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(References updated August 2011)

Occupational Exposure Incidents Involving Bloodborne Pathogens

What are bloodborne pathogens?

Bloodborne pathogens are disease-producing microorganisms spread by contact with blood or other body fluids contaminated with blood from an infected person. Examples include hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV).



What constitutes an occupational exposure incident in dentistry?



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

When determining the need for postexposure evaluation and follow-up in occupational settings, what body fluids are considered potentially infectious?

When evaluating occupational exposures to fluids that might contain HBV, HCV, or HIV, blood and all body fluids containing visible blood are considered infectious. During dental procedures, saliva is predictably contaminated with blood. Even when blood is not visible, it can still be present in limited quantities and therefore is considered a potentially infectious material by OSHA. It is likely that only very small quantities of blood are present and the risk for transmission of HBV, HCV, and HIV is extremely small. Despite this small risk of transmission, a qualified health-care professional* should evaluate any occupational exposure incident to saliva in dental settings, regardless of the presence of visible blood.

What is the risk of infection after an occupational exposure?

Hepatitis B Virus (HBV)

Health-care workers who have received the hepatitis B vaccine and have developed immunity to the virus are at virtually no risk for infection. For a susceptible 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 than those who are HBeAg negative. While there is a risk for HBV infection from exposures of mucous membranes or nonintact skin, there is no known risk for HBV infection from exposure to intact skin.

Hepatitis C Virus (HCV)

Based on limited studies, the risk for infection after a needlestick or cut exposure to HCV-infected blood is approximately 1.8%. The risk following a blood exposure to the eye, nose or mouth is unknown, but is believed to be very small; however, HCV infection from a blood splash to the eye has been reported. There also has been a report of HCV transmission that may have resulted from exposure to nonintact skin, but no known risk from exposure to intact skin.



Human Immunodeficiency Virus (HIV)

- The average risk of HIV infection after a needlestick or cut exposure to HIV-infected blood is 0.3% (i.e., three-tenths of one percent, or about 1 in 300). Stated another way, 99.7% of needlestick/cut exposures 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).



What should be done following an occupational exposure incident?

All exposure incidents should be treated as medical emergencies and tended to immediately.

- 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.
 - There is no evidence of benefit for application of antiseptics or disinfectants such as bleach or other caustic agents or squeezing ("milking") puncture sites.
- Report the injury immediately to your supervisor and complete the designated incident reporting forms.
- Follow all instructions for immediate medical evaluation and follow-up care.



What type of information will be helpful in evaluating and managing the exposure incident?

The following information will help the qualified health-care professional* evaluate and manage the occupational exposure incident:

- date and time of exposure;
- details of the procedure being performed;
- details of the exposure;
- details about the patient's bloodborne health status—whether the patient was infected with HBV and hepatitis B e antigen (HBeAg) status, HCV, or HIV; and
- details about the exposed person (e.g., hepatitis B vaccination and vaccine-response status).



How are exposures to blood handled from an unknown source or from an individual whose infection status is unknown?

If the source individual cannot be identified (e.g., an injury occurs while cleaning instruments from multiple patient appointments in the instrument processing area) or tested, the circumstances of the exposure incident should be assessed by the qualified health professional* to determine the likelihood of transmission of HBV, HCV, or HIV. Decisions regarding appropriate management should be handled on a case-by-case basis. Certain situations, as well as the type of exposure, may suggest an increased or decreased transmission risk. Follow-up testing should be available to all personnel who are concerned about possible infection through occupational exposure.

Consider the following information:

- Where and under what circumstances did it occur?—Exposure to a visibly bloody device suggests a higher-risk exposure than exposure to an instrument that has been processed through a washer-disinfector.
- What is the prevalence of HBV, HCV, or HIV in the population?—An exposure that occurs in a geographic area where injectable-drug use is prevalent or on an AIDS unit would be considered epidemiologically to have a higher risk for transmission than one that occurs in a facility where no known HIV-infected patients are present.



Testing of needles and other sharp instruments implicated in an exposure, regardless of whether the source is known or unknown, is not recommended. The reliability and interpretation of findings in such circumstances are unknown and testing might be hazardous to individuals handling the contaminated sharp instrument.

What are some measures to reduce the risk of blood contact?

