biopsy specimens should be placed in a sturdy, leak-proof container with a secure lid for transportation. The DHCP should take care when collecting the specimen to avoid
contaminating the outside of the container. If the outside of the container becomes or is suspected to be contaminated, it should be cleaned and disinfected or placed in an impervious bag prior to transportation.

Local state regulations may require a biopsy container to be labeled with the biohazard symbol during storage, transport, shipment and disposal.

Food_cPancreas_4073240953.png

**Extracted Teeth**

Extracted teeth may be returned to a patient without any special considerations for infection prevention and control.

Extracted teeth that are being discarded should be handled carefully and disposed in general waste. Extracted teeth sent to a dental laboratory for shade or size comparisons should be cleaned and surface-disinfected with a hospital-grade tuberculocidal intermediate-level disinfectant. Extracted teeth containing dental amalgam should not be placed in waste containers that are subsequently incinerated. (CDA, 2008)

**Disposal of Waste**

Medical waste of concern requires special storage, handling, neutralization and disposal, according to state regulations. Such waste includes:

- Solid waste soaked or saturated with blood or saliva
- Surgically removed hard or soft tissue (not including extracted teeth)
- Contaminated sharp items (e.g., needles, scalpel blades, wires)

All containers with blood or saliva (e.g., suctioned fluids) may be safely poured into a utility sink, drain or toilet, which drains into a sanitary sewer system or septic tank. DHCP should wear appropriate PPE during this task.

**Summary of Bloodborne Pathogen Management Principles**

The goal of a dental bloodborne pathogen/ infection-control program is to provide a safe
treatment environment for the patient and a safe working environment for the DHCP. This is accomplished by reducing the risk of health-care associated (nosocomial) infections in patients and occupational exposures in DHCP. Errors in infection prevention and control practices are caused by faulty systems, processes and conditions that lead DHCP to make mistakes or fail to prevent errors being made by others.

Effective program evaluation is a systematic way to ensure procedures are useful, feasible, ethical and accurate. Program evaluation is an essential organizational practice.

A successful infection prevention and control program depends on developing standard operating procedures, evaluating practices, routinely documenting adverse outcomes (e.g., occupational exposures to blood) and work-related illnesses in DHCP and monitoring health-care associated infections in patients. Strategies and tools to evaluate the infection-control program can include:

- Periodic observational assessments
- Checklists to document procedures
- Routine review of occupational exposures to blood-borne pathogens

References

Centers for Disease Control 2013; www.cdc.gov; multiple articles and additional information; public domain.


Wilkins, Ester M., Clinical Practice of the Dental Hygienist, Lippincott Williams & Wilkins, 2009; pp. 67-84.

Section 3: Hazard Communication Standard

Objectives

Upon completion of this course, the participant will be able to:

- Describe a hazard communication program in a dental office
- Understand basic categories for employee training with hazardous materials.
- Read and interpret information on labels and on MSDSs.
- Know measures that employees can take to protect themselves from the hazards.
• Identify specific procedures put into effect by the employer to provide protection, such as engineering controls, work practices, and the use of personal protective equipment.
• Understand the changes in the new Hazard Communication guidelines.
• Recognize the new pictograms which standardize labeling.
• Ask questions if necessary for any aspect not understood in Hazard Communication.

Introduction

This course in the Hazard Communication Standard is designed to meet the training needs for dental personnel for annual training and for new employee training. According to OSHA regulations this required training can be accomplished by:

• Staff meetings or in-service training,
• Continuing dental education from a registered provider Audiovisual presentation.

Training sessions should always include an opportunity for employees to ask questions to ensure that they understand the information presented. If a person taking this course has a question about the OSHA Hazard Communication Standard, please submit your question to CEsupport@DentalLearning.org and we will get a response to you within 1 business day.

Training & Information

Employers are required to take specific measures to inform employees about their rights under OSHA regulations and to provide training in handling hazardous materials which will be encountered in the workplace.

One of the first things an OSHA inspector will look for is OSHA poster 2203, entitled, “Job Safety and Health Protection.” This poster (or equivalent agency poster) should be prominently displayed in the clinic. It specifies employee rights as defined by the Occupational Safety and Health Act and meets the requirement of that Act to provide such information.

