**Bloodborne Pathogens Annual Training Module**

**BLOODBORNE PATHOGENS** are an occupational hazard for employees who may be exposed to blood and other potentially infectious materials that may result from the performance of an employee's duties.

*Information in this unit was provided by UNCH Hospital Epidemiology, was adapted for use at UNC-CH, and was amended for use by USC. **Note:** This self-study unit is intended for university employees. Employees should also refer to their specific department's Exposure Control Plan and other policies and procedures.

**INTRODUCTION**

On December 6, 1991, the Occupational Safety and Health Administration (OSHA) published their standard for occupational exposure to bloodborne pathogens in the Federal Register. A component of this standard requires the employer to provide annual education regarding the occupational hazard of bloodborne pathogens. There are 13 required components of this education all of which are incorporated in this study module. It is important to remember that OSHA standards are federal law and compliance is mandatory. However, it is more important to recognize that this standard was established to help protect the healthcare worker from the serious workplace hazard of bloodborne pathogens.

**EXAMPLES OF BLOODBORNE PATHOGENS**

- Hepatitis B (HBV)
- Hepatitis C (HCV)
- Other NON A, NON B Hepatitis
- Human Immunodeficiency Virus (HIV)
- Malaria
- Other Potentially Infectious Materials

Other body fluids besides blood have demonstrated a viral load sufficient to potentially transmit infection. These fluids are:

- Cerebrospinal fluid
- Synovial fluid
- Pleural fluid
- Amniotic fluid
- Pericardial fluid
- Peritoneal fluid
- Semen
- Vaginal secretions
- Any body fluid contaminated with blood or saliva in dental procedures
- Body fluids in emergency situations that cannot be recognized

Also considered potentially infectious are unixed tissue or body organs other than intact skin, and blood, organs, and tissues from experimental animals infected with HIV or HBV. Saliva not contaminated with blood may also pose some risk for certain infections i.e.; Hepatitis B even though the risk is likely quite low.
TRANSMISSION

HIV, hepatitis B virus, and hepatitis C virus are the viruses most likely to be transmitted via the following routes in an occupational setting:

- needle stick / sharps injuries
- skin or eye contact
- mucous membrane and non-intact skin exposure to contaminated
- blood or other potentially infectious materials (scratches, cuts, bites, or wounds)

HUMAN IMMUNODEFICIENCY VIRUS (HIV)

AIDS is the acquired immunodeficiency syndrome, a serious illness that harms the body's ability to fight infection, and is caused by the HIV virus.

During the incubation period, which may last for many years, there may be no signs that a person is infected with HIV; however, the person can still pass the virus on to others.

*The cumulative prevalence of HIV in the U.S. is estimated to be 1 million

*100% progress to chronic infection

*The risk of HIV infection after a single positive needle stick is .3% (CDC, 1996)

There is no known cure or vaccine available at this time; however, research is focused on developing treatments and a vaccine, and improved medical therapies have substantially increased survival among those infected.

CLINICAL MANIFESTATIONS OF HIV INFECTION

The spectrum of HIV infection ranges from an asymptomatic state to severe immunodeficiency and associated opportunistic infections, neoplasms, and other conditions. Initial infection can be followed by an acute flu-like illness.

As the disease progresses, severe and lasting symptoms may include: recurrent fevers, rapid weight loss, anorexia, diarrhea, lymphadenopathy, night sweats, myalgia, arthralgia, rash, malaise, sore throat, white spots or unusual blemishes in the mouth, and headache. The natural history of HIV infection can vary considerably from person to person. The risk of disease progression increases with the duration of infection. HIV may attack the nervous system causing damage to the brain and spinal cord.

Most people infected with HIV ultimately develop AIDS and normally mild or rare diseases may turn into potentially fatal conditions such as pneumocystis carinii pneumonia. This lung infection is highly uncommon among healthy individuals.

HEPATITIS B VIRUS

Acute viral hepatitis is a common and sometimes serious viral infection of the liver leading to inflammation and necrosis. There are at least five distinct viral agents that cause acute viral hepatitis: HAV, HBV, HDV (delta), HCV, and HEV (an enterally transmitted non A, non B hepatitis agent).

Hepatitis B is probably the best-known of the viral hepatitides.

*The cumulative prevalence of HBV is estimated to be 1 million, as is HIV.
5% progress to chronic infection.

The risk of HBV infection after a single positive needle stick is 30% (CDC, 1996)

Hepatitis B is far more common than HIV and is present in very high concentrations in the blood of infected persons. Anyone with HBV can spread the disease to others:

- before signs of illness appear
- for an unknown time after signs of illness appear
- even if he or she never has signs of infection

There are 2 phases of HBV:

1) The Acute Phase - occurs just after a person becomes infected and can last from a few weeks to several months. Some individuals recover after the acute phase, but others remain infected for the rest of their lives. Of those who become infected, only about 1/3 become symptomatic. Many people who are infected never have any signs of the disease and most people recover completely from Hepatitis B.