Avoiding occupational blood exposures is the primary way to prevent transmission of HBV, HCV, and HIV in health-care settings. Methods used to reduce occupational blood exposures in dental settings include the following:

Engineering controls remove or isolate a hazard in the workplace and are frequently technology based. In the context of sharps injury prevention, engineering controls include sharps disposal containers and needles and other sharps devices with an integrated engineered sharps injury prevention feature such as self-sheathing anesthetic needles, retractable scalpels, and needleless IV ports. The emphasis on engineering controls has led to the development of many types of devices with engineered sharps injury prevention features. Whenever possible, engineering controls should be used as the primary method to reduce exposures to bloodborne pathogens with sharp instruments and needles.



Typical Safety Scalpel

Work practice controls are behavior-based and are intended to reduce the risk of blood exposure by changing the manner in which a task is performed. Examples include: -

- Using a one-handed scoop technique, a mechanical device designed for holding the needle cap to facilitate one-handed recapping, or an engineered sharps injury protection device (e.g., needles with re-sheathing mechanisms) for recapping needles between uses and before disposal;
- Not bending or breaking needles before disposal;
- Avoiding passing a syringe with an unsheathed needle;
- Removing burs before disassembling the handpiece from the dental unit;
- Using instruments, rather than fingers, to grasp needles, retract tissue, and load/unload needles and scalpels;
- Placing used disposable syringes and needles, scalpel blades, and other sharp items in appropriate puncture-resistant containers located as close as feasible to where the items were used; and
- Giving verbal announcements when passing sharps.



Personal protective equipment consists of specialized clothing or equipment worn to protect against hazards. Examples include gloves, masks, protective eyewear with side shields, and gowns to prevent skin and mucous membrane exposures.



Where can I find additional information on dental safety devices?

Additional information for developing a safety program and for identifying and evaluating safer dental devices can be found at the following Web sites:

Information about Safety Devices

- List of Devices Designed to Prevent Percutaneous Injury and Exposures to Bloodborne Pathogens in the Health-Care Setting (Developed by the University of Virginia's International Health Care Worker Safety Center). www.healthsystem.virginia.edu/internet/epinet/
- Needlestick-Prevention Device Selection Guide (Sponsored by ECRI, an independent nonprofit health services research agency). www.ecri.org/

Screening and Device Evaluation Forms

- Centers for Disease Control and Prevention: Sample Screening and Device Evaluation Forms www.cdc.gov/OralHealth/infectioncontrol/forms.htm
- Training for Development of Innovative Control Technologies (TDICT) Project, University of California - San Francisco: Safety Feature Evaluation Forms - Design Criteria for Evaluation of Several Medical Devices www.tdict.org



*A qualified health-care professional is any health-care provider who can provide counseling and perform all medical evaluations and procedures in accordance with the most current recommendations of the USPHS, including postexposure chemotherapeutic prophylaxis when indicated. In addition, the healthcare provider should be familiar with the unique nature of dental injuries so they can provide appropriate guidance on the need for postexposure prophylaxis.

Selected References and Additional Resources

CDC. Exposure to Blood What HealthCare Personnel Need to Know. Available at: [www.cdc.gov/ncidod/dhqp/pdf/bbp/Exp to Blood.pdf](http://www.cdc.gov/ncidod/dhqp/pdf/bbp/Exp%20to%20Blood.pdf). Accessed August 2011.

CDC. Sharps Safety: Be Sharp. Be Safe. Available at www.cdc.gov/sharpssafety. Accessed August 2011.

CDC. Guidelines for prevention of transmission of human immunodeficiency virus and hepatitis B virus to health-care and public-safety workers. MMWR 1989;38(S-6):1-36.

CDC. Update: universal precautions for prevention of transmission of human immunodeficiency virus, hepatitis B virus, and other bloodborne pathogens in health-care settings. MMWR 1988;37:377-382, 387-388.

CDC. Updated U.S. Public Health Service guidelines for the management of occupational exposures to HBV, HCV, and HIV and recommendations for postexposure prophylaxis. MMWR 2001;50(No.RR-11).

CDC. Updated U.S. Public Health Service guidelines for the management of occupational exposures to HIV and recommendations for postexposure prophylaxis. MMWR 2005;54(No. RR-9):1-17.



