BLOODBORNE PATHOGENS

Introduction to Bloodborne Pathogens

A ***bloodborne pathogen*** is a microorganism that can be found in human blood, which is infectious and can lead to diseases and other sicknesses.

Notable Pathogens Include:

1. Hepatitis B
2. Hepatitis C
3. HIV
4. Tuberculosis
5. Scabies
6. Ringworm

How Can Bloodborne Pathogens be Transmitted?

Transmission of occurs when one comes in contact with blood carrying that pathogen or they are exposed to other potentially infectious body materials – called OPIM. The most common OPIM are amniotic fluid, semen, cerebrospinal fluid, blood, pleural fluid, synovial fluid, peritoneal fluid, and vaginal secretions.

These pathogens are most frequently transmitted through needles, piercings, sexual contact, body piercings, and contact with open cuts and sores.

What Precautions Must be Taken?

There is a set of universal precautions set forth by the Occupational Safety and Health Administration or **OSHA**, which attempt to deter the transmission and spread of bloodborne pathogens in blood and other bodily fluids. By following these guidelines, safety is prioritized when coming into contact with an infected person. In a situation where bloodborne pathogens may be present, it is crucial to consider all bodily fluids to be infected. Engineering controls, improved work practice controls, and sufficient PPE are effective in the protection against infectious fluids.

Engineering Controls help separate an employee from being exposed to bloodborne pathogens and other potentially dangerous materials by making physical changes to the environment or the instruments used.

Examples of these controls are:

- Needle safety devices
- Sharps disposal containers
- Benchtop splashguards
- Biological safety cabinets

Containment Equipment includes:

- ***Biological safety cabinets*** are workspaces that are enclosed and ventilated, which are intended to be used when working with contaminated materials.
- ***Alkaline hydrolysis digesters*** and ***pathological incinerators*** are safe methods of disposal for larger bodies of infected animals.
- ***Effluent Decontamination Systems*** sterilize any liquid waste deemed to be a biohazard. This liquid waste often comes from biocontainment laboratories. Within healthcare settings, there must be proper exhaust to minimize the chance of exposure to contaminated material in the air. With more hazardous pathogens, the exhaust must head directly outside, as it could be hazardous.
- ***High-Efficiency Particulate Air Filters*** are used to exhaust air from rooms to outside environments.

How Else May Bloodborne Pathogens be Contained?

Further containment can be provided by efficient facility design and operating in a proper manner. Keeping laboratory work areas separate from areas where the public may enter is crucial as a means of secondary containment. Decontamination equipment should be available. These include but are not limited to washing facilities and double entryways.

Bloodborne pathogens should be isolated in order to keep the environment clean and contaminant free. Isolation keeps the hazardous materials distant from most workers, but an enclosure for working with them can be even more effective in keeping the hazard completely separate. Enclosures area rarely opened besides for sample transport, cleaning, and maintenance. They are sealed tightly so that no leaks occur. Immense care should be practiced when opening an enclosure or when performing maintenance.

Work Practice Controls

Work Practice Controls are controls enacted in order to reduce risk and exposure to bloodborne pathogens and OPIM. Examples of behaviors prohibited under these controls include:

- Mouth pipetting
- Drinking, eating, or smoking
- Recapping, breaking, or bending needles

Additionally, laboratories that work with potentially hazardous materials should be limited in access to only permitted employees. Those employees must frequently use hand washing stations and maintain a no-hands procedure during the disposal of contaminated objects like needles.

Personal Protective Equipment (PPE)

Personal Protective Equipment is medical equipment that maintains safety when you may be in contact with blood, OPIM, and potentially hazardous materials. PPE includes face shields, gloves, goggles, masks, gowns, etc.

When there is any chance of exposure, employees must wear protective garments, and in more extreme cases, should wear surgical caps and shoe covers when gross contamination is expected. Proper PPE should be determined prior to entering the scene. All employees should be familiar with the equipment used prior to engaging with a hazardous material, OPIM, or blood.

Cleaning PPE

When employees clean surfaces that are potentially contaminated with bloodborne pathogens, they must be protected from exposure as well. It is the employer's responsibility to

ensure that all workers are protected from exposure as well as not letting them be exposed to dangerous levels of disinfecting chemicals and cleaners.

Guidelines for Decontamination

Any surface where bodily fluids can be seen must be cleaned and disinfected immediately. Any areas that are potentially contaminated should be isolated until the completion of the decontamination process so that risk is diminished.

