

## Introduction

Welcome to the course material for Bloodborne Pathogens Training (BIO500). This course is designed to train UAB Campus Employees on the principles and requirements of the OSHA Bloodborne Pathogen (BBP) Standard. Hospital and clinical staff should receive training addressing their specific unit's exposure control and incident response plans, which differ from those outlined in this course.



The content of this course is written specifically to satisfy the OSHA requirements of UAB Campus Employees. Hospital and clinical staff should receive training addressing their specific unit's exposure control and incident response plans, which differs the information outlined in this course material. If you have any questions about Bloodborne Pathogens, UAB policies, or procedures related to biosafety, contact UAB's Department of Environmental Health & Safety (EHS) at (205) 934-2487.

## Objectives

After this course, participants will be able to:

1. Identify potential sources and risks of exposure to Bloodborne Pathogens in their area.
2. Implement containment controls to mitigate the exposure risk to Bloodborne Pathogens.
3. Apply the precautions outlined in the OSHA Bloodborne Pathogens Standard.
4. Apply the correct response procedures and treatment plan if exposure or injury occurs.

## The Bloodborne Pathogens Standard

The [OSHA Bloodborne Pathogens Standard](#) was established to minimize occupational exposure to the Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV), and other pathogenic microorganisms potentially present in human blood. For more information, see [The UAB Biosafety Manual](#) or email [biosafety@uab.edu](mailto:biosafety@uab.edu).

## Regulatory Definitions

These terms and definitions come from the OSHA Bloodborne Pathogen Standard.

- **Contamination** refers to anything soiled with human blood, OPIM, or Bloodborne Pathogens (BBPs).
- **Decontamination** refers to making surfaces and equipment safe for being handled or used, and disposed of by removing, inactivating, and destroying the infectious material.
- **Other Potentially Infectious Materials (OPIM)** are any other potentially contaminated fluids, including:
  - Cells, tissues, or organ cultures containing HIV, HBV, or HCV
  - Culture medium containing HIV, HBV, or HCV
  - Animal Specimens (such as blood and organs) with HIV, HBV, HCV, or other BBP
  - Untested Human Body Fluids potentially containing blood
  - Semen, Vaginal Secretions, Cerebrospinal Fluid, Synovial Fluid, Pleural Fluid, Pericardial Fluid, Peritoneal Fluid, and Amniotic Fluid
- **Primary Containment** refers to engineering controls [i.e., Biosafety Cabinets (BSC), Sharps Containers, and Centrifuge Safety Cups] acting as a primary barrier limiting the infectivity of a pathogen for specific hosts, its dissemination, and survival in the environment.
- **Standard Precautions** is the premise that all human blood, blood products, and body fluids are affected by BBP contamination. Always handle materials using the appropriate controls and precautions.

## Four Key Elements

### *Element #1: Exposure Control Plan (ECP)*

An ECP is a site-specific risk assessment conducted by a Principal Investigator (PI) or other designee designed to identify and reduce the risk of BBP exposures. It must be reviewed and updated by the PI or designee annually, or earlier if significant changes in personnel or procedures occur.

The objectives of an ECP are to:

1. Identify the materials or processes in the workplace, posing an increased risk for exposures to BBP (i.e., human blood or OPIM).
2. Determine job classifications or duties that place employees at risk for exposure to BBP.
3. Define the controls required to reduce those risks.

Each laboratory or distinct operational facility containing unfixed material of human origin must include an ECP in their Safety Manual and make it available to all employees determined at risk for occupational exposure to Human BBPs.

### *Element #2: Determination of Employee Exposure*

An evaluation must be made to determine if an employee's duties put them at risk for a BBP exposure. After identifying an employee's exposure risk, exposure controls mitigating those risks should be implemented. Controls used to reduce risk include Administrative and Workplace Practices, Engineering Controls, and Personal Protective Equipment (PPE).

EHS Officials can help with risk assessments, but the PI is **ultimately responsible** for identifying the materials, procedures, and job duties posing a risk to their laboratory personnel.

