Infection Control and Bloodborne Pathogens Training

Preventing Disease Transmission and Infection Control
Which one of the following statements concerning Hepatitis B is FALSE?

a) Needle sticks and sharps incidents account for the majority of occupational Hep B. exposures.
b) There is a safe and >95% effective vaccine for Hepatitis B.
c) Hepatitis B is very fragile and cannot survive in dried blood.
d) 5% – 10% of infected adults will develop a chronic infection.
Quiz

Which one of the following statements concerning Hepatitis B is FALSE?

a) Needle sticks and sharps incidents account for the majority of occupational Hep B exposures.

b) There is a safe and >95% effective vaccine for Hepatitis B.

c) Hepatitis B is very fragile and cannot survive in dried blood.

d) 5% – 10% of infected adults will develop a chronic infection.

The Hepatitis B virus is very durable, and it can survive in dried blood for up to seven days.

c) Hepatitis B is very fragile and cannot survive in dried blood.
Bloodborne pathogens are disease-causing microorganisms that are present in:

a) Human blood and body fluids that may contain blood
b) Sweat, tears and saliva
c) River water and certain kinds of soil
d) None of the above
Bloodborne pathogens are disease-causing microorganisms that are present in:

a) Human blood and body fluids that may contain blood
Transmission of bloodborne pathogens in the field may occur due to:

a) Accidental puncture - a sharp, contaminated object punctures your skin
b) Broken skin - infected blood or body fluids come into contact with your already broken or damaged skin
c) Body openings - infected material comes into contact with your eyes, nose or mouth
d) All of the above
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d) All of the above
The hepatitis B vaccine is 95% effective in preventing infection from the hepatitis B virus.

a) True
b) False
The hepatitis B vaccine is 95% effective in preventing infection from the hepatitis B virus.

a) True
What actions can you take at work to help keep yourself safe from bloodborne pathogens?

a) Use mechanical means to handle contaminated materials, sharps and piercing objects
b) Use appropriate personal protective equipment (PPE)
c) Follow universal precautions any time you might be exposed to a bloodborne pathogen
d) All of the above
What actions can you take at work to help keep yourself safe from bloodborne pathogens?

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Introduction

- Approximately 5.6 million workers in healthcare and emergency response are at risk of exposure to bloodborne pathogens such as Human Immunodeficiency Virus, the Hepatitis B virus (HBV), and the Hepatitis C virus (HCV)

- OSHA’s Bloodborne Pathogens standard prescribes safeguards to protect workers against the health hazards from exposure to blood and other potentially infectious materials, and to reduce their risk from this exposure
Objectives

• At the end of this session, the student will be able to:
  – Describe what laws and safety regulations cover Bloodborne Pathogens
  – List and describe the diseases that cause the greatest concerns for providers
  – Describe how to prevent disease transmission
  – Describe the necessary steps the provider must complete when an exposure occurs
  – Describe the Exposure Control Plans
Topics

- Laws and Safety Regulations
- Exposure Control Plans
- How Exposures Occur
- Diseases that Cause Concern
- Preventing Disease Transmission
- If an Exposure Occurs…
Laws and Safety Regulations

- OSHA, the Occupational Safety & Health Administration, issued the Occupational Exposure to Bloodborne pathogens, OSHA 29 CFR 1910.1030, to protect employees by reducing or removing the hazards of bloodborne pathogens from the workplace.
  - The regulation applies to employers whose employees, as a result of job requirements, have the potential for exposure to bloodborne pathogens.
Exposure Control Plans

- Preventing disease transmission begins with preparation and planning.
- The Exposure Control Plan creates a system to protect people from infection.
- The Plan requires the employer to identify who will receive training, protective equipment and vaccination.
- Found at http://epaosc.org/hsmanualregion4
Infectious Materials

- Human blood and blood components
- Body cavity fluids
  - Spinal, synovial (joint), pleural (chest), pericardial, amniotic, peritoneal (abdominal) fluids
- Semen and vaginal secretions
- Saliva in dental procedures
  - There is usually some amount of blood present even in routine dental cleanings.
- Any fluid that is visibly contaminated with blood.
- Urine, feces, vomit, sweat, saliva and tears are not considered infectious for bloodborne pathogens unless visible blood is present. There could be other diseases present, though, so universal precautions should still be followed with any body fluid.
How Exposures Occur

- Most common: needle sticks
- Cuts from other contaminated sharps (scalpels, broken glass, etc.)
- Contact of mucous membranes (for example, the eye, nose, mouth) or broken (cut or abraded) skin with contaminated materials
How Exposures Occur

• Disease transmission is a two-way street. It is just as easy for you to infect a person with whom you come in contact as it is for that person to infect you.