Employees must also be trained to handle all hazardous materials they will encounter in the workplace. This training must be provided at the time of initial employment and whenever a new hazardous material is introduced into the workplace or when procedures for safe handling or emergency precautions change.

The information contained on the MSDS (Material Safety Data Sheet), SDS (Safety Data Sheet) or PSDS (Product Safety Data Sheet) serves as the information basis for such training. However, merely having employees read these sheets does not satisfy
the intent of this regulation. Training should consist of the following:

- A description of how the hazard communication program is implemented in that workplace
- Instruction on how to read and interpret information on labels and on MSDSs
- Instruction on how employees can obtain and use the available hazard information
- Instruction on the specific hazards of chemicals present in that workplace
- A description of measures that employees can take to protect themselves from the hazards
- Information on specific procedures put into effect by the employer to provide protection, such as engineering controls, work practices, and the use of personal protective equipment
- Information on methods and observations, such as visual appearance or smell, which workers can use to detect the presence of a hazardous chemical to which they may be exposed

Hazard Communication Program

On May 23, 1988, Occupational Safety and Health Administration (OSHA) regulations which require compliance with Hazard Communication Standards (1910.1200) by all non-manufacturing employers became effective. These standards, set forth by the Occupational Safety and Health Act of 1970, define the rights of employees to know the potential dangers associated with hazardous chemicals they may encounter in the workplace.

Under these regulations, employers of health care workers must develop, implement, and maintain a written hazard communication program which includes:

1. Labeling of containers which contain hazardous chemicals.
2. Obtaining and maintaining a current list of all hazardous chemicals used in the workplace. In addition to a list of chemicals, a file of Material Safety Data Sheets (MSDSs) for each product must be maintained and made available to employees.
3. Providing training and information to employees on aspects of handling hazardous materials which will be encountered in the workplace.
4. Maintaining records to include all training provided to employees on handling hazardous materials and an incident log of any occupational injury.

OSHA Hazard Communication Standard: Basic Information

Chemicals pose a wide range of health hazards (such as irritation, sensitization, and carcinogenicity) and physical hazards (such as flammability, corrosion, and reactivity).
OSHA’s Hazard Communication Standard (HCS) is designed to ensure that information about these hazards and associated protective measures is disseminated. This is accomplished by requiring chemical manufacturers and importers to evaluate the hazards of the chemicals they produce or import, and to provide information about them through labels on shipped containers and more detailed information sheets called material safety data sheets (MSDSs). All employers with hazardous chemicals in their workplaces must prepare and implement a written hazard communication program, and must ensure that all containers are labeled, employees are provided access to MSDSs, and an effective training program is conducted for all potentially exposed employees.

The HCS provides people the right-to-know the hazards and identities of the chemicals they are exposed to in the workplace. When employees have this information, they can effectively participate in their employers’ protective programs and take steps to protect themselves. In addition, the standard gives employers the information they need to design and implement an effective protective program for employees potentially exposed to hazardous chemicals. Together these actions will result in a reduction of chemical source illnesses and injuries in American workplaces.

**The “New” Hazard Communication Standard**

The Hazard Communication Standard (HCS) used to be a challenge to understand and implement in the dental setting, and it was frequently very confusing. The change that has been put into place aligns the program with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). This 16-point system will put in place a common and simple system of classifying chemicals, as well as place information on labels and safety data sheets. The new standards will improve the quality and consistency of the information that is available in the workplace for the safe use and handling of hazardous chemicals. Knowing the specifics of handling, storing, and using chemicals is the key to keeping people safe. By December 2013 this must have been in place in all dental offices.
New Pictograms for Hazard Communication

So what are the changes?

In order to ensure chemical safety in the workplace, information about the identities and hazards of the chemicals must be available and understood by workers. OSHA’s HCS requires the development and dissemination of such information:

Currently: Chemical manufacturers and importers are required to evaluate the hazards of the chemicals they produce or import, and prepare labels and safety data sheets to convey the hazard information to their downstream customers.

- All employers with hazardous chemicals in their workplaces must have labels and safety data sheets for their exposed workers, and must train them to handle the chemicals appropriately.

