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# OSHA blood-borne pathogen training in the dental setting

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# OSHA blood-borne pathogen training in the dental setting

## EDUCATIONAL OBJECTIVES

At the conclusion of this educational activity, participants will be able to:

1. Recognize and correct occupational blood-borne health hazards in the dental setting;
2. Develop procedures in the dental setting to assure compliance with OSHA blood-borne pathogen standards;
3. Integrate prevention tools that address occupational health risks, including blood-borne pathogens; and
4. Identify and value the necessary screening protocols, as well as health and safety education necessary, for all workers in the dental setting.

## ABSTRACT

The Occupational Safety and Health Administration (OSHA) was developed to assure safety in the workplace by establishing safety and health standards. OSHA ensures workplace compliance through inspections. Working in cooperation with the Centers for Disease Control and Prevention (CDC), it protects dental workers from occupational exposure to pathogens and other health risks in the dental setting. Their ultimate goal is to have employees go home safe at the end of the day. This course reviews the blood-borne pathogen health hazards and the preventive measures necessary.



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## INTRODUCTION

The Occupational Safety and Health Administration is part of the Department of Labor and was developed for the sole purpose of keeping employees safe in the workplace. It was established by Congress in 1970 to protect the health of all American workers by establishing safety and health standards. The mission of OSHA is to save lives, prevent injuries, and protect the health of America's workers.<sup>1</sup>

A variety of methods are used to ensure workplace compliance, from education to inspections. Working in cooperation with the CDC, OSHA implemented the Bloodborne Pathogens Standard in 1991 to protect health-care workers from occupational exposure to pathogens.

Utilizing OSHA's resources can improve workplace outcomes. "OSHA and its state partners have approximately 2,100 inspectors, plus complaint discrimination investigators, engineers, physicians, educators, standards writers, and other technical and support personnel spread over more than 200 offices throughout the country. This staff establishes protective standards, enforces those standards, and reaches out to employers and employees through technical assistance and consultation programs."<sup>2</sup> To find the regional offices and your state-specific regulations, go to [osha.gov/html/RAmap.html](http://osha.gov/html/RAmap.html).

## TRAINING FOR WORKPLACE SAFETY

Training is a major part of OSHA's program. Each dental office must have at minimum annual training for those who are occupationally exposed to blood-borne pathogens. When someone new starts a job with occupational exposures, he or she must be trained before commencing work. Any time employees have additional tasks added to their jobs or change their positions in the office to another that includes the risk of occupational exposure to blood-borne pathogens, they must have additional training. All employees who have the possibility of being exposed must receive training. This includes the janitorial staff and those working in administrative positions.

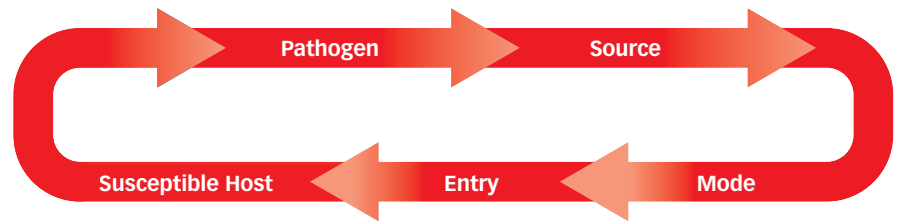
There can be no cost to the employee, and the training has to occur during working hours. The materials used to teach the course must be appropriate in both content

### Tip: OSHA training must include an accessible copy of the regulatory text of the OSHA standard and an explanation of its contents

These documents are available at [osha.gov/Publications/osha2254.pdf](http://osha.gov/Publications/osha2254.pdf).

- For laws and regulations, go to [osha.gov/law-regs.html](http://osha.gov/law-regs.html).
- For medical and dental offices, go to [osha.gov/Publications/OSHA3187/osha3187.html](http://osha.gov/Publications/OSHA3187/osha3187.html).
- For model plans and programs, go to [osha.gov/Publications/osha3186.html](http://osha.gov/Publications/osha3186.html)
- For a complete list of what must be in your office OSHA training, go to [osha.gov/pls/oshaweb/owadisp.show\\_document?p\\_table=STANDARDS&p\\_id=10051](http://osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10051).

Figure 1: The chain of infection



and vocabulary. Special attention needs to be given to the educational level, literacy, and language of the employees and the materials taught at the employee's level.

The course must be comprehensive and include at minimum instruction in the basics of infection control and prevention, blood-borne pathogens, modes of transmission, and proper use of needlestick and contact precautions.

## CHAIN OF INFECTION

The chain of infection represents the events that happen in order for a disease to be transmitted and occur. The links in the chain of infection include the following:

- An adequate number of pathogens, or disease-causing organisms, to cause disease
- A reservoir or source that allows the pathogen to survive and multiply (e.g., blood)
- A mode of transmission from the source to the host
- An entrance through which the pathogen may enter the host
- A susceptible host (i.e., one who is not immune)

The process begins when a pathogen leaves its host or source through a portal of exit via some mode of transmission. It then enters the appropriate portal of entry and infects the susceptible host. Understanding these steps in the chain can help dental health-care personnel (DHCP) prevent disease. For example, if DHCP screen patients for active tuberculosis before they come into

the clinic, the source would not be present, thereby preventing disease transmission.

