Bloodborne Pathogens

Oklahoma State University
Objectives

- What is a Bloodborne Pathogen (BBP)?
- Who is at risk?
- Modes of transmission.
- What are your employer’s responsibilities?
- What is an exposure control plan?
- How do I prevent or reduce exposure or the spread of BBPs.
- Types of PPE, proper use, and disposal.
- Emergency actions following possible exposure.

This standard was designed to prevent more than 200 deaths and 9,000 Bloodborne infections every year.

Anyone who can "reasonably expect to come in contact with blood or potentially infectious materials" as part of their job is covered by the standard.
What is a BBP, and why are they important?

- Microorganisms that are carried in blood that can cause disease in humans.

- These pathogens include, but are not limited to:
  - Hepatitis B
  - Hepatitis C
  - HIV

- OSHA estimates 5.6 million workers in health care and other facilities are at risk of exposure to bloodborne pathogens.

- Bloodborne pathogens can be transmitted through blood or ‘other potentially infectious material’ (OPIM).
What are “Other Potentially Infectious Materials?"

- Cerebrospinal Fluid
- Saliva (in dental procedures)
- Blood
- Pleural Fluid
- Pericardial Fluid
- Peritoneal Fluid
- Semen and Vaginal Secretions
- Amniotic Fluid
- Synovial Fluid

Any fluid containing visible blood.
Could you contract a bloodborne pathogen doing these things?

- Administering First-Aid?
- Cleaning the restroom?
- Using a tool covered with dried blood?
- Cleaning up after an accident?
- Cutting yourself with something that is contaminated with blood?
Who is at risk? Could you be exposed at work?

- First responders
- Laboratory personnel
- Housekeeping & facilities personnel
- Nurses & other healthcare personnel
Modes of Transmission

**Direct**

Physical contact between an infected person and a susceptible person.

- Touching an infected individual
- Kissing
- Sexual contact
- Contact with oral secretions
- Contact with body lesions.

**Indirect**

- Person is infected from contact with a contaminated surface.
- Some organisms are capable of surviving on surfaces for an extended period of time.
- To reduce chance of transmission by indirect contact, regularly clean surfaces that are touched a lot.
Hepatitis B (HBV)

• An infection of the liver that can cause scarring, liver failure, and cancer.

• Usually an acute infection, but 5% to 10% of adults and children older than 5 who have Hep B end up with a chronic infection. There is a vaccination available!

• As many as 1.4 million people in the U.S. are carriers.

• Infection rates have dropped from 200,000 in the ‘80s to 20,000 in 2016.

• HBV can survive for at least one week in dried blood.

• Symptoms, such as jaundice, fever, fatigue, abdominal pain, nausea, and vomiting and can occur 1.5 to 6 months post-exposure.
Hepatitis C (HCV)

- HCV is a contagious liver disease that affects about 2.4 million adults in the U.S.

- Can range from mild illness lasting a few weeks to a serious, lifelong illness. About 75% to 85% of people infected with Hep C develop a chronic infection.

- Symptoms include: fever, fatigue, abdominal pain, nausea, vomiting, and jaundice.

- The average time from exposure to symptoms showing is 2 to 12 weeks. However, most people do not develop symptoms.

- No vaccination available.
Human Immunodeficiency Virus (HIV)

- HIV is the virus that leads to acquired immunodeficiency syndrome (AIDS).
- Almost 40,000 people diagnosed in the U.S. in 2017 and 1.1M total living with HIV.
- Depletes the immune system by destroying blood cells that help the body fight diseases.
- Does not survive well outside the body.
- Symptoms are flu-like and include fever, chills, or rash. They may develop 2 to 4 weeks post-exposure and may last for a few days to several weeks.
What is the risk of infection following an occupational exposure?

- **HBV**
  - ✓ Personnel who have received hepatitis B vaccine and developed immunity to the virus are at virtually no risk for infection.
  - ✓ For a susceptible person, the risk from an exposure ranges from 6 – 30%.

- **HCV**
  - ✓ The average risk for infection after exposure is approximately 1.8%.