RECOMMENDATIONS FOR MANAGING OCCUPATIONAL BLOOD EXPOSURES

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|--|---|--|--|--|--|------------------------------|---------------------------------|-------------------------|-----------------------|--|----------------------------------|------------------------|------------------------------|-----------------------|---------------------------|--|
| <p>Establish written protocols for management of occupational exposures:</p> <ul style="list-style-type: none"> ✓ Based on current PHS/CDC Guidelines ✓ Review periodically ✓ Provide training to personnel <ul style="list-style-type: none"> - prevention & response to occupational exposures ✓ Identify a qualified health-care professional who <ul style="list-style-type: none"> - is familiar with current PHS postexposure management recommendations, antiretroviral therapy, bloodborne disease transmission, and the OSHA BBP standard - will ensure prompt evaluation, treatment, management, and follow-up - will provide necessary counseling <p>Provide immediate care to the exposure site:</p> <ul style="list-style-type: none"> ✓ Wash wounds and skin with soap and water ✓ Flush mucous membranes with water ✓ No evidence exists that using antiseptics for wound care or expressing fluid by squeezing the wound further reduces the risk of BBP transmission <p>Immediately report the exposure to the infection control coordinator who should:</p> <ul style="list-style-type: none"> ✓ Initiate referral to a qualified health-care professional ✓ Complete necessary reports <p>Include the following information in the postexposure report:</p> <ul style="list-style-type: none"> ✓ Date and time of exposure ✓ Details of the procedure being performed <ul style="list-style-type: none"> - where and how the exposure occurred - type of device involved <ul style="list-style-type: none"> -- how and when during its handling the exposure occurred Details of the exposure <ul style="list-style-type: none"> - type and amount of fluid or material - severity of the exposure ✓ Details about the exposure source (e.g., HBV, HCV, HIV status) ✓ Details about the exposed individual (e.g., hepatitis B vaccination and vaccine-response status) ✓ Details about counseling, postexposure management, and follow-up. | <p>Evaluate the exposure</p> <p><u>Determine risk associated with exposure</u></p> <table border="1"> <tr> <td data-bbox="722 164 989 526"> <ul style="list-style-type: none"> ✓ Exposures posing risk of infection transmission <ul style="list-style-type: none"> - Percutaneous injury - Mucous membrane exposure - Non-intact skin exposure - Bites resulting in blood exposure to either person involved </td> <td data-bbox="995 164 1283 526"> <ul style="list-style-type: none"> ✓ Substances posing risk of infection transmission <ul style="list-style-type: none"> - Blood - Fluids containing visible blood - Potentially infectious fluids (semen; 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The 2005 CDC Guidelines only update the FIN Recommendations and do not pertain to HBV and HCV. For HBV & HCV the 2001 guidelines should still be referenced. Both the 2001 and 2005 CDC guidelines are available by visiting www.cdc.gov/niosh/topics/bbp/guidelines.html</p> <p><u>Perform follow-up testing and provide counseling</u></p> <p>HBV exposures</p> <ul style="list-style-type: none"> - Test for anti-HBs 1-2 months after last dose of vaccine if only vaccine given - Follow-up not indicated if exposed person immune to HBV or received HBIG PEP <p>HCV exposures</p> <ul style="list-style-type: none"> - Perform testing for anti-HCV and ALT 4-6 months after exposure - Perform HCV RNA testing at 4-6 weeks if earlier diagnosis of HCV infection desired - Confirm repeatedly reactive anti-HCV EIAs with supplemental tests <p>HIV exposures</p> <ul style="list-style-type: none"> - Evaluate exposed persons taking PEP within 72 hours after exposure and monitor for drug toxicity for at least 2 weeks - Perform HIV-antibody testing for at least 6 months postexposure (e.g., at baseline, 6 weeks, 3 months, and 6 months) - Perform HIV antibody testing for illness compatible with an acute retroviral syndrome - Advise exposed persons to use precautions to prevent secondary transmission during the follow-up <u>period</u> |
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An exposure can be defined as a percutaneous injury (e.g., needlestick or cut with a sharp object) or contact of mucous membrane or non-intact skin (e.g., exposed skin that is chapped, abraded, or afflicted 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 HBV, HCV, or HIV infection, and therefore should be evaluated immediately following treatment of the exposure site by a qualified health-care professional.

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Source: Col Jennifer Harte/ USAF Dental Evaluation & Consultation Service (<http://www.airforcemedicine.af.mil/DECS>)