The occurrence of all these events is considered the "chain of infection" (figure 1). Any disease may be prevented simply by breaking one link in the chain. Infection control refers to a series of procedures that removes one or more of the links in the chain.<sup>3</sup> If any

### Tip: Detecting tuberculosis

Tuberculosis (TB) transmission has been shown to be a risk in the health-care field. In many states, cases are on the rise. People who work or receive care in health-care settings are at higher risk for becoming infected with TB.<sup>4,5</sup> Prevention is the key to stopping the spread of this disease. The most effective method of prevention is prompt detection and isolation of infectious patients. Simply training all DHCP to ask the following questions before treatment removes the source patient, preventing the spread of disease:

- Have you had a persistent cough for greater than three weeks?
- Have you had night sweats, unexplained weight loss, increased frequency of cough, increased production of sputum, hemoptysis (coughed-up blood)?<sup>6</sup>



one of these conditions is not met, transmission of a particular disease cannot take place. Effective infection control strategies prevent disease transmission by interrupting one or more links in the chain of infection.

As DHCP, it is important to know all the links in the chain and the preventive measures for each link.

## **PATHOGENS**

According to Merriam-Webster, a pathogen is “a specific causative agent (such as a bacterium or virus) of disease.” The Greek root of the word means “that which produces suffering.”

There are many forms of pathogens. The two main microbes we need to focus on in dentistry are bacteria and viruses. Bacteria are the larger of the two and have very complex biology. Bacteria live outside of the cells of the host and are able to reproduce without the host. Pathogens vary in infectivity and virulence. To cause disease, an infectious dose of a pathogen is required. Many bacteria are beneficial or harmless to the host. The human body contains specific bacteria that are called normal floras. These bacteria protect humans from infection by competing with pathogens that cause infection. Normal floras usually don't cause disease unless they are out of balance.

An example of this is when a broad-spectrum antibiotic is utilized with those who carry *Clostridium difficile* (*C. diff*) in the intestine. A proliferation of *C. diff* can occur as a result of the symbiotic bacteria being destroyed by the antibiotic. The symptoms can occur from the first day to two months later. Antibiotics are effective against many kinds of bacteria, although the overuse or misuse of antibiotics has produced antibiotic-resistant strains of bacteria.<sup>9</sup>

Viruses are the smallest and simplest forms of life, about 100 times smaller than bacteria. Not all viruses cause disease. They must be in the cells of the host to survive. They use the hosts' genetic materials to reproduce and are the most harmful. Antibiotics are not effective against viruses, but vaccines have been effective in eliminating or helping to control (to some degree) viral diseases such as polio, measles, mumps, and rubella.<sup>9-13</sup>

## **SOURCE/RESERVOIR**

According to the CDC, a source is the habitat that allows the pathogen to survive and multiply. This can be anything from blood to water lines. The reservoir of an infectious agent is the habitat in which the agent normally lives, grows, and multiplies. Reservoirs include blood, human skin, and elements of the environment such as water lines and clinical contact surfaces. Here are some examples of how DHCP can help to eliminate the source/reservoir:

- Verify that staff's vaccinations are up-to-date, including influenza.
- Avoid elective treatment on people who have contagious diseases.
- Manage, handle, and dispose of bodily fluids including blood and saliva following CDC recommendations and OSHA regulations.
- Verify that single-use items, including gloves and masks, are used only one time.
- Treat and test waterlines according to the instructions for use of the Food and Drug Administration (FDA) approved dental unit. Each water unit has FDA approved instructions (also called instructions for use) that give direction such as acceptable level of bacteria in the water that the clinician must follow.
- Require ill workers to stay home.
- Manage sterilization and disinfection according to CDC recommendations and OSHA regulations.

## **MODE OF TRANSMISSION**

In the dental setting, patients and dental personnel can be exposed to a variety of pathogenic microorganisms through

- **inhalation** of airborne microorganisms that can remain suspended in the air for long periods;
- **contact** of conjunctival, nasal, or oral mucosa with droplets (e.g., spatter) containing microorganisms generated from an infected person and propelled a short distance by coughing, sneezing, or talking;
- **direct contact** with blood, oral fluids, or other patient materials; and
- **indirect contact** with contaminated objects such as instruments, equipment, or environmental surfaces.

## **DENTAL PRECAUTIONS: AEROSOLS, DROPLETS, AND SPATTER**

Aerosols, droplets, and spatter contaminated

with blood, saliva, viruses, and bacteria are produced during many dental procedures. Dental equipment such as air-water syringes, air polishers, ultrasonic units, and dental handpieces produce airborne contamination. Spatter and overspray can be produced with handpieces and many other dental devices. All of these tasks can include the involvement of blood and other potentially infectious materials (OPIM), leading to transmission of blood-borne pathogens. Aerosols are suspensions in air (or in a gas) of solid or liquid particles small enough that they will remain airborne for a prolonged period of time because of their low settling velocity. Aerosols containing bacteria and viruses pose the greatest risk because of the microscopic size of particles that can be suspended in air for up to 30 minutes depending on their size.<sup>14,15</sup> Severe acute respiratory syndrome (SARS), TB, influenza, and Legionnaire's disease can all be contracted through an aerosol.

Use of personal protective equipment including a grade 1-3 mask, and if necessary, an N95 respirator, patient exam and surgical gloves, ANSI-approved eye protection, splash guards, splash aprons, testing and maintenance of waterlines in dental units, use of barriers such as dental dams, high volume suction, and proper ventilation of the area all contribute to creating a safe environment. Knowing the specification and proper use these preventive tools can help prevent aerosol exposure.