- **HIV**
  - ✓ The average risk of HIV after exposure is 0.3%.
No! Here are some other infectious agents that fall under the standard:

<table>
<thead>
<tr>
<th>Plasmodium species</th>
<th>Spirillum minus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treponema species</td>
<td>Colorado Tick Fever Viruses</td>
</tr>
<tr>
<td>Babesia species</td>
<td>Borrelia species</td>
</tr>
<tr>
<td>Brucella species</td>
<td>Creutzfeldt-Jakob agent</td>
</tr>
<tr>
<td>Leptospira species</td>
<td>Human T-lymphotropic Virus Type I</td>
</tr>
<tr>
<td>Francisella species</td>
<td>Hemorrhagic Fever Viruses</td>
</tr>
<tr>
<td>Streptobacillus moniliformis</td>
<td>Mycobacterium tuberculosis</td>
</tr>
<tr>
<td>Rabies Virus</td>
<td>Cutaneous Anthrax</td>
</tr>
<tr>
<td>Vaccinia</td>
<td>Epstein-Barr Virus</td>
</tr>
<tr>
<td>Human Papillomavirus</td>
<td>Simian Vacuolating Virus 40</td>
</tr>
</tbody>
</table>
Cutaneous Anthrax

• Happens when anthrax spores get into the skin.

• Most often from handling infected animals or contaminated animal products like hides and hair.

• Infection develops from 1 to 7 days after exposure.

• Without treatment, up to 20% of people with cutaneous anthrax may die.
Rabies

- All species of animals are susceptible.
- Transmitted through:
  - Bites
  - Infected blood or saliva gets into an open cut/wound
  - Contamination of mucous membranes
  - Aerosolization
- Incubation period of weeks to months and is fatal once symptoms occur.
- Symptoms include:
  - Weakness
  - Fever
  - Headache
Why does 29 CFR 1910.1030 apply to finite and continuous human cell lines?

- The CDC’s Biosafety in Microbiological and Biomedical Laboratories recommends that all work with NHP and human cells follows the Bloodborne Pathogen Standard.

- There is extensive testing required to ensure that cell lines are free of all bloodborne pathogens – Not just Viral Hepatitis and HIV (EBV, HTLV, HPV, CMV . . . ).

- Establishment of an Exposure Control Plan is much easier than maintaining documentation of testing for OSHA.

- Safety is our number one priority.
Employer Responsibilities

• OSHA’s Bloodborne Pathogen Standard states that anyone whose job requires exposure to BBP is required to complete BBP training.
  – Initial training is conducted face to face; not online
  – Training is required annually

• Anyone whose job requires exposure to BBP is offered vaccines and post exposure evaluation following any possible exposure incidents at no cost to the employee.

• Employer must offer personal protective equipment (PPE) and a written exposure control plan.
Exposure Control Plan

- Plan should be updated annually to implement any changes.
- Should be available within your department.
  - EHS can provide current template.
- Address the implementation of *Universal Precautions* and the identification and use of engineering controls.
- Provisions for PPE and training.
- Hep B vaccinations available for all employees with occupational exposure.
- Post exposure evaluation and follow-up for any occupational exposure.
- Use of signs and labels to communicate hazards.
- Record keeping.
Suggested binder set up:
- OSHA Bloodborne Pathogen standard 1910.1030
- Exposure Control Plan with all appendixes
- List of all employees under plan
- Copies of completed/signed Hep B vaccination forms
- Training documentation
- Self inspection documentation
- Completed parameter sheet

EHS can assist with program set up and may do periodic checks.
Exposure Prevention

- **Elimination**: Physically remove the hazard.
- **Substitution**: Replace the hazard.
- **Engineering Controls**: Isolate workers from the hazard.
- **Administrative Controls**: Change the way people work.
- **PPE**: Protect the worker with Personal Protective Equipment.
Engineering Controls

• Reduce exposure by either removing or isolating the hazard, or isolating the worker from exposure.

• Are limited in effectiveness due to proper selection, examination, and maintenance.

• Examples: Sharps containers, biohazard waste containers.
Administrative/Workplace Controls

• Restrict eating, drinking, smoking, applying cosmetics, and handling contact lenses near blood or OPIMs.

• Prevent the storage of food or drink in locations where blood or OPIMs are kept.

• Provide and require the use of handwashing facilities.