• A pathogen is a disease-producing organism that enters the body; basically, a germ.

• The immune system relies heavily on the skin to keep the amount of pathogens that enter the body to a minimum.
How Infections Occur

Susceptible Host

Infectious Agent

Reservoir

Means of Entry

Means of Exit

Mode of Transmission

Chain of Infection
How Infections Occur

- Routes of Transmission:
  - Direct contact
  - Indirect contact
  - Airborne transmission
  - Vector-borne transmission
How Infections Occur

• Direct Contact
  – Touching the body fluids from an infected person

• Indirect Contact
  – Touching objects that have been in contact with the body fluid of an infected person

• Airborne
  – Breathing in droplets that became airborne when an infected person coughs or sneezes

• Vector-borne
  – Through a bite from an infected animal or insect
How Infections Occur

• Most infectious diseases are caused by one of five types of pathogens. The most common are viruses and bacteria.
  – Viruses
  – Bacteria
  – Fungi
  – Protozoa
  – Parasites
How Infections Occur

– Viruses
  • Hepatitis, Chicken Pox, HIV, Flu, etc.
– Bacteria
  • Meningitis, Tuberculosis, MRSA
– Fungi
  • Athlete’s foot, ringworm
– Protozoa
  • Malaria, dysentery
– Parasites
  • Abdominal pain, anemia, etc.
How Infections Spread

- Human-to-human contact
- Animal-to-human contact
- Human contact with an infected surface
- Airborne transmission through tiny droplets of infectious agents suspended in the air
- Food or water
- Hospitals and pre-hospital medical settings
Bloodborne Pathogens?

• Bloodborne Pathogens are causative agents of disease that are carried in blood, blood products and other potentially infectious materials. They can result in severe and deadly disease in healthcare or research personnel.
How Infections Occur

• Just because pathogens have a means of getting into the body does not mean that disease will be transmitted.

• For diseases to be transmitted, all four of the following conditions must be met:
  – A pathogen is present.
  – There is sufficient quantity of the pathogen to cause disease.
  – A person is susceptible to the specific pathogen.
  – The pathogen enters the body through the correct entry site.
Diseases that Cause Concern

• What is infectious?
  – Capable of causing infection
  – Caused by a pathogen
  – Illness resulting from an invasion of a host by a disease producing organism
Diseases that Cause Concern

• You should be familiar with diseases that can have serious consequences if transmitted.

• These include -
  – Herpes - These viruses cause infections to the skin and mucus membranes.
  – Meningitis - A severe infection of the coverings of the brain and spinal cord.
  – Tuberculosis—A disease that predominantly affects the respiratory system.
  – Hepatitis - A viral infection of the liver. Different forms of hepatitis are transmitted in different ways.
  – HIV: A disease that attacks white blood cells and destroys the body’s ability to fight infections.
Diseases that Cause Concern

- Bloodborne Pathogens of Special Concern To Health Care Providers and Emergency Responders
  - HBV: Hepatitis B virus
  - HCV: Hepatitis C virus
  - Other emerging viral hepatitis
  - HIV: Human Immunodeficiency virus
Hepatitis B Virus
Diseases that Cause Concern

• Hepatitis B (HBV)
  – Infection of liver caused by HBV
  – Virus is in blood and other body fluids
  – Spread by exposure to blood and body fluids
  – Some people are at higher risk of HBV
  – In 1983 there were 17,000 new cases among healthcare workers, while in 1995 there were only 400 occupationally acquired infections. With the introduction of the HBV vaccine to healthcare workers, the period from 1983 to 1995 had a 95% decrease in new cases among healthcare workers.
Diseases that Cause Concern

Hepatitis B (HBV) Symptoms:

- Lethargy
- Loss of appetite
- Fever
- Vomiting
- Jaundice
- Dark-colored urine.
- Light colored stool

DID YOU KNOW???

It is estimated that 4.9% of all Americans have been infected with HBV
Diseases that Cause Concern

• HBV Treatment
  – NO CURE
  – Fluids
  – Rest
  – Right diet
  – Avoid alcohol & some medicines
Diseases that Cause Concern

• Hepatitis B Prevention
  – Avoid exposure
  – A VACCINE IS AVAILABLE!
Hepatitis B Vaccination

- Hepatitis B Virus (HBV) Vaccination
  - Vaccinations available to all members at risk
  - Vaccine should be provided ASAP
  - Vaccines administered through FOH
  - Can be received at any time if initially declined
  - Series of three (3) IM injections at day one, one month later, and then six (6) months from day one
  - A declination form is required if declining
Hepatitis C Virus
Diseases that Cause Concern

- Hepatitis C (HCV)
  - Infection of the liver
  - Virus is in blood and other body fluid
- HCV mainly spread by exposure to blood and blood products
- Certain people are at higher risk of getting HCV
Diseases that Cause Concern