## **DIRECT AND INDIRECT CONTACT**

**Direct contact** with blood, oral fluids, or other patient materials can occur every time DHCP work on patients. Preventive measures must be adhered to in order to help reduce the incidents and exposure. Hand hygiene has proven to be the most effective method of reducing disease, yet the rate of compliance is very low in the medical field.<sup>16</sup> Wash your hands when they are visibly soiled. Use a hand sanitizer between hand washing if your hands are not soiled.

Remove all personal protective equipment before leaving patient care areas (lab, sterilization, and operatory). Do not wear PPE to the restroom, lunchroom, or home. PPE can carry pathogens, especially lab coats, that can carry large amounts of

microbes.<sup>17</sup>

**Indirect contact** occurs when DHCP or patients have contact with contaminated objects such as instruments, equipment, or environmental surfaces. Dental equipment that is contaminated with blood and OPIM can transmit disease from one patient to another or from patient to DHCP. It is vital to follow the two-step process of cleaning and disinfecting surfaces and objects. Objects that can be sterilized should be cleaned and then sterilized. Automated systems of cleaning such as a washer/disinfector or an ultrasonic bath are preferred over hand scrubbing. This not only reduces exposure to aerosols from scrubbing, but also reduces sharps injuries.

**The mode of entry** is the manner in which a pathogen enters the body. The portal of entry must provide access to tissues in which the pathogen can multiply or a toxin can act. Many times, the portal of entry and the portal of exit will be the same for the source host. A good example of this pathway is influenza. It enters and exits through the respiratory tract of the host. For example, influenza virus exits the respiratory tract of the source host and enters the respiratory tract of the new host.<sup>18</sup> There are many entries into the body including open wounds, mouth, skin and mucous membranes.

Here are some examples of how DHCP can help to eliminate the entry/exit of pathogens.

- Have patients and employees cover coughs and sneezes with a tissue. Try to have all patients and staff stay home while they are coughing or sneezing. Isolate patients who come in with a cough that have to have emergency treatment. Postpone elective treatment for patients with a cough.
- Keep wounds covered with a dressing. If the wound is wet, or there is weeping dermatitis or draining, do not perform tasks that involve the risk of exposure to blood-borne pathogens or other potentially infectious materials or involve patient care.

**A susceptible host (i.e., one who is not immune):** Susceptibility of a host depends on many factors, including genetic or constitutional factors, specific immunity, and nonspecific factors that affect an individual's

ability to resist infection or to limit pathogenicity.<sup>19</sup> An individual's genetic makeup may either increase or decrease susceptibility.

Factors that may increase susceptibility to infection by disrupting host defenses include age, stress, malnutrition, alcoholism, lack of sleep, and disease or therapy that impairs the nonspecific immune response.<sup>20-23</sup> There are many ways DHCP can help to decrease their own susceptibility.

- **Sleep hygiene:** It is recommended that the average adult aged 18 to 60 get seven or more hours of sleep a night.<sup>23</sup>
- **Decreased stress:** The National Institutes of Health recognizes stress as a contributing factor in disease. Some suggestions for decreasing stress include:
- **Recognize the signs** of your body's response to stress, such as difficulty sleeping, increased alcohol and other substance use, being easily angered, feeling depressed, and having low energy.
- **Talk to your doctor or health-care provider.** Get proper health care for existing or new health problems.
- **Get regular exercise.** Just 30 minutes per day of walking can help boost your mood and reduce stress.
- **Try a relaxing activity.** Explore stress-coping programs, which may incorporate meditation, yoga, tai chi, or other gentle exercises. For some stress-related conditions, these approaches are used in addition to other forms of treatment. Schedule regular times for these and other healthy and relaxing activities. Learn more about these techniques on the National Center for Complementary and Integrative Health (NCCIH) website at [nccih.nih.gov/health/stress](http://nccih.nih.gov/health/stress).
- **Set goals and priorities.** Decide what must get done and what can wait. Learn to say no to new tasks if they are putting you into overload. Note what you have accomplished at the end of the day, not what you have been unable to do.
- **Stay connected** with people who can provide emotional and other support. To reduce stress, ask for help from friends, family, and community or religious organizations.

The CDC has stated that the big three public health efforts should be interventions directed at

- controlling or eliminating the agent at the source of transmission;
- protecting portals of entry; and
- increasing the host's defenses.

One of the concepts that the CDC has been promoting is called "herd immunity." Herd immunity involves interventions that are designed to prevent a pathogen from encountering a susceptible host. According to this concept, "if a high enough proportion of individuals in a population are resistant to an agent, the susceptible will be protected by the resistant majority, since the pathogen will be unlikely to 'find' those few susceptible individuals."<sup>24</sup>