• Require the use gloves when cleaning up blood or OPIM spills.

• Prohibit recapping, bending, removing, shearing, or breaking contaminated needles.

• Routinely check equipment and decontaminate it prior to servicing and shipping.
Personal Protective Equipment

- PPE must be used if engineering controls and work practice control do not eliminate exposure
- PPE can consist of gloves, masks, safety glasses, and respiratory protection
- PPE selection is based on anticipated contact with blood or OPIM
Proper Use and Handling of PPE

• Wear appropriate gloves when there is a reasonable hazard of contact with infectious materials

• Replace gloves if they become torn, punctured, contaminated, and when moving on to other patients

• Never reuse disposable gloves

• Wear face and eye protection if risk of splashes, sprays, splatters or droplets of blood or OPIM are present
PPE, Contaminates, Sharps, and Waste Disposal

- Gloves and other PPE should be disposed of in an appropriate area.

- Sharps should be disposed of in sharps containers that is leak-proof, puncture-resistant, and labeled/color-coded red.

- Blood and OPIMs should be disposed of in a closable, leak-proof, and labeled/color-coded container
Biohazard Labels

• Warning labels will be affixed to items such as:
  • Containers of regulated waste
  • Containers of contaminated reusable sharps
  • Refrigerators and freezers containing blood or OPIMs
  • Containers used to store, transport, or ship blood or OPIMs
  • Contaminated equipment being shipped or serviced
  • Bags or containers of contaminated laundry

• Labels must be fluorescent orange or orange-red

• Put labels on containers or as close as possible
Universal Precautions

Treat all blood, body fluids, secretions, excretions (except sweat), non-intact skin, and mucous membranes as if they contain transmissible infectious agents.

Also make sure to:

• Use good hand hygiene
• Use gloves, gowns, masks, eye protection, and/or face shields depending on the anticipated exposure.
• Use safe injection practices
What happens after an accidental exposure?

• Post exposure evaluation and follow-up procedures:
  • Evaluation will involve documenting exposure root cause and circumstances
  • Identifying and documenting the source individual
  • Collecting exposed employee’s blood
  • Testing individual’s blood
  • Sharing results with exposed employee
  • Post exposure measures and counseling
  • Evaluating reported illness
Precautions for Providing First-Aid to a Co-Worker

If possible, always have the patient **self-administer** first aid.

If they cannot self-administer, protect yourself before offering assistance by:

- Wearing clean, leak-proof gloves
- Being aware of personal cuts or broken skin
- Protecting your nose and mouth in the event of splatters or sprays
- Immediately washing skin if contaminated with blood
- Immediately flushing eyes with water if contaminated
The shipping of infectious substances is highly regulated by the US Department of Transportation (49 CFR 173.134).

The US DOT classifies infectious substances into two categories:

- Category A Infectious Substances – Capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans or animals when exposure to it occurs.
- Category B Infectious Substances – Generally capable of causing permanent disability or life-threatening or fatal disease in otherwise healthy humans or animals when exposure to it occurs.
BBP and the US Department of Transportation

• Do you perform any of the following tasks:
  • Determine the hazard class of an infectious substance to be shipped?
  • Select packaging for an infectious substance to be shipped?
  • Package an infectious substance?
  • Secure a closure on an infectious substance package?
  • Label a package to indicate it contains an infectious substance?
  • Certify that an infectious substance is in proper condition for transportation?
  • Load an infectious substance package into a transport vehicle?

If yes, you must complete training in infectious material shipping.
What should you take away?

• Bloodborne pathogen rules are in place for your health and safety

• Failure to follow these rules is an unnecessary risk that shouldn’t be taken

• “Better safe than sorry"
Questions?

Oklahoma State University
Environmental Health and Safety
744-7241
Environmental Health and Safety

Programs and services:
- Fire Protection Engineering
- Life Safety and Emergency Preparedness
- Laboratory Safety
- Occupational Safety
- Occupational Health and Medical Surveillance
- Materials Management
- Industrial Hygiene
- Chemical Hygiene
- Safety Training

Location: University Health Services Building, Room 002 (Basement)

Phone Number: 405-744-7241

Email: EHS@okstate.edu

Website: http://ehs.okstate.edu