Bloodborne Pathogens
Standard Annual Review

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California Registered Provider Number: RP5631
Answer Sheet: OSHA Bloodborne Pathogens Standard Annual Review

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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.

Course 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. Many state dental licensing boards require that licensed and non-licensed dental professionals 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 of the general public and the dental clinician. This course on bloodborne pathogens, with an OSHA perspective, provides employers a recognized standard of information for their employees.

About the Authors

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Howard A. Boone, MD, is a faculty advisor for Academy of Dental Learning for Infection Control in the clinical setting. Former Chief of Surgery at Tahoe Forest Health System and San Francisco General Hospital, Dr. Boone supervised clinical training for infection control specialists.

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Ms. Wright is a continuing education editor and writer as well as a Temp PRN with agencies in the Washington State area. Ms. Wright earned her MS at the UNM and Pierce College of Washington State in 1997 and certification in Utilization of the 970 Diode Laser and Safety in Dentistry in February of 2015. Ms. Wright works to implement Dental Education seminars as a Hospital-Dental Liaison building collaborative, mutual efforts to promote patient wellness between medical practitioners and dentists while prioritizing care for untreated, medically compromised patients.

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 this 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. 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.
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.

The following information is for professional display from OSHA® website, as of December 2019: https://www.osha.gov/OshDoc/data_BloodborneFacts/bbfact01.pdf
OSHA’s Bloodborne Pathogens Standard

Bloodborne pathogens are infectious microorganisms present in blood that can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV), the virus that causes AIDS. Workers exposed to bloodborne pathogens are at risk for serious or life-threatening illnesses.

Protections Provided by OSHA’s Bloodborne Pathogens Standard

All of the requirements of OSHA’s Bloodborne Pathogens standard can be found in Title 29 of the Code of Federal Regulations at 29 CFR 1910.1030. The standard’s requirements state what employers must do to protect workers who are occupationally exposed to blood or other potentially infectious materials (OPIM), as defined in the standard. That is, the standard protects workers who can reasonably be anticipated to come into contact with blood or OPIM as a result of doing their job duties.

In general, the standard requires employers to:

• **Establish an exposure control plan.** This is a written plan to eliminate or minimize occupational exposures. The employer must prepare an exposure determination that contains a list of job classifications in which all workers have occupational exposure and a list of job classifications in which some workers have occupational exposure, along with a list of the tasks and procedures performed by those workers that result in their exposure.

• **Employers must update the plan annually** to reflect changes in tasks, procedures, and positions that affect occupational exposure, and also technological changes that eliminate or reduce occupational exposure. In addition, employers must annually document in the plan that they have considered and begun using appropriate, commercially available effective safer medical devices designed to eliminate or minimize occupational exposure. Employers must also document that they have solicited input from frontline workers in identifying, evaluating, and selecting effective engineering and work practice controls.

• **Implement the use of universal precautions** (treating all human blood and OPIM as if known to be infectious for bloodborne pathogens).

• **Identify and use engineering controls.** These are devices that isolate or remove the bloodborne pathogens hazard from the workplace. They include sharps disposal containers, self-shielding needles, and safer medical devices, such as sharps with engineered sharps-injury protection and needleless systems.

• **Identify and ensure the use of work practice controls.** These are practices that reduce the possibility of exposure by changing the way a task is performed, such as appropriate practices for handling and disposing of contaminated sharps, handling specimens, handling laundry, and cleaning contaminated surfaces and items.

• **Provide personal protective equipment (PPE), such as gloves, gowns, eye protection, and masks.** Employers must clean, repair, and replace this equipment as needed. Provision, maintenance, repair and replacement are at no cost to the worker.

• **Make available hepatitis B vaccinations to all workers with occupational exposure.** This vaccination must be offered after the worker has received the required bloodborne pathogens training and within 10 days of initial assignment to a job with occupational exposure.

• **Make available post-exposure evaluation and follow-up to any occupationally exposed worker who experiences an exposure incident.** An exposure incident is a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or OPIM. This evaluation and follow-up must be at no cost to the worker and includes documenting the route(s) of exposure and the circumstances.
under which the exposure incident occurred; identifying and testing the source individual for HBV and HIV infectivity, if the source individual consents or the law does not require consent; collecting and testing the exposed worker’s blood, if the worker consents; offering post-exposure prophylaxis; offering counseling; and evaluating reported illnesses. The healthcare professional will provide a limited written opinion to the employer and all diagnoses must remain confidential.