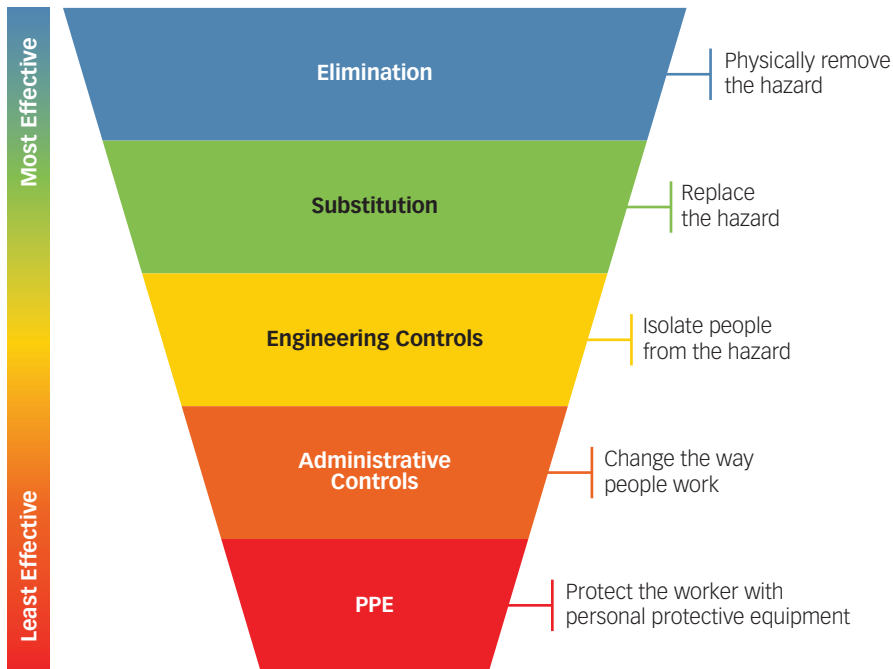
The effectiveness of herd immunity varies from disease to disease. Some diseases such as measles and rubella have continued with immunization levels being as high as 85% to 90%. The issue with this concept is that socioeconomic and cultural acceptance of immunization as well as clusters of susceptible hosts may make some subgroups more susceptible to disease. There can be highly immunized populations and yet clusters of subgroups that have few immunized. When pathogens are introduced into one of these subgroups, an outbreak may occur.

Since DHCP are serving those subgroups, it is important for them to be vaccinated to prevent the spread of disease.<sup>25-28</sup>

## CONTROLS

OSHA has developed a set of controls to prevent both injury and diseases; see Figure 1. The core methods for prevention of employee exposure to blood in health-care settings include standard precautions, engineering controls, work practice controls, and administrative controls. Elimination or physically removing the hazard is the most effective. Substitution is next in the hierarchy. This involves replacing the risk. Engineering controls involve newly designed materials that reduce the risk. Administrative controls are policies and procedures that reduce the risk of exposure to certain diseases. They monitor and change the way employees work. PPE is the least effective.

Where engineering controls do not fit the need or are not available, work practice controls that result in safer behavior and personal protective equipment can help prevent exposure.

**Figure 2:** OSHA's hierarchy of controls. Used with permission.

Personal protective equipment includes masks, gowns, respirators, ANSI-approved eye wear, and sharps- and chemical-resistant utility gloves while working with chemicals or sharps after patient care or in the sterilization area.

### PREVENTION OF SHARPS INJURIES

A good example of all of the steps is prevention of sharps injuries. The process for reduction of sharps injuries is all encompassing. It has many options that utilize all of the tools OSHA has brought forward.

- Elimination: Remove the needle from the

tray and dispose of it in the sharps container as soon as the injection has been delivered. Have a sharps container in each room. Dispose of the sharps as close to the point of patient contact as possible.

- Substitution: Substitute a self-sheathing needle for a standard needle.
- Engineering controls: Use a cardboard re-capper that creates a barrier between the needle and the clinician.
- Work-practice or administrative controls: Train and monitor all staff on the scoop method of recapping.
- PPE: Wear personal protective equipment

### 5 OSHA REMINDERS

- Every operator should have a sharps container that is easy to access.
- All staff must be supplied PPE at no cost, including but not limited to: ANSI-approved eye protection, gown, patient exam gloves, masks, N95 respirator, and sharps- and chemical-resistant utility gloves. No PPE may leave the patient treatment area including lab, sterilization, and operator. It does not belong in the lobby, restroom, or lunch room.
- All staff must be supplied with hand hygiene equipment, supplies, and stations.
- All staff exposed to chemicals and disinfectant and using FDA- and EPA-approved materials must be trained in the instructions for use (IFU). When a new product comes in, all staff must be trained.
- A sharps injury log must be maintained, as well as an evaluation log for sharps prevention devices. Sharps prevention must be monitored, and training must be completed yearly or as needed.

including ANSI approved eye wear, fluid resistant gown, patient exam gloves, mask

### SHARPS INJURY PREVENTION

Standard precautions remind us to treat all patients as if they have blood-borne pathogens present. Many times, patients will not know they are carrying a disease. Human immunodeficiency virus (HIV), hepatitis B virus (HBV), and hepatitis C virus (HCV) are the top three viruses known to be transmitted in the medical setting to health-care workers. Contact through mucous membrane or nonintact skin with blood or OPIM and percutaneous injuries are the ways that most transmissions have occurred.

HIV disables the immune system until it is no longer able to fight infections. Over time, and sometimes quickly, a person will lose weight, have a persistent low-grade fever, flu-like symptoms, and opportunistic diseases such as thrush, fungal infections, intestinal disorders, and pneumonia.<sup>27</sup>

The estimated risk of HIV infection from a sharps injury is about 0.3% (1 in 300 that have had a sharps injury from an HIV infected patient). Of the 57 transmission cases in the medical setting that the CDC documented between 1981 and 2006, 48 were associated with percutaneous injury (cuts or punctures).