**Hepatitis C (HCV) Symptoms:**

- Lethargy
- Loss of appetite
- Abdominal pain
- Nausea

- Vomiting
- Yellow skin & eyes (jaundice)
- Urine that is dark in color
Diseases that Cause Concern

Hepatitis C (HCV) Treatment

• NO CURE
• Treatment limited
• Rest & fluids
• Avoid alcohol & some medicines
Diseases that Cause Concern

• Hepatitis C (HCV) Prevention
  – NO effective VACCINE!
  – Taking the same precautions that protect you from Hepatitis B and HIV will help prevent transmission of HCV in the workplace.
Human Immunodeficiency Virus

HIV - seen as small spheres on the surface of white blood cells
Diseases that Cause Concern

**Human Immunodeficiency Virus (HIV)**

- AIDS is caused by the HIV virus
- Some people at higher risk than others
- HIV is in blood and other body fluids
- HIV is spread by exposure to HIV infected blood and HIV infected body fluids
Diseases that Cause Concern

• As of 2002, and according to the Centers for Disease Control and Prevention (CDC), there are over 816,000 reported cases of people with AIDS in the US, and an estimated 5 million people were infected with the Human Immunodeficiency Virus (HIV) worldwide.

• In the US, HIV-related illness was the leading cause of death among young adults between the ages of 25 and 44 years old in 1995.
Diseases that Cause Concern

- **AIDS annual rates per 100,000 population - United States, January - December 1996**

  - **14.5**
  - **30.1**
  - **13.4**
  - **26.6**
  - **3.9**
  - **12.0**
  - **6.1**
  - **25.3**
  - **14.2**
  - **50.9**
  - **4.0**
  - **MD. 44.4**
  - **D.C. 232.3**
Diseases that Cause Concern

• HIV
  – Certain symptoms & conditions may be associated with HIV/AIDS
  – Fever
  – Weight loss
  – Swollen lymph nodes
  – White patches in mouth (thrush)
  – Certain cancers
    eg. Kaposi’s sarcoma, certain lymphomas
  – Infections eg. pneumocystis pneumonia, TB, etc.
Diseases that Cause Concern

- A blood test may tell if you have HIV infection
- Antibodies are formed six to twelve (6-12) weeks after infection. The AIDS test looks for these antibodies, not the virus itself
- You can test negative for three (3) months while being infected
- HIV treatment
  - No CURE
  - A treatment protocol (Zidovudine (AZT) plus lamivudine (3TC) for 28 days) has been developed by the U.S. Public Health Service and is to be administered following a high-risk exposure to a known HIV-infected source.
  - Combination therapy with a variety of medications help people with HIV by slowing the disease process
Diseases that Cause Concern

• There is NO VACCINE!
• Avoid exposure
• Follow standard (universal precautions) such as the use of: gloves, eye protection, gowns, etc.

DID YOU KNOW???
According to previous reports from the CDC, HIV does not survive well outside the body. The number of infectious HIV particles is reduced by 90 to 99 percent within several hours. However, this natural inactivation can take up to 8 hours or longer!
Tuberculosis
Diseases that Cause Concern

• What Is Tuberculosis?
  – Mycobacterial disease
  – Caused by the infectious agent: Mycobacterium tuberculosis
  – Transmitted by infected airborne particles called droplet nuclei
Diseases that Cause Concern

• A diagnosis of TB should be suspected in any patient with the following:
  – Productive cough (>2 to 3 wks duration)
  – Fever - Chills
  – Night sweats
  – Easily fatigable
  – Loss of appetite (anorexia) - weight loss
  – Hemoptysis (bloody sputum)
Diseases that Cause Concern

- TB Infection can result from exposure to infectious droplet nuclei
- Positive PPD but, no clinically apparent signs or symptoms of TB
- Negative CXR & negative smears and cultures which means usually not infectious
- May develop into TB disease
Diseases that Cause Concern

• An exposure to TB is defined as:
  – Potential exposure to the exhaled air of an individual with suspected or confirmed TB disease
  – Exposure to high hazard procedure performed on persons with suspected or confirmed TB disease
Diseases that Cause Concern

• TB Prevention & Control - Continued
  – Face, eye and respiratory protection during exposure prone activities
  – Decontamination with E.P.A. approved hospital grade detergent disinfectant
Preventing Disease Transmission

• Precautions taken to exposure to blood or other body fluids containing visible blood are known as Universal Precautions.
  – Precautions taken to prevent exposure to any other type of body fluids or substances are known as Body Substance Isolation (BSI).