Major changes to the Hazard Communication Standard

- **Hazard classification**: Provides specific criteria for classification of health and physical hazards, as well as classification of mixtures.
- **Labels**: Chemical manufacturers and importers will be required to provide a label that includes a harmonized signal word, pictogram, and hazard statement for each hazard class and category. Precautionary statements must also be provided.
- **Safety data sheets**: Will now have a specified 16-section format.
• **Information and training**: Employers are required to train workers by Dec. 1, 2013, on the new label elements (they must be familiar with them, understand how to use them, and be able to access the information effectively), and safety data sheets format in order to facilitate recognition and understanding.

The **new format** of the 16-section Safety Data Sheet (SDS) should include the following sections:

- Section 1. Identification
- Section 2. Hazard(s) identification
- Section 3. Composition/information on ingredients
- Section 4. First aid measures
- Section 5. Firefighting measures
- Section 6. Accidental release measures
- Section 7. Handling and storage
- Section 8. Exposure controls/personal protection
- Section 9. Physical and chemical properties
- Section 10. Stability and reactivity
- Section 11. Toxicological information
- Section 12. Ecological information
- Section 13. Disposal considerations
- Section 14. Transport information
- Section 15. Regulatory information
- Section 16. Other information, including date of preparation or last revision

Sections 12-15 may be included in the SDS, but are not required by OSHA.

**Labeling**

Manufacturers are required to properly label all chemical containers. Labels must contain information which properly identifies the chemicals, provides the appropriate hazard warning, and gives the name and address of the manufacturer or other responsible party.
The name of the chemical identified on the label must be consistent with the name of the chemical on the corresponding MSDS.

Containers that are properly labeled by the manufacturer do not need additional labels. If labels are missing or incomplete, the manufacturer must be notified immediately.

Materials subject to Food and Drug Administration (FDA) labeling requirements are not covered by these regulations, but have similar labels in most instances.

If a chemical is transferred to another container for storage purposes, the container must be appropriately labeled. If transferred to another container for immediate use, no label is required.

**List of Hazardous Chemicals and MSDSs**

The written hazard communication program must contain a list of all hazardous chemicals which may be encountered in the workplace. This list must be accurate and current. An MSDS must be kept on file for each chemical identified on the list. The name of the chemical as it appears on the MSDS must be the same as used on the container label.

Manufacturers and suppliers are required to provide MSDSs for products which contain hazardous chemicals. If MSDS are not supplied, they must be obtained from the supplier or other sources. If questions arise about the hazard potential of a specific product, the manufacturer or supplier should be contacted immediately.

The file containing the MSDS should be readily available to employees. These sheets describe the chemical composition, physical properties, type of hazard, safe handling, and emergency procedures for a hazardous chemical. The information provided on these sheets should provide the basis for training employees to handle any given hazardous material.

**Recordkeeping**

To comply with these regulations, the following aspects of recordkeeping are necessary:

- Each training session should be documented. The documentation should consist of the date the training was performed, what topics were covered, who conducted the training, and the signatures of each employee receiving the training.
- If the facility has a staff of eleven or more, OSHA Form 200 must also be maintained. This accident log should be kept for the entire facility and is most appropriately maintained by the facility’s Safety Officer.
Checklist for Implementing Hazard Control Plan and Training

1. **Equipment**
   - Hazardous substances inventory list and location
   - MSDS collection
   - Labels for containers without original labels from substance manufacturers
   - Exhaust vents, as necessary, are installed for chemical vapors
   - Spill kits appropriate for hazardous liquids used in the dental office
   - Appropriate personal protective equipment, such as safety glasses and utility gloves