2) The Chronic Phase - Those who remain infected and become chronic carriers. The virus remains in their liver and blood. Nearly 10% of adult victims become carriers.

CLINICAL MANIFESTATIONS

The clinical presentation of acute HBV ranges from asymptomatic, subclinical illness to fulminant hepatic failure. The disease has a long incubation period from 30 to 180 days. Initial symptoms are nonspecific, typically include malaise, anorexia, vomiting, fever, rash, and polyarthritis. These symptoms last 3-10 days. This is followed by the onset of jaundice and/or dark urine.

Fulminant viral hepatitis is defined as the development of severe acute liver failure with hepatic encephalopathy within 8 weeks of the onset of symptoms with jaundice.

HEPATITIS B VACCINE

Recombinant vaccines that consist of highly purified HBsAg particles expressed in yeast were licensed in the U.S. in 1986. Given as a series of three injections, the vaccine produces a high antibody titer in over 90% of recipients under the age of 40-50 years. Older age, obesity, heavy smoking, and immunologic impairments have been associated with lower anti HBs responses. The higher the antibody titer after vaccination, the longer anti HBs persists. When the anti HBs titer falls below 10 MIU/ml, HBV infections may occur but are always subclinical and usually without detectable serum HBsAg. There is no need for a booster dose of vaccine in those with documented positive HBs titers, even if the titer wanes.

All USC School of Medicine employees who have reasonably anticipated exposure to blood or other potentially infectious materials will be offered the hepatitis B vaccine free of charge through Student/Employee Health. OSHA considers the hepatitis B vaccine so important that employees will be required to sign a declination statement if they choose to not receive the vaccine. Those declining the vaccine may receive it at any later time as long as they remain an employee of the USC School of Medicine.

HEPATITIS C VIRUS

Hepatitis C is another common cause of viral hepatitis. Before the early 1990s it was referred to as non A, non B hepatitis.

Cumulative prevalence is estimated to be 4 million
*85% progress to chronic infection

*Risk of HCV infection after single positive needle stick is 3-10% (CDC, 1996)

*HCV accounts for more liver transplants in the U.S. than any other condition.

The incubation period ranges from 2-6 months, most commonly 2-3 months. The period of communicability ranges from one or more weeks before onset of symptoms to months / years. 85% persist indefinitely and are chronic carriers. There is no pre or post-exposure prophylaxis or vaccine available at the time. There is no effective immune globulin preparation. Treatment is not without side effects, but can reduce the likelihood of chronic disease if within the first few months after documented infection. The physical and emotional health impact, long term consequences, and economic burden of hepatitis C are very significant.

**CLINICAL MANIFESTATIONS of HCV**

Approximately 1 in 5 persons have no symptoms with acute HCV infection. Early signs of HCV are often nonspecific, ie: Fatigue, fever, headaches, nausea, vomiting, loss of appetite, abdominal pain, jaundice, dark-colored urine, clay-colored stools, abnormal liver function tests, and positive HCV serologies.

HCV can cause: inflammation of liver cells, cirrhosis, hepatocellular carcinoma, immunologic abnormalities, and other complications. Alcohol clearly worsens the course of HCV.

**METHODS TO PREVENT THE TRANSMISSION OF BLOODBORNE PATHOGENS:**

1) **Administrative Controls:** Exposure Control Plan

The USC School of Medicines Exposure Control Plan for Bloodborne Pathogens is available to all employees. To receive a copy please call the Employee/Student Health office at 803-434-2479. This document contains a complete listing of all job categories that have been identified as having the risk of occupational exposure to bloodborne pathogens. Also the plan outlines management of employee exposures and methods to prevent exposure in the workplace. Directly behind the Exposure Control Plan is a copy of the OSHA standard. Every employee should be familiar with the Exposure Control Plan and the OSHA standard for bloodborne pathogens.

2) **Standard Precautions**

Standard Precautions (formerly referred to as Universal Precautions) are essential to reducing the occupational acquisition of a bloodborne pathogen. Standard Precautions mean that we treat every patient as if they are infected with a bloodborne pathogen such as HIV, HBV, or HCV. Standard Precautions also require that exposed employees use personal protective equipment to prevent direct contact with blood or body fluids. The consistent practice of Standard Precautions is the best method that employees can use to protect themselves from occupationally acquiring a bloodborne disease.

3) **Engineering Controls**

An engineering control is a device that removes the hazard from the workplace. Employers are required to provide engineering controls that have been demonstrated to significantly reduce an occupational hazard. Examples of engineering controls used at USC for bloodborne pathogens are sharps disposable containers, self-sheathing needles, and safer medical devices such as sharps with engineered sharps injury protection and needleless systems.