Since August 1987, the Centers for Disease Control and Prevention have defined Universal Precautions as: "Since medical history and examination cannot reliably identify all patients infected with HIV or other blood-borne pathogens, blood and body-fluid precautions should be consistently used for ALL patients."
Preventing Disease Transmission

• Immunizations are current
  – Hep A and Hep B
  – Tetanus within past 10 years
  – Flu (annual)
  – MMR, DPT, Varicella, etc.

• Use Personal Protective Equipment (PPE)
• Barrier between you and the hazard
• Be careful when handling needles and contaminated sharp objects
• Maintenance of personal health
• Wash hands
Preventing Disease Transmission

- Prophylactic Antibiotic Prescription Program
  - Prescription for CIPRO or Doxycycline issued by FOH at annual physical
  - Fill the prescription at local pharmacy or at the emergency site if directed by Branch Management
    - Pay for the prescription with your Travel Card
  - Take the medicine as directed on the prescription
  - Immediately notify your supervisor if you lose the prescription
  - Take prescription to your annual physical to have it renewed and re-issued
Preventing Disease Transmission

• Preventing disease transmission involves following basic precautions:
  – Personal hygiene: Personal habits or practices such as hand washing and proper grooming
  – Protective equipment: Protects a person from direct contact with infected material (i.e., gloves, masks, etc.)
Preventing Disease Transmission

• Hand washing is the best overall prevention:
  – Soap and water best
    • Alcohol based substances good until soap and water available
  – After removing PPE
  – After handling potentially infectious materials
  – After cleaning or decontaminating equipment
  – After using the toilet
Preventing Disease Transmission

• Hand washing needs to be performed for at least 10 to 15 seconds with 10-15ml of soap and adequate water
  – Waterless bactericidal cleanser may be used until proper hand washing facilities available
Preventing Disease Transmission

• To reduce the risk of infection:
  – Wear gloves
  – Wear Safety Glasses or Face Shields
  – Protective Clothing
  – Minimize contact with body fluids
  – Wash hands or any exposed area immediately and thoroughly after you provide care or clean a spill
Preventing Disease Transmission

• Engineering and work practice controls help eliminate or reduce the risk of exposure in the workplace.

• Engineering controls isolate or remove the hazard (i.e., containers for sharp items such as needles)

• Work practice controls reduce the likelihood of exposure by changing the way a task is carried out (i.e., washing hands before and after giving first aid)
Engineering Controls

- Isolation supplies
- Hand washing facilities
- Waterless hand cleaners
- Sharps container
- Ventilation
- Medical waste containers
- Self sheathing needles or needleless systems
Work Practices

- All infectious materials go into a red biohazard bag. No one is to remove anything from a biohazard bag.
- All sharps go into a red sharps container. No one is to remove anything from a sharps container. DO NOT RECAP NEEDLES
- Hand washing is required after the completion of all work with potential infectious materials. Hand washing is the best way to avoid infection.
- No food, drink, smoking, application of cosmetics, or handling of contact lenses is permitted in any hazardous areas.
Work Practices

- Never bend, break, or recap needles
- Avoid causing splashes and splatters of blood body fluids
- Properly handle contaminated items
- Hand washing
- **Prohibited** in work areas
  - Eating and Drinking
  - Smoking
  - Applying cosmetics or lip balm
  - Handling contact lenses
If an Exposure Occurs

- An exposure may include contact with potentially infectious blood or other body fluids through a needle stick, broken skin, or membranes of the eyes, nose, or mouth.
- If it is believed that an exposure has occurred, clean the area of contact thoroughly with soap and water, write down what happened, and notify your supervisor immediately.
- Squeeze the needle stick site and allow to bleed
- Seek care at the closest medical facility
- Attempt to secure source material
Post Exposure Evaluation

• Notify your supervisor
• FOH will provide post exposure evaluation and confidential medical evaluation
• Will/may include:
  – Several Office Visits
  – Re-vaccination/prophylaxis
Exposure Reporting Procedure
Exposure Reporting Procedure

- Complete the EPA OSHA 301 Form
- Complete the CA-1 form
- Contact Delphine Williams (2-8148) for assistance
- To expedite communicable disease testing, it is imperative to report an exposure IMMEDIATELY!
- Forms are found at http://intranet.epa.gov/ohr/benefits/workerscomp/forms.htm
Exposure Reporting Procedure

• Supervisors must
  – Complete the CA-1 form
  – Complete the CA-16 form
  – Complete the CA-17, Light Duty Request Form (if applicable)

• Contact Delphine Williams (2-8148) for assistance

• Forms are found at
  http://intranet.epa.gov/ohr/benefits/workerscomp/forms.htm
Summary

• Laws and Safety Regulations
• How Infections Occur
• Diseases that Cause Concern
• Preventing Disease Transmission
• If an Exposure Occurs
• Exposure Control Plans