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## Job Classifications

Campus employees who work in the following job classifications are likely to be at risk for occupational exposure to Bloodborne Pathogens. **This list is by no means exhaustive.**

- Researchers working with unfixed human materials or BBP cultures
- Environmental Health and Safety Staff
- Environmental Services Personnel
- Campus Police
- Health Profession Instructors and assistants
- Plumbers and mechanics supporting research spaces
- Animal care staff
- Administrators who routinely enter at-risk laboratories

## Routes of Exposure

Potential routes of exposure include any of the following:

1. Inhalation (infectious aerosols)
2. Absorption (skin or mucous membrane contact)
3. Ingestion (eating)
4. Injection (skin puncture)

## *Element #3: Vaccinations and Post-exposure Follow-Up Procedures*

### HBV Vaccination Program

The PI or Lab Manager ensures all persons determined at risk for occupational exposure to human Bloodborne Pathogens are offered a Hepatitis B vaccination within ten days of starting work. **The PI or department must maintain documentation of HBV participation or declination.** Medical records are confidential and are to be maintained by the EHS Occupational Medicine Program or healthcare provider for at least 30 years post-employment.



Prompt medical attention may reduce the risk of serious health consequences after an exposure event.

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## Exposure and Injury-Response Procedures

Have you been exposed to human blood or OPIM? You should:

- Wash affected areas with soap and water for 15 minutes
- Flush mucous membranes with water for 15 minutes
- Notify your PI, Supervisor, or Manager as soon as possible

### **Campus Employees** (not hospital or medical care associated exposures):

- You are required to report any exposure or injury to a supervisor, PI, or manager. The supervisor, PI, or manager is responsible for reporting the incident to the Biosafety Officer (BSO) at UAB Environmental Health & Safety (EHS) at (205) 934-2487. The BSO will investigate the circumstances surrounding the exposure and work to mitigate the risk of future exposures.
- A completed [Initial Medical Evaluation Authorization Form](#), signed by a Supervisor, PI, or Manager, should accompany any employees seeking treatment.
- If the exposure occurs during the course and scope of your employment activities, you should go to The Workplace Clinic within UAB Highlands, between 7 am-4 pm during weekdays. Outside of these hours, or on weekends, campus employees should go to the University Hospital Emergency Department (UED), or Highland ED.

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### Students:

You are required to report any exposure or injury to a supervisor, PI, or manager. The PI, supervisor, or manager is also responsible for reporting the incident to the UAB Biosafety Officer (BSO) in Environmental Health & Safety (EHS) at (205) 934-2487. The BSO will investigate the circumstances surrounding the exposure, and work with the supervisor, PI, or manager to develop additional prevention strategies.



- **Non-Emergencies (Class-Related):** Students seeking non-emergency medical attention for exposures or injuries occurring in the course of their academic curriculum should go to Student Health.
- **Non-Emergencies (Work-Related):** Student-employees seeking non-emergency medical attention for exposures or injuries occurring in a UAB space as part of their job or volunteer duties (their employment) should follow procedures established by the [UAB On-The-Job Injury \(OJI\) Program](#) and go to The Workplace Clinic, within UAB Highlands between 7 am-4 pm (during weekdays). For all other times, student-employees should go to the University Hospital Emergency Department (UED), or Highland ED.
- **Emergencies:** Students and student-employees seeking emergency medical attention for any UAB work or curriculum-associated injury or exposure emergency, should go to the University Hospital Emergency Department (UED), or Highland ED.

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## Reporting

You must report the exposure incident within 48 hours, to receive the following at no cost:

- A confidential medical exam
- Counseling
- Blood testing and analysis
- A confidential reply from the attending healthcare professional within 15 days

Despite the 48-hour reporting requirement, you are strongly encouraged to report all exposures and injuries immediately, since the timing of post-exposure treatment for HIV is a critical determinant of efficacy.

## UAB On-The-Job Injury (OJI) Program

Employees are required to report any exposure or injury to a supervisor, PI, or manager. Completing the [OJI Application for Benefits](#) form, [Release of Information](#) Form, and Trend Tracker Report, if available, is a requirement for any medical treatment with a chance of generating a bill.

## *Element #4: Training and Hazard Communication*

### Employee Training

Employees whose job assignments place them at risk for BBP exposure must complete training within ten working days of initial appointment and annually after that. This Bloodborne Pathogens Training Course (BIO500) satisfies the initial training requirement and is updated each year to fulfill annual refresher training requirements. The PI is responsible for ensuring all laboratory personnel completes the Bloodborne Pathogens Training (BIO500) annually.