HBV can cause liver damage as well as death. The symptoms that patients exhibit include abdominal pain, jaundice, fever, nausea, and vomiting. Five to 10% of patients who contract this disease will have it in a chronic form. The chronic form of the disease statistics includes a 20% chance of dying from cirrhosis of the liver and a 6% chance of dying of liver cancer. A sharps injury from a patient currently infected with HBV results in a 6 to 30% chance of transmission if the DHCP is not vaccinated against the disease. The rate of transmission is at an all-time low. That is due largely to the use of HBV vaccination by health-care providers, standard/universal precautions, and the measures required by OSHA.<sup>27-34</sup>

HCV may be present for many years without the patient being aware. This disease causes serious damage to the liver and is often fatal. The hardest part of detecting this disease is that it can occur without symptoms, or the symptoms can be very



# A guide to compliance with OSHA standards

## Bloodborne Pathogens Standard (29 CFR 1910.1030)

This is the most frequently requested and referenced OSHA standard affecting medical and dental offices. Some basic requirements of the OSHA Blood-borne Pathogens Standard include:

- A written exposure control plan, to be updated annually
- Use of universal precautions
- Consideration, implementation, and use of safer, engineered needles and sharps
- Use of engineering and work practice controls and appropriate personal protective equipment (gloves, face and eye protection, gowns)
- Hepatitis B vaccine provided to exposed employees at no cost
- Medical follow-up in the event of an exposure incident
- Use of labels or color-coding for items such as sharps disposal boxes and containers for regulated waste, contaminated laundry, and certain specimens
- Employee training
- Proper containment of all regulated waste

## Hazard Communication (29 CFR 1910.1200)

The hazard communication standard is sometimes called the “employee right-to-know” standard. It requires employee access to hazard information. The basic requirements include:

- A written hazard communication program
- A list of hazardous chemicals (such

as alcohol, disinfectants, anesthetic agents, sterilants, mercury) used or stored in the office

- A copy of the Material Safety Data Sheet (MSDS) for each chemical (obtained from the manufacturer) used or stored in the office
- Employee training

## Ionizing Radiation (29 CFR 1910.1096)

This standard applies to facilities that have an x-ray machine and requires the following:

- A survey of the types of radiation used in the facility, including x-rays
- Restricted areas to limit employee exposures
- Employees working in restricted areas must wear personal radiation monitors such as film badges or pocket dosimeters
- Rooms and equipment may need to be labeled and equipped with caution signs

## Exit Routes (29 CFR Subpart E 1910.35, 1910.36, 1910.37, and 1910.38 and 1910.39)

These standards include the requirements for providing safe and accessible building exits in case of fire or other emergency. It is important to become familiar with the full text of these standards because they provide details about signage and other issues. OSHA consultation services can help or your insurance company or local fire/police service may be able to assist

you. The basic responsibilities include:

- Exit routes sufficient for the number of employees in any occupied space
- A diagram of evacuation routes posted in a visible location

## Electrical (Subpart S-Electrical 29 CFR 1010.301 to 29 CFR 1910.399)

These standards address electrical safety requirements to safeguard employees. OSHA electrical standards apply to electrical equipment and wiring in hazardous locations. If you use flammable gases, you may need special wiring and equipment installation. In addition to reading the full text of the OSHA standard, you should check with your insurance company or local fire department or request an OSHA consultation for help.

## OSHA Poster

Every workplace must display the OSHA poster (OSHA Publication 3165), or the state plan equivalent. The poster explains worker rights to a safe workplace and how to file a complaint. The poster must be placed where employees will see it. You can download a copy or order one free copy from OSHA’s web site at [www.osha.gov](http://www.osha.gov) or by calling (800) 321-OSHA.

## Source

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mild. Studies have shown that this disease is chronic in up to 80% of patients with HCV, with 70% getting active liver disease. In 10-20%, it can lead to cirrhosis of the liver, and in 5%, liver cancer.<sup>30, 32, 34</sup>

The incidence rate of HCV in health-care professionals is about the same as the general population, 1 to 2%. Health-care workers do have an increased occupational risk and a higher risk of infection after exposure. Statistics show the risk for transmission after a needlestick or cut exposure is about

1.8%.<sup>29</sup> There is great hope in treating this disease now with new antivirals available post-exposure. As with any sharps injury, medical treatment and advice should be sought immediately after an incident occurs.

The Needlestick Safety and Prevention Act was signed into law in 2000 because occupational exposure to blood-borne pathogens from accidental sharps injuries posed a serious risk. Congress felt that a modification to the OSHA Blood-borne Pathogens Standard was necessary to give more specifics

regarding OSHA’s requirement for employers to identify, evaluate, and implement safer medical devices. The act also mandated additional requirements for maintaining a sharps injury log, and for the involvement of non-managerial health-care workers in evaluating and choosing devices. Every office is required to comply with this act.

These revisions clarified the need for employers to select safer needle devices as they become available, and to involve employees in identifying and choosing the

devices. OSHA's Blood-borne Pathogens Standard, including its 2001 revisions, applies to all employers who have employees with reasonably anticipated occupational exposure to blood or other potentially infectious materials. These employers must implement the applicable requirements set forth in the standard.

The CDC worked closely with interested parties to put together a solid program, including forms to meet the needs and requirements of this program. These forms can be easily adapted to any item that presents a risk in the dental environment.<sup>31</sup>

Dental offices must develop and implement programs to prevent sharps injuries to dental personnel and patients. A qualified staff person knowledgeable about or willing to be trained in injury prevention (i.e., a safety coordinator) should be assigned to

- promote safety awareness;
- facilitate prompt reporting and postexposure management of injuries;
- identify unsafe work practices and devices;
- coordinate the selection and evaluation of safer dental devices;
- organize staff education and training;
- complete the necessary reporting forms and documentation; and
- monitor safety performance.