If there is a bulk spill of contaminated material, it must be treated with disinfectant prior to its removal. Once the bulk material is removed, disinfected should be used again to completely decontaminate the area. All spills must be covered with an absorbent material and after, a disinfectant should be applied, saturating the area. The disinfectant will then kill any potentially infectious material that may be in the spill. It is crucial to have the area be well-ventilated when using disinfectants.

After the spill is removed, an EPA-registered disinfectant that is suitable for non-enveloped viruses should be applied to the surface. A 1:10 solution of bleach and water is also an effective method to use when commercial disinfectants are not available.

When Should Respiratory Protection by Used?

If there are bio-aerosols suspected to contain blood, hazardous materials, or OPIM, respiratory protection must be used. At a minimum, a fit-tested N95 respirator mask must be used in order to ensure employee safety.

Cleaning Equipment

When workers are cleaning, they must also have proper PPE. These workers should be wearing gowns, goggles, face shields, face masks, and gloves. The arms, legs, and feet must also be covered by fluid-resistant coverings. In some cases, respiratory protection may also be necessary.

Before equipment is shipped or repaired, the equipment must be decontaminated so that those tasked with handling and transporting the equipment are not exposed. There should be s standard procedure that instructs how to clean the equipment before someone else handles it.

If full decontamination isn't possible, a biohazard warning labelling which portions of the equipment are still contaminated is a must.

Removing PPE, Washing Hands, Flushing the Eyes, and Flushing the Mouth

After the cleaning and disinfection process is complete, all PPE should be removed and discarded in appropriate containers before leaving the room. The hands should be washed with soap and water or an alcohol-based gel.

In the event that your eyes come into contact with blood or OPIM, immediately flush the eyes with a saline eyewash or water for 5-10 minutes.

If the mouth or face comes into contact with blood or OPIM, rinse with water for 5-10 minutes.

How to Handle Specimens and Sharps

Procedures should be identified for the proper handling of specimens. This should include procedures for the packaging of specimen containers and their shipping.

Needles should never be recapped or bent unless absolutely necessary. All sharps should be in puncture-resistant containers which identify that they are in there. Disposal of sharps requires professional judgment and safety prioritized.

Color Coding and Biohazard Labelling

The **Bloodborne Pathogens Standard** discloses potential hazards and helps ensure the proper labels and signs are used to communicate any potential hazard present to protect workers.

Examples of containers that warning labels must be attached to:

- Regulated waste
- Contaminated laundry
- Fridges holding blood or OPIM
- Containers for contaminated sharps

Some facilities allow red bags and containers to be used instead of labels. Signs must be present, though, in HIV/HBV research labs or facilities handling infected animals.

Exposure Control Plans

Exposure Control Plans provide answers to questions about bloodborne pathogens and make sure that proper control activities are in place. If exposure is at all possible, an employer must develop an Exposure Control Plan in accordance with the OSHA Bloodborne Pathogens Standard and this plan must be accessible to all employees.

Plans are required to be specific to each facility and updated yearly. Workers should be informed of the purpose and uses of this plan and they should know where to find it if they were to need it.

How to Dispose of Biohazardous Waste

First, a biohazard warning label should be placed on every receptacle of medical waste and it should be disposed of in a proper manner. The regulated waste that this applies to includes:

- Contaminated sharps
- Contaminated items that could release blood or OPIM when put under pressure
- Blood or OPIM
- Items soaked in dried blood or OPIM

To ensure that all non-regulated waste has been properly decontaminated and is safe to handle, all containers should be properly labeled with a date and signature. If non-regulated waste has been properly decontaminated before disposal, it can be thrown away in a normal dumpster in plastic trash backs. Biohazard bags can't be placed in a regular dumpster and procedure should be followed.

Regulated waste should be disposed of in red biohazard bags or containers with proper labelling. Sharps must be in containers that can't be punctured. This waste must be taken to a biohazard collection facility.

What to Do If Exposed to Potentially Infectious Materials or Blood

- Report the exposure to your supervisor
- Request a Hepatitis B vaccination if you do not already have one
- Identify the source of the exposure if not prohibited by law
- Record the route of exposure and the event itself
- Test the individual's blood for HIV and HBV
    - If they are known to be HIV or HBV positive, administer prophylaxes as recommended by the US Public Health Service
- Obtain an evaluation by a healthcare professional

Recordkeeping Requirements

- There must be documentation of the yearly consideration and further implementation of safer medical devices aimed at minimizing exposure to workers
- There must be record of soliciting healthcare workers (non-managerial) for the identification and selection of engineering and work practice controls.

The Hazard Communication Standard

The **Hazard Communication Standard** mandates that employers provide their employees with sufficient information and training on the hazardous chemicals in their workplace. OSHA expects employers to document that the requirements have been met for each employee.