2. **Employee Training Checklist**
   - Explain purpose of the Hazard Communication program, identify person in charge of program, and note how employee can obtain/see copy of the written plan
   - Show list of hazardous substances and where substances are located in the dental practice.
   - Describe how substances are used.
   - Instruct on the labeling system for hazardous substances.
   - Show location of hazardous substances inventory list and Material Safety Data Sheets.
   - Instruct how to read an MSDS.
   - Instruct how to detect the presence of hazardous substances, for example, through visual appearance or odor of hazardous substances when being released, etc., or through monitoring conducted by the employer
   - Instruct on use of personal protective equipment, such as safety glasses and utility gloves, while developing x-rays and while mixing, pouring or diluting chemicals
   - Instruct on processes and procedures to reduce employee's exposure to hazardous substances, including the appropriate venting of chemicals, the use of air-tight containers for storing substances which have permissible exposure levels such as dental amalgam and glutaraldehyde, and the use of secondary containers for
   - Instruct on proper technique of shutting off the oxygen tank valve
   - Instruct on proper use of nitrous oxide equipment, on the hazards of recreational use of nitrous oxide and its tetrogenic effects
   - Instruct on the need/requirement to report spills and leaks immediately the use of spill kits
   - Instruct on the use of spill kits
Additional Resources

The OSHA Hazard Communications Website:
http://www.osha.gov/dsg/hazcom/index.html

The many links available on this website provide a complete description of the requirements of the Hazard Communication Standard.

The OSHA fact sheet on the HCS:


Course Test
Section 1: Infection Control In the Dental Setting

1. Destruction of most forms of microorganisms, but not bacterial and mycotic spores best describes:
   a) Disinfection
   b) Sterilization
   c) Antiseptics

2. Three major components of infection control are:
   a) Aseptic technique
   b) Patient screening and evaluation
   c) Personal protection
   d) All the above

3. Critical instruments include instruments, devices and other items that are not used to penetrate soft tissue or bone, but contact oral mucous membranes, non intact skin or other potentially infectious materials (OPIM).
   a) True
   b) False

4. Personal protective equipment includes:
   a) Gowns
   b) Gloves
c) Masks
d) All the above

5. Alcohol can be used as a sterilizing agent.
   a) True
   b) False

6. After each patient, handpiece waterlines must be flushed for:
   a) 30 seconds
   b) 10 seconds
   c) 40 seconds
   d) 5 minutes

7. When close their lips around saliva ejector tips, it causes a suck back effect potentially exposing patients to pathogens.
   a) True
   b) False

8. To sterilize instruments in the autoclave, they must remain at 273°F for 20-30 minutes.
   a) True
   b) False

9. Spore testing must be performed:
   a) Daily
   b) Weekly
   c) Monthly
   d) Annually

10. Sharps containers must be:
    a) Leak proof
    b) Puncture resistant
    c) A and B

Section 2: OSHA: Annual Review of Bloodborne Pathogens Standards

    a. True
    b. False
12. An example of a mode of transmission is:
   a. Direct contact
   b. Indirect contact
   c. Airborne
   d. All of the above

13. The Bloodborne Pathogens standard covers all workers in the private sector as well as civilian employees of federal entities.
   a. True
   b. False

14. Hepatitis B is an airborne and foodborne virus.
   a. True
   b. False

15. All DHCP who are exposed to blood or other potentially infectious materials should receive the Hepatitis B vaccine according to the current CDC recommendations.
   a. True
   b. False

16. Of the various hepatitis viruses, the one of most concern in dentistry is:
   a. Hepatitis A
   b. Hepatitis B
   c. Hepatitis C
   d. A & B

17. All of the following are examples of PPE (Personal Protection Equipment), EXCEPT:
   a. Needle guards
   b. Face shields
   c. Clinical gowns
   d. Latex or nitrile gloves

18. Face masks continue to be effective even if wet.
   a. True
   b. False

19. Hand hygiene is considered the most effective measure for reducing the risk of transmitting organisms to patients and DHCP.
20. A latex allergy may include the following symptoms, **EXCEPT**:
   a. hives
   b. dilated pupils
   c. itchy eyes
   d. coughing spells

**Section 3: OSHA Hazard Communication Standard**

21. Employers are required to take specific measures to inform employees about their rights under OSHA regulations and to provide training in handling hazardous materials which will be encountered in the workplace.
   a. True
   b. False

22. Dental offices are exempt from having a hazard communication program.
   a. True
   b. False

23. Office must maintain records of employee training and an incident log of any occupational injury.
   a. True
   b. False

24. The main change in the HCS for 2013 that has been put into place aligns the program with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).
   a. True
   b. False

25. Pictograms indicate the categories of various hazards with an icon or picture.
   a. True
   b. False