Each office should look at available products for sharps injury prevention and consider all features. Evaluation should happen at the start of use and end of use. The criteria for the screening phase will help determine many things including if the device is safe to use, easy and practical, compatible with equipment, and cost effective. Sharps screening forms are available at [cdc.gov/oralhealth/infectioncontrol/pdf/screening.pdf](http://cdc.gov/oralhealth/infectioncontrol/pdf/screening.pdf). A sharps device evaluation form is available at [cdc.gov/oralhealth/infectioncontrol/pdf/device.pdf](http://cdc.gov/oralhealth/infectioncontrol/pdf/device.pdf).

## REFERENCES

1. [https://www.osha.gov/dte/outreach/intro\\_osha/intro\\_to\\_osha\\_english/slide8.html](https://www.osha.gov/dte/outreach/intro_osha/intro_to_osha_english/slide8.html). Accessed 7/3/18
2. <https://www.osha.gov/archive/vanguard/customer/cussay.html> Accessed 7/3/18
3. <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5217a1.htm> Accessed 3/20/18.
4. Al Jahdhami I. (2013). Latent tuberculosis in healthcare workers: time to act. *Oman Medical Journal*. 28(2), 146–148.
5. de Vries G, Sebek MM, Lambregts-van Weezenbeek CS. Healthcare workers with tuberculosis infected during work. *The European Respiratory Journal*. 2006; 28:1216–1221.
6. [https://www.cdc.gov/tb/publications/guidestoolkits/interviewing/tbinterviewing\\_ssmmodules.pdf](https://www.cdc.gov/tb/publications/guidestoolkits/interviewing/tbinterviewing_ssmmodules.pdf) Accessed 2/17/18.
7. <http://www.cidrap.umn.edu/news-perspective/2017/10/study-links-dental-antibiotics-cdiff-cases> Accessed 3/20/18.
8. Bye M, Whitten T, Holzbauer S. (2017). Antibiotic prescribing for dental procedures in community-associated *Clostridium difficile* cases, Minnesota, 2009–2015. *Open Forum Infectious Diseases*. 4(Suppl 1), S1. <http://doi.org/10.1093/ofid/ofx162.001> Accessed 3/10/18.
9. Lindahl JF, Grace D. (2015). The consequences of human actions on risks for infectious diseases: a review. *Infection Ecology & Epidemiology*. 5, 10.3402/iee.v5.30048.
10. Jacobsson G, Dashti S, Wahlberg T, Andersson R. (2007). The epidemiology of and risk factors for invasive *Staphylococcus aureus* infections in western Sweden. *Scand J Infect Dis*. 39: 6–13.
11. Giefing-Kröll C, Berger P, Lepperdinger G, Grubeck-Loebenstien B. (2015). How sex and age affect immune responses, susceptibility to infections, and response to vaccination. *Aging Cell*. 14(3), 309–321.
12. Esper AM, Moss M, Lewis CA, Nisbet R, Mannino DM, Martin GS. (2006). The role of infection and comorbidity: factors that influence disparities in sepsis. *Critical Care Medicine*. 34(10), 2576–2582.
13. National Institutes of Health (US). Biological Sciences Curriculum Study. NIH Curriculum Supplement Series [Internet]. Bethesda (MD): National Institutes of Health (US); 2007. Understanding emerging and re-emerging infectious diseases. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK20370/> Accessed 3/25/18.
14. Tellier R. (2009). Aerosol transmission of influenza A virus: a review of new studies. *Journal of the Royal Society Interface*. 6(Suppl 6), S783–S790.
15. Aliabadi AA, Rogak SN, Bartlett KH, Green SI. (2011). Preventing airborne disease transmission: review of methods for ventilation design in health care facilities. *Advances in Preventive Medicine*. 2011, 124064.
16. Aiello AE, Coulborn RM, Perez V, Larson EL. (2008). Effect of hand hygiene on infectious disease risk in the community setting: a meta-analysis. *American Journal of Public Health*. 98(8), 1372–1381.
17. Priya H, Acharya S, Bhat M, Ballal M. (2009). Microbial contamination of the white coats of dental staff in the clinical setting. *Journal of Dental Research, Dental Clinics, Dental Prospects*. 3(4), 136–140.
18. Killingley B, Nguyen-Van-Tam J. (2013). Routes of influenza transmission. *Influenza and Other Respiratory Viruses*. 7(Suppl. 2), 42–51.
19. Barreto ML, Teixeira MG, Carmo EH. (2006). Infectious diseases epidemiology. *Journal of Epidemiology and Community Health*. 60(3), 192–195.
20. Besedovsky L, Lange T, Born J. (2012). Sleep and immune function. *Pflügers Archiv*. 463(1), 121–137.
21. Asif N, Iqbal R, Nazir CF. (2017). Human immune system during sleep. *American Journal of Clinical and Experimental Immunology*. 6(6), 92–96.
22. Rolston KVI, Bodey GP. Factors responsible for increased susceptibility to infections. In: Kufe DW, Pollock RE, Weichselbaum RR, et al., editors. *Holland-Frei Cancer Medicine*. 6th edition. Hamilton (ON): BC Decker; 2003.
23. Watson NF, Badr MS, Belenky G, et al. Recommended amount of sleep for a healthy adult: a joint consensus statement of the American Academy of Sleep Medicine and Sleep Research Society. *Sleep*. 2015;38(6):843–844
24. <https://www.cdc.gov/ophss/csels/dsepd/ss1978/lesson1/section10.html> Accessed 7/16/18
25. Kim TH, Johnstone J, Loeb M. (2011). Vaccine herd effect. *Scandinavian Journal of Infectious Diseases*. 43(9), 683–689.
26. Gonçalves G. Herd immunity: recent uses in vaccine assessment. *Expert Rev Vaccines*. 2008; Dec; 7(10):1493–506.
27. Kinyanjui TM, House TA, Kiti MC, Cane PA, Nokes DJ, Medley GF. (2015). Vaccine induced herd immunity for control of respiratory syncytial virus disease in a low-income country setting. *PLoS ONE*. 10(9), e0138018.
28. Parker AM, Vardavas R, Marcum CS, Gidengil CA. (2013). Conscious consideration of herd immunity in influenza vaccination decisions. *American Journal of Preventive Medicine*. 45(1), 118–121.
29. <https://www.cdc.gov/niosh/stopsticks/blood-borne.html> Accessed 4/2/18
30. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1415841/> Accessed 7/25/18
31. <https://www.cdc.gov/sharpsafety/> Accessed 4/2/18.
32. Cleveland JL, Gray SK, Harte JA, Robison VA, Moorman AC, Gooch BF. (2016). Transmission of blood-borne pathogens in US dental health care settings: 2016 update. *Journal of the American Dental Association (1939)*, 147(9), 729–738. <http://doi.org/10.1016/j.adaj.2016.03.020>.
33. Nelson NP, Easterbrook PJ, McMahon BJ. (2016). Epidemiology of hepatitis B virus infection and impact of vaccination on disease. *Clinics in Liver Disease*. 20(4), 607–628. <http://doi.org/10.1016/j.cld.2016.06.006>
34. <https://www.cdc.gov/hepatitis/hbv/hbvfaq.htm> Accessed 4/2/18.