4) **Work Practice Controls**
Work practice controls are designed to change the way in which a task is performed to reduce the likelihood of exposure to bloodborne pathogens. Examples of work practice controls are: handwashing; needles are not recapped; specimens are transported in a secondary container; and sharps are disposed of immediately after use by placing them in a sharps container. Healthcare workers are responsible for carefully disposing of all sharps (e.g., syringes with needles attached, scalpels, razors) immediately after use. Handwashing is the single most important means of preventing the spread of infection.

5) Personal Protection Equipment

Personal protective equipment (PPE) is specialized clothing and equipment worn by an employee for protection against a hazard such as blood or other potentially infectious materials. PPE should be readily available and provided to the employee at no cost. Employees should never put themselves at risk of exposure to bloodborne pathogens by not using the appropriate protective equipment. PPE should be removed after use. Care should be taken not to contaminate the skin. Soiled gowns, gloves, etc. should be disposed of in the regular trash immediately at the point of use and hands thoroughly washed. Goggles and safety glasses should be cleaned regularly.

6) Follow-up After Exposure

For HIV and hepatitis B, post-exposure prophylaxis is available. For hepatitis C, there is no effective post-exposure prophylaxis, but early detection of infection followed by treatment can reduce the risk of long-term disease. Therefore, it is important for employees who experience potential bloodborne pathogen exposures despite the above precautions to receive appropriate medical care and follow-up. This can be conducted through the USC School of Medicine Employee/Student Health office, as described below.

UNIVERSAL BIOHAZARD SIGN

The universal BIOHAZARD sign is used to alert employees that containers, specimen refrigerators, or secondary containers used to transport specimens may contain infectious materials. Individual tubes of blood or primary specimen containers do not need to be labeled, however, secondary containers used for manually transporting specimens must display the BIOHAZARD sign. Additionally, equipment that may have internal contamination that cannot be accessed for decontamination should be labeled with a BIOHAZARD tag denoting the area of suspected contamination. This alerts the maintenance or medical engineering employee to use precautions when handling the equipment.

CONTAMINATED EQUIPMENT

Equipment such as blood pressure cuffs and stethoscopes must be cleaned if contaminated with blood or other potentially infectious materials. An EPA approved disinfectant detergent (i.e., Vespheine) or a 1:10 or 1:100 dilution of bleach and water should be used.

TRANSPORTING SPECIMENS

Specimens should not be hand carried; all specimens must be transported in a secondary container displaying a BIOHAZARD label. The primary specimen container and accompanying tags and/or labels must be free of any contamination.

DISPOSING OF MEDICAL WASTE

Certain items are required by South Carolina state law to be incinerated and are referred to as regulated medical waste. Regulated medical waste includes: microbiological cultures, pathology specimens, blood
products (includes blood, serum, plasma, emulsified human tissue, spinal fluid, pleural and peritoneal fluid), full sharps containers. The following table indicates the method of disposal for each type of waste.

**Disposal of Regulated Waste**

**Regulated Waste Disposal Method:**

**Blood:** incineration; sanitary sewer

**Microbiological Waste:** Incineration; steam sterilization

**Contaminated Sharps:** Incineration; steam sterilization then sanitary landfill

**Pathological Waste Incineration**

Blood contaminated waste should be placed in the orange plastic trash bags labeled with the BIOHAZARD sign. These bags are located in individual departments. Remember the biohazard bags are a plastic that can easily be punctured.

All healthcare and laboratory workers must dispose of all sharps in the designated sharps containers (NOT in biohazard bags) to prevent sharp injuries to housekeeping staff.

**Wet, Contaminated Linen**

Contaminated linen should not be sorted or handled any more than necessary for disposal. Fluid resistant linen bags are available for use when disposing of wet, contaminated linen. Linen should be double bagged when necessary to prevent leaking.

**DERMATITIS OF THE HANDS**

Working with hand dermatitis puts you at greater risk of infection from bloodborne pathogens. All employees who develop dermatitis should be evaluated and treated prior to work involving exposure to blood.

**EXPOSURE INCIDENTS**

The following events are considered an exposure incident: percutaneous (stick) injury involving a potentially contaminated needle or other sharps, splash of blood or other potentially infectious materials to the eyes, mouth, or mucous membranes blood or other potentially infectious materials contacting broken skin.

**STEPS TO TAKE IN THE EVENT OF AN EXPOSURE**

Do not delay treatment for any reason. If possible, immediately wash or flush the exposed area with soap and / or water.