- **Use labels and signs to communicate hazards.** Warning labels must be affixed to containers of regulated waste; containers of contaminated reusable sharps; refrigerators and freezers containing blood or OPIM; other containers used to store, transport, or ship blood or OPIM; contaminated equipment that is being shipped or serviced; and bags or containers of contaminated laundry, except as provided in the standard. Facilities may use red bags or red containers instead of labels. In HIV and HBV research laboratories and production facilities, signs must be posted at all access doors when OPIM or infected animals are present in the work area or containment module.

- **Provide information and training to workers.** Employers must ensure that their workers receive regular training that covers all elements of the standard including, but not limited to: information on bloodborne pathogens and diseases, methods used to control occupational exposure, hepatitis B vaccine, and medical evaluation and post-exposure follow-up procedures. Employers must offer this training on initial assignment, at least annually thereafter, and when new or modified tasks or procedures affect a worker’s occupational exposure. Also, HIV and HBV laboratory and production facility workers must receive specialized initial training, in addition to the training provided to all workers with occupational exposure. Workers must have the opportunity to ask the trainer questions. Also, training must be presented at an educational level and in a language that workers understand.

- **Maintain worker medical and training records.** The employer also must maintain a sharps injury log, unless it is exempt under Part 1904 – Recording and Reporting Occupational Injuries and Illnesses, in Title 29 of the Code of Federal Regulations.

### Additional Information

For more information, go to OSHA’s Bloodborne Pathogens and Needlestick Prevention Safety and Health Topics web page at: [https://www.osha.gov/SLTC/bloodbornepathogens/index.html](https://www.osha.gov/SLTC/bloodbornepathogens/index.html).

To file a complaint by phone, report an emergency, or get OSHA advice, assistance, or products, contact your nearest OSHA office under the “U.S. Department of Labor” listing in your phone book, or call us toll-free at **(800) 321-OSHA** (6742).

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This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is **(202) 693-1999**; the teletypewriter (TTY) number is **(877) 889-5627.**

For assistance, contact us. We can help. It’s confidential.
**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, 2019; it took effect on April 18, 2019. 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 2019 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:
  o Universal Precautions;
  o Engineering and work practice controls, e.g., safer medical devices, sharps disposal containers, hand hygiene;
  o Personal protective equipment;
  o Housekeeping, including decontamination procedures and removal of regulated waste.
• Documentation of:
  1. the annual consideration and implementation of appropriate commercially available and effective safer medical devices designed to eliminate or minimize occupational exposure, and
  2. 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 the 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 Post-exposure 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 2019) 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, though in 2003 there was 1 documented occurrence of patient-to-patient transmission.

**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.

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 immunoglobulin 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.
**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 2019, 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, 2019).

**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
- MMR: Measles, Mumps, Rubella
- Varicella (Chickenpox)
- Tdap: Tetanus, Diphtheria, Pertussis
Recommendations below taken from CDC website, in December 2019: https://www.cdc.gov/oralhealth/infectioncontrol/pdf/safe-care.pdf

**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).

Taken from The Center for Disease Control website in 2019:

CDC - Bloodborne Pathogens - Occupational Exposure FAQs - Infection Control in Dental Settings - Oral Health

What constitutes an occupational exposure in dentistry?

An exposure can be defined as a percutaneous injury (e.g., needlestick or cut with a sharp object) or contact of mucous membrane or nonintact skin (e.g., exposed skin that is chapped, abraded, or with dermatitis) with blood, saliva, tissue, or other body fluids that are potentially infectious. Exposure incidents might place dental health care personnel at risk for hepatitis B virus (HBV), hepatitis C virus (HCV), or human immunodeficiency virus (HIV) infection, and therefore should be evaluated immediately following treatment of the exposure site by a qualified health care professional.

What body fluids are potentially infectious during an occupational exposure?

When evaluating occupational exposures to fluids that might contain hepatitis B virus (HBV), hepatitis C virus (HCV), or human immunodeficiency virus (HIV), health care workers should consider that all blood, body fluids, secretions, and excretions except sweat, may contain transmissible infectious agents. Blood contains the greatest proportion of infectious bloodborne virus particle titers of all body fluids and is the most critical transmission vehicle in the health-care setting. During dental procedures it is predictable that saliva will become contaminated with blood. If blood is not visible, it is still likely that very small quantities of blood are present, but the risk for transmitting HBV, HCV, or HIV is extremely small. Despite this small transmission risk, a qualified health care professional should evaluate any occupational exposure to saliva in dental settings, regardless of visible blood.

What is the risk of infection after an occupational exposure?

Health care workers who have received hepatitis B vaccine and have developed immunity to the virus are at virtually no risk for infection. For an unvaccinated person, the risk from a single needlestick or a cut exposure to HBV-infected blood ranges from 6%–30% and depends on the hepatitis B e antigen (HBeAg) status of the source individual. Individuals who are both hepatitis B surface antigen (HBsAg) positive and
HBeAg positive have more virus in their blood and are more likely to transmit HBV.