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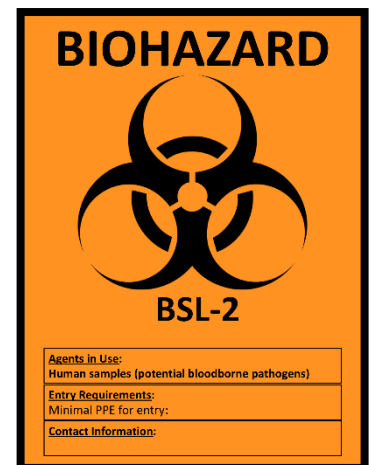
## Hazard Communication

OSHA requires hazard communication to employees who may come in contact with Bloodborne Pathogens by the use of warning signs, labels, and annual employee training. Post Biohazard Warning Labels on or near the entrance to an area or lab where blood or OPIM is stored/used. Signage includes:

- Universal Biohazard Symbol
- Special PPE requirements
- Name of biohazardous materials used
- Emergency contact information

Biohazard Warning Labels must be:

- Red or fluorescent orange
- Imprinted with the Universal Biohazard Symbol
- Placed on all biohazard storage areas, medical waste containers, or equipment
- Applied to sample containers leaving the work area
- Posted on lab entrances
  - “Biosafety Level 2” (BSL2) containment designation
  - List names of infectious materials or agent(s) used in the lab (e.g., “Human tissues,” or “HBV”)
  - List requirements [i.e., PPE, training (if applicable)] for entry to the laboratory.



A biohazard warning label is not required for clinical specimens if the samples do not leave the laboratory and standard precautions have been followed.



## Methods of Exposure Control

### *Administrative and Workplace Controls*

Administrative Controls are typically described as the policies and requirements in place to prevent exposures and safely work with hazardous materials, whereas Workplace Practices are the Standard Operating Procedures (SOP's) or methods for implementing the policies.

Work areas must be:

1. Cleaned and decontaminated with an appropriate disinfectant daily (after work has concluded) and immediately after contamination with blood or OPIM.
2. Labeled with a Universal Biohazard Symbol if used for storage or processing of Human Blood or OPIM.

### **Handwashing**

Wash hands as soon as possible in the following situations:

- After the removal of gloves or other PPE
- After any contact with human blood or OPIM
- Before leaving the work area



If liquid soap and water are not immediately available for handwashing, use antiseptic paper towels or an antiseptic hand lotion until a handwashing sink can be located.

### *Engineering Controls*

Engineering Controls eliminate or reduce exposure to BBP through the use or substitution of engineered safety machinery or equipment. You should always use these types of controls when working with any infectious materials.



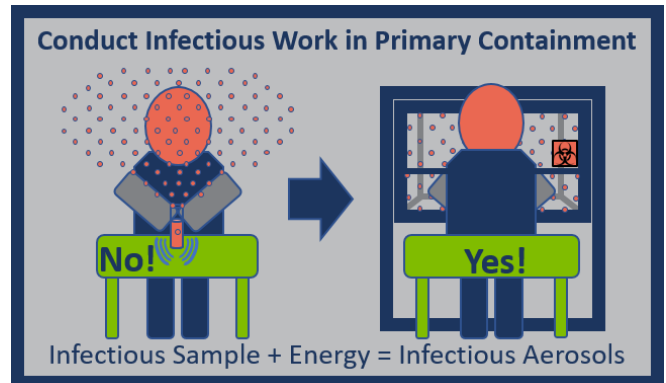
Safety Centrifuge Cups and Biosafety Cabinets (BSC) are the most common engineering controls used for the manipulation of blood and body fluids. For more information, see [Appendix A of the BMBL](#).

## Creation of Infectious Aerosols

Any procedure imparting energy to a sample can create aerosols. Activities creating aerosols include pipetting, vortexing, sonicating, and centrifuging samples.

Proficiency, diligence, and the attitude of the individuals conducting the work are also factors that determine the likelihood and routes of exposures in the laboratory.

Poor handwashing or glove-changing practices can quickly disseminate infectious agents to multiple surfaces. Similarly, sloppy or rushed sample processing techniques exacerbate infectious aerosol production.