During normal working hours: Monday - Friday, 8:30 am – 4:30 pm, please immediately contact the School of Medicine Employee/Student Health office at the Richland Family Medicine Center located on campus of Palmetto Richland Memorial Hospital. The phone number is 803-434-2479. It is wise to call prior to arriving at the office, to ensure that your care will be coordinated as seamlessly as possible. If there is no answer at the number above, contact Dr. Mann at 434-4575 or page him at 654-3143.
After normal working hours (between 4:30 pm and 8:30 am the following work day), and on weekends and holidays, please report to the Emergency Department at Palmetto Richland Memorial Hospital. If you are working at the Dorn VA Medical Center, you should contact the VA Employee Health office or the Medical Officer of the Day for immediate attention. For employees or students working in satellite clinics and hospitals that are located out of town: Report to the nearest hospital's Emergency Department. Prior to reporting for care, be sure to record the 'source patient’s’ name, record number and date of birth. Contact the physician in charge of caring for the patient so that physician can order stat HIV antibody testing, hepatitis B surface antigen, and hepatitis C antibody on the source patient.

Be sure to inform the personnel caring for you that the injury is an exposure to bloodborne pathogens and / or a needle stick. Finally, if you do receive initial care at PRMH or at the Dorn VAMC, please be certain to inform the USC School of Medicine Employee/Student Health office by the next working day in order to ensure that all administrative paper work is done correctly, to avoid problems with the Workers’ Compensation billing.

Please complete the attached quiz and sign it, indicating that you have read this training module, and bring it with you for your annual Employee Health visit, when you will have an opportunity to ask questions. In the meantime, if you have any questions, call Dr. Joshua Mann at 434-4575.

**Important Contact Information**

VA: Employee Health Clinic (extension 6387 or 6530, room 5B122). After hours, go to ED or page MOD through operator. Notify USC Student/Employee Health as soon as possible as well.

USC: Contact Donna Wall, LPN Employee Health Nurse (434-2479; pager 303-0035) or Dr. Joshua Mann (434-4575; pager 654-3143). After hours, go to PRMH ER. Follow-up with USC School of Medicine Employee Health if you do not want to receive a bill for ER services.

Greenville Memorial Hospital: Contact the GMH Exposure Control Nurse at extension 5-4209. Then follow voice mail instructions.
BBP Quiz – 70% Correct Required

Circle the one best answer for each question.

1. Which of the following pose(s) a risk for transmission of blood-borne pathogens?
   a. Cerebrospinal fluid
   b. Blood
   c. Semen
   d. Amniotic fluid
   e. All of the above

2. Which of the following is not considered an exposure incident conveying risk of infection with hepatitis B, hepatitis C and HIV?
   a. Needlestick with contaminated needle
   b. Splash of blood into the eye
   c. Splash of blood or other potentially infectious material on intact skin
   d. Splash of cerebro-spinal fluid into the mouth
   e. Splash of blood or other potentially infectious material on broken skin

3. The risk of acquiring hepatitis B infection from a needlestick, where the source patient is infected with hepatitis B (assuming the health care worker is not immune) is:
   a. Approximately 1%
   b. Approximately 10%
   c. Approximately 30%
   d. Approximately 50%
   e. Approximately 70%

4. If an employee who is not ill, but is infected with hepatitis B, hepatitis C, or HIV may he/she transmit the virus to others?
   a. True
   b. False

5. Gauze or other materials soaked with blood may be disposed of in the regular trash bag
   a. True
   b. False

6. Definition of “Standard Precautions”?
   a. Never shake hands with someone who might have HIV, HBV, or HCV
   b. Use appropriate barrier precautions when in contact with blood or other potentially infectious materials
   c. Use appropriate barrier precautions only when in contact with blood or other potentially infectious materials of a patient known to be HIV+, HBV+, or HCV+

7. What should you do immediately if you are stuck with a potentially contaminated needle in a USC or Palmetto Richland facility?
   a. Wash the area with soap and water, inform your supervisor about the incident, contact Employee/Student Health: telephone # 434-2479 or page 303-0035. After hours, report to Palmetto Richland Memorial Hospital Emergency Department.
   b. Wash the area with soap and water, report the incident to your supervisor and call your personal physician.
   c. Do nothing since bloodborne pathogens are not transmitted by needlestick injuries.

8. An example of a work practice control that is used by healthcare or laboratory workers is:
   a. Handwashing
   b. Never recapping a used needle
   c. Both of the above

9. An example of an engineering control that is used to protect employees is:
   a. Protective needle devices
   b. Sharps boxes
   c. Both of the above

10. What sign is used to designate containers, refrigerators, or areas that may contain blood or other potentially infectious materials:
     a. Strict isolation
     b. Contact precautions
     c. Obtain and read the MSDS
     d. Universal biohazard sign

I certify that I have completed Blood-Borne Pathogen Training

Print Name: ____________________________________________ Dept./Class ____________

Signature: ____________________________________________ Date: ______________