**Hepatitis C Virus (HCV)**

Based on limited studies, the estimated risk for infection after a needlestick or cut exposure to HCV-infected blood is approximately 1.8%. The risk following a blood splash is unknown but is believed to be very small; however, HCV infection from such an exposure has been reported.

**Human Immunodeficiency Virus (HIV)**

The average risk for HIV infection after a needlestick or cut exposure to HIV-infected blood is 0.3% (about 1 in 300). Stated another way, 99.7% of needlestick/cut exposures to HIV-contaminated blood do not lead to infection.

The risk after exposure of the eye, nose, or mouth to HIV-infected blood is estimated to be, on average, 0.1% (1 in 1,000).

The risk after exposure of the skin to HIV-infected blood is estimated to be less than 0.1%. A small amount of blood on intact skin probably poses no risk at all. There have been no documented cases of HIV transmission due to an exposure involving a small amount of blood on intact skin (a few drops of blood on skin for a short period of time). The risk may be higher if the skin is damaged (for example, by a recent cut), if the contact involves a large area of skin, or if the contact is prolonged.

What should be done following an occupational exposure?

Wounds and skin sites that have been in contact with blood or body fluids should be washed with soap and water; mucous membranes should be flushed with water. Immediate evaluation must be performed by a qualified health care professional. Health care providers who evaluate exposed dental health care professionals should be:

- Selected before dental health care professionals are placed at risk of exposure.
- Experienced in providing antiretroviral therapy.
- Familiar with the unique nature of dental injuries so they can provide appropriate guidance on the need for antiretroviral prophylaxis.
- Employers should follow all federal (including the Occupational Safety and Health Administration (OSHA)) and state requirements for recording and reporting occupational injuries and exposures. The following information should be included in the exposure report, recorded in the exposed person's confidential medical record, and made available to qualified health care professionals:
  - Date and time of exposure.
• Details of the procedure being performed, including where and how the exposure occurred, whether the exposure involved a sharp device, the type of device, whether there was visible blood on the device, and how and when during its handling the exposure occurred.

• Details of the exposure, including the type and amount of fluid or material and the severity of the exposure. For a percutaneous injury, details would include the depth of the wound, the gauge of the needle, and whether fluid was injected; for a skin or mucous membrane exposure they would include the estimated volume of material, the duration of contact, and the condition of the skin (e.g., chapped, abraded, or intact).

• Details about the exposure source—whether the patient was infected with hepatitis B virus (HBV) and his or her hepatitis B e antigen (HBeAg) status; hepatitis C virus (HCV); or human immunodeficiency virus (HIV); and, if the source was infected with HIV, the stage of disease, history of antiretroviral therapy, and viral load, if known. If this information is not known from the medical record, then the source patient should be asked to obtain serologic testing for HBV, HCV, and HIV.

• Details about the exposed person (e.g., hepatitis B vaccination and vaccine-response status).

• Details about counseling, post-exposure management, and follow-up.

What factors must qualified health care professionals consider when assessing the need for follow-up of occupational exposures?

The evaluation must include the following factors to determine the need for further follow-up:

• Type of exposure
• Percutaneous injury (e.g., depth, extent)
• Mucous membrane exposure
• Nonintact skin exposure
• Bites resulting in blood exposure to either person involved
• Type and amount of fluid/tissue
• Blood present
• Fluids containing blood present
• Infectious status of source
• Presence of hepatitis B surface antigen (HBsAg) and hepatitis B e antigen (HBeAg)
• Presence of hepatitis C virus (HCV) antibody
• Presence of human immunodeficiency virus (HIV) antibody
• Susceptibility of exposed person
• Hepatitis B vaccine and vaccine response status
• HBV, HCV, or HIV immune status

After conducting this initial evaluation of the occupational exposure, a qualified health care professional must decide whether to conduct further follow-up on an individual basis using all of the information obtained.

**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
- 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.

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 person handling the instruments through removal, cleaning, packaging and sterilization
needs to use heavy-duty gloves to help prevent injury with sharp contaminated instruments."

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

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 medical 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, Last Accessed 2019; 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.
Course Test: Bloodborne Pathogens Standard Annual Review

1. The term “Standard Precautions” replaces an older term, “Universal Precautions”.
   a. True
   b. False

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

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

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

5. 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

6. 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
7. 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

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

9. Hand hygiene is considered the most effective measure for reducing the risk of transmitting organisms to patients and DHCP.
   a. True
   b. False

10. Biopsy specimens should be placed in a sturdy, leak-proof container with a secure lid for transportation:
    a. True
    b. False