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## QUESTIONS

1. **The Occupational Safety and Health Administration (OSHA) is part of the Department of Labor and oversees the health and safety of:**
  - a. The public
  - b. The patient
  - c. The employee
  - d. A and B
2. **Each dental office must have blood-borne pathogen training at minimum \_\_\_ for those who are occupationally exposed to blood-borne pathogens.**
  - a. Once a year
  - b. Every two years
  - c. Every five years
  - d. Every ten years
3. **In order to prevent a disease, you must remove \_\_\_ link(s) in the chain of infection.**
  - a. One
  - b. Two
  - c. Three
  - d. Four
4. **There are many forms of pathogens. Two of the main microbes DHCP need to focus on in dentistry are:**
  - a. Protozoa and parasites
  - b. Fungi and spores
  - c. Bacteria and viruses
  - d. None of the above
5. **The mode of transmission includes all except which of the following?**
  - a. Inhalation of airborne microorganisms
  - b. Direct contact
  - c. Indirect contact
  - d. Susceptible host
6. **The correct order for the hierarchy of infection control is:**
  - a. Elimination, PPE, engineering controls, substitution, work-practice or administrative controls
  - b. Elimination, substitution, engineering controls, work-practice or administrative Controls, PPE
  - c. PPE, elimination, substitution, engineering controls, work-practice or administrative controls
  - d. All of the above; there is no hierarchy
7. **Viruses must be \_\_\_ the cells of the host to survive and \_\_\_ be treated with antibiotics.**
  - a. Outside / can
  - b. Outside / can't
  - c. Inside / can
  - d. Inside / can't
8. **Aerosols are suspensions in air (or in a gas) of solid or liquid particles small enough that they will remain airborne for a prolonged period of time because of their \_\_\_\_\_ settling velocity.**
  - a. High
  - b. Low
  - c. Medium
  - d. Speedy
9. **The rate of HBV has decreased in medical professionals largely because of:**
  - a. Standard/universal precautions
  - b. HBV vaccinations
  - c. Measures required by OSHA
  - d. All of the above
10. **The incidence of HCV in health-care professionals is:**
  - a. Higher than the general population
  - b. Much lower than the general population
  - c. About the same as the general population
  - d. Slightly lower than the general population
11. **Screening of sharps injury prevention devices is:**
  - a. Required
  - b. Recommended
  - c. Not required
  - d. Not recommended
12. **Sharps-resistant and chemical-resistant utility gloves must be used:**
  - a. While working with chemicals
  - b. In the sterilization area when processing instruments
  - c. While working with patients
  - d. A and B
13. **The sharps container should be:**
  - a. In each room where care is delivered that involves sharps
  - b. In sterilization only
  - c. As close to the point of contact as possible
  - d. A and C
14. **OSHA regulations apply:**
  - a. Only to employers that have more than 14 employees and with reasonably anticipated occupational exposure to blood or other potentially infectious materials.
  - b. Only to employers with full-time employees that are employed more than 120 days a year with reasonably anticipated occupational exposure to blood or other potentially infectious materials.
  - c. To all employers who have employees with reasonably anticipated occupational exposure to blood or other potentially infectious materials.
  - d. None of the above
15. **OSHA regulations are:**
  - a. Suggested
  - b. Recommended
  - c. Required
  - d. Only apply to setting with more than 75 employees

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## QUESTIONS

**16. The hardest part of detecting HCV is that:**

- a. It is not recognized as a disease
- b. It can occur without symptoms
- c. The symptoms can be very mild
- d. B and C

**17. Of the 57 transmission cases in the medical setting that the CDC documented between 1981 and 2006, 48 were associated with:**

- a. Susceptible employees
- b. Herpetic lesions
- c. Percutaneous injury
- d. Mucosa exposure

**18. Standard precautions remind us to treat all patients:**

- a. As if they do not have a blood-borne pathogens present
- b. As if they do not have blood-borne pathogens present unless there are symptoms
- c. As if they have blood-borne pathogens present
- d. As if they were a family member