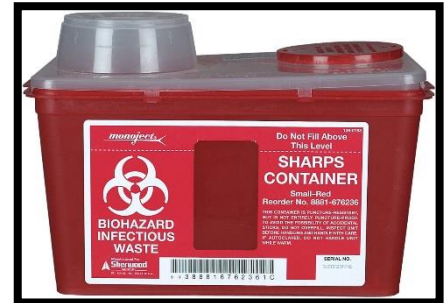


Infectious aerosols are particularly relevant in the research setting since most Laboratory-Associated Infections (LAIs) occur by aerosol-based transmission. The small size of infectious particles and a lack of awareness about activities that can create aerosols often increases the likelihood of an LAI. Because of their smaller volume, aerosols have a reduced infectious load capacity per particle, but these particles are efficiently disseminated and pose an infection risk to anyone in the vicinity. In contrast, droplets are larger and quickly settle from the air, but they also may contain higher loads of infectious agents that can be easily transferred to other laboratory surfaces, increasing the risk of mucous membrane or ingestion-based exposures.

## Sharps Containers

Always place sharps in the proper sharps containers! These containers should be:

- Made out of hard plastic
- Designed for the disposal of sharps
- Labeled with the Universal Biohazard Symbol
- Replaced when the contents reach the fill line on the container or when approximately  $\frac{3}{4}$  full



## Mechanical Pipettes

You use mechanical pipettes for transferring human blood or bodily fluids.

**Mouth pipetting is strictly prohibited!**



## Needleless System

A needleless system is defined as a “non-needle sharp or a needle with a built-in safety feature or mechanism effectively reducing the risk of a percutaneous exposure incident.” Percutaneous means “administered, removed, or absorbed by way of the skin, as an injection, needle biopsy, or transdermal drug.”



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## Personal Protective Equipment (PPE)

PPE is explicitly worn to prevent BBP exposure and contamination. Always wear PPE when working with human blood or OPIM. PPE must be replaced frequently, or immediately if it becomes contaminated or damaged in any way. Discard any potentially contaminated disposable PPE as medical waste.



The PI or Department is responsible for supplying, replacing, or disinfecting PPE, as needed.

- Minimal Required PPE:
  - Appropriate Gloves: The gloves should be material that does not absorb liquid (i.e., Nitrile Gloves).
    - **Never** reuse single-use gloves!
    - **Never** use ripped or compromised gloves.
  - Cleaned and buttoned lab coat
  - Eye protection may be required if there are splash hazards and the type of procedure performed.
    - Full-Face Shield (if there is a risk of a splash hazard)
    - Safety Glasses (if there is a risk of a physical hazard)

## Waste Disposal

Anything potentially contaminated with Bloodborne Pathogens must be disinfected or disposed of as medical waste. Examples include contaminated specimen containers, pipette tips,

syringes, needles, and culture plates, etc. If you are responsible for generating, handling, or signing for the removal of medical waste at UAB, you are required to complete [Medical Waste Management for Labs \(BIO301L\)](#).



Any waste contaminated with Category A must be autoclaved before being offered as medical waste to Stericycle.

## 2020 Featured Topic

Clinical units or researchers providing or redistributing human tissues, OPIM, or BBP cultures at UAB share a responsibility to ensure the recipients of these materials are aware of the hazards, training, and other requirements stipulated in the OSHA Standard. This includes the requirement to enroll in the [EHS Occupational Medicine Program](#).

## Conclusion

This section concludes the course material for Bloodborne Pathogens (BIO500). You should now complete the Reality Check.

### EHS Decision Tree

EHS has developed many training courses available to all active UAB Employees and Students. These course topics include radiation safety, biosafety, chemical safety, building life safety, waste (hazardous, medical, or universal), PPE, and hazard communication. EHS has a [decision tree](#) to assist you in choosing the right course to match the knowledge or skills you may need at work every day, as well. If you have any questions or comments, contact EHS at (205) 934-2487.



While all courses are broadly available to the UAB community, the training may be intended for a particular audience at UAB. More detailed instruction or alternative reporting or response procedures may be appropriate, depending on your specific roles and responsibilities at UAB. This information should be included your exposure control plan.