**19. In the Hierarchy of Controls elimination defined means:**

- a. Replace the hazard
- b. Isolate people from the hazard
- c. Change the way people do business
- d. Physically remove the hazard

**20. In the Hierarchy of Controls purpose of engineering controls is to:**

- a. Replace the hazard
- b. Isolate people from the hazard
- c. Change the way people do business
- d. Physically remove the hazard

**21. It is recommended that the average adult ages 18 to 60 get:**

- a. 5 or more hours of sleep a night
- b. 6 more hours of sleep a night
- c. 7 or more hours of sleep a night
- d. 8 or more hours of sleep a night

**22. Which of the following is true about OSHA training?**

- a. There can be cost to the employee and the training does not have to be during working hours.
- b. There can be a cost to the employee and training does not have to occur during working hours.
- c. There can be no cost to the employee, and the training has to occur during working hours.
- d. OSHA training is the responsibility of the employee and is not required.

**23. The OSHA core methods for prevention of employee exposure to blood in health-care settings include all but:**

- a. Standard precautions
- b. Management policy
- c. Engineering controls
- d. Administrative controls

**24. The incidence rate of HCV in health-care professionals is:**

- a. Higher than the general population
- b. Lower than the general population
- c. Unknown
- d. About the same as the general population

**25. Dental patients and personnel can be exposed to a variety of pathogenic microorganisms through:**

- a. Inhalation
- b. Contact
- c. Indirect and Direct contact
- d. All of the above

**26. Dental offices must develop and implement programs to prevent sharps injuries to:**

- a. dental personnel
- b. delivery workers
- c. patients
- d. a and b

**27. Each office should look at products available for sharps injury prevention and consider all the following features except:**

- a. safe to use
- b. easy and practical
- c. compatible with some equipment
- d. cost effective

**28. OSHA's Blood-borne Pathogen Standard, including its 2001 revisions, requires that employers must implement which of the following:**

- a. applicable requirements set forth in the standard
- b. making employees solely responsible
- c. applicable and non-applicable standards
- d. qualified vanguard

**29. Which of the following was signed into law in 2000 due to serious risk from needlestick injury:**

- a. Congressional modifications
- b. The Needlestick Safety and Prevention Act
- c. The Needlestick Enforcement Act
- d. None of the above

**30. HBV can cause:**

- a. liver damage
- b. death
- c. kwashiorkor
- d. a and b

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|-------------------|------------|
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# OSHA blood-borne pathogen training in the dental setting

Name: \_\_\_\_\_ Title: \_\_\_\_\_ Specialty: \_\_\_\_\_

Address: \_\_\_\_\_ E-mail: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_ Country: \_\_\_\_\_

Telephone: Home (    ) \_\_\_\_\_ Office (    ) \_\_\_\_\_

Lic. Renewal Date: \_\_\_\_\_ AGD Member ID: \_\_\_\_\_

Requirements for successful completion of the course and to obtain dental continuing education credits: 1) Read the entire course. 2) Complete all information above. 3) Complete answer sheets in either pen or pencil. 4) Mark only one answer for each question. 5) A score of 70% on this test will earn you 3 CE credits. 6) Complete the Course Evaluation below. 7) Make check payable to PennWell Corp. **For Questions Call 800-633-1681**

### EDUCATIONAL OBJECTIVES

1. Recognize and correct occupational blood-borne health hazards in the dental setting;
2. Develop procedures in the dental setting to assure compliance with OSHA blood-borne pathogen standards;
3. Integrate prevention tools that address occupational health risks, including blood-borne pathogens; and
4. Identify and value the necessary screening protocols, as well as health and safety education necessary, for all workers in the dental setting.

### COURSE EVALUATION

1. Were the individual course objectives met?

Objective #1: Yes No      Objective #2: Yes No

Objective #3: Yes No      Objective #4: Yes No

Please evaluate this course by responding to the following statements, using a scale of Excellent = 5 to Poor = 0.

2. To what extent were the course objectives accomplished overall?    5    4    3    2    1    0

3. Please rate your personal mastery of the course objectives.            5    4    3    2    1    0

4. How would you rate the objectives and educational methods?        5    4    3    2    1    0

5. How do you rate the author's grasp of the topic?                        5    4    3    2    1    0

6. Please rate the instructor's effectiveness.                                5    4    3    2    1    0

7. Was the overall administration of the course effective?                5    4    3    2    1    0

8. Please rate the usefulness and clinical applicability of this course.    5    4    3    2    1    0

9. Please rate the usefulness of the supplemental bibliography.        5    4    3    2    1    0

10. Do you feel that the references were adequate?                            Yes      No

11. Would you participate in a similar program on a different topic?      Yes      No

12. If any of the continuing education questions were unclear or ambiguous, please list them.

\_\_\_\_\_

13. Was there any subject matter you found confusing? Please describe.

\_\_\_\_\_

14. How long did it take you to complete this course?

\_\_\_\_\_

15. What additional continuing dental education topics would you like to see?

\_\_\_\_\_

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| 11. (A) (B) (C) (D) | 26. (A) (B) (C) (D) |
| 12. (A) (B) (C) (D) | 27. (A) (B) (C) (D) |
| 13. (A) (B) (C) (D) | 28. (A) (B) (C) (D) |
| 14. (A) (B) (C) (D) | 29. (A) (B) (C) (D) |
| 15. (A) (B) (C) (D) | 30. (A) (B) (C) (D) |

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