Introduction

Welcome to the Bloodborne Pathogens Initial Training (BIO300) course. This course is designed for anyone that has the potential for exposure to bloodborne pathogens in their work environment or area.

Objectives

At the conclusion of this course, participants should be able to:

1. Use the standard precautions to protect yourself and others
2. Determine the exposure risks
3. Use engineering controls to avoid exposure
4. Properly handle and dispose of sharps
5. Correctly disinfect when spills or accidents occur
6. Wear the proper PPE for protection

Although this course is compliant with UAB training policies for UAB employees and students, there are other aspects to the OSHA Bloodborne Pathogens Standard that are not included in this course.

The Standard

The Federal OSHA Bloodborne Pathogen Standard was designed to reduce and minimize the potential for occupational exposure to the Human Immunodeficiency Virus (HIV), the Hepatitis B Virus (HBV) and other human bloodborne pathogens. This training program is a direct result of the requirements of this regulation.

A complete copy of OSHA Standard is **here**.

Key Elements

Key elements of the bloodborne pathogens regulations include:

- Written Exposure Control Plan – reviewed annually or when new tasks are added.
- Determine if employees are at risk
- Offer HBV vaccinations to those employees at risk for HBV exposure and post-exposure follow up procedures
- Offer Bloodborne Pathogen Training within 10 days of job assignment and annually thereafter

A copy of the UAB Biosafety Manual is available **here**.

Exposure Control Plan

The Standard requires that laboratories working with bloodborne pathogens prepare an Exposure Control Plan. The Plan must be designed to document procedures that minimize employee exposure to bloodborne pathogens.

The Plan **MUST** be updated annually or when new tasks are added.

Compliance Methods

In compliance with The Standard, UAB's Exposure Control Plan requires the use of the following methods:

- Universal Precautions
- Work Place Practices
- Engineering Controls
- Personal Protective Equipment (PPE)

Other requirements in your Exposure Control Plan:

- Housekeeping procedures
- Regulated medical waste disposal
- HBV Vaccination
- Post-Exposure follow up
- Hazard Communication
- Training

Regulatory Definitions

Below are some terms that you must know. Please keep in mind that these are regulatory definitions, not necessarily common dictionary definitions.

Standard Precautions
The premise of standard precautions is that all human blood, blood products, and body fluids are contaminated. You should **ALWAYS** handle materials using appropriate safety precautions and good work practices. This is also known as **universal precautions**.
Human Blood
Blood, blood components, and products made from human blood
Other Potentially Infectious Materials (OPIM)
These are any other fluids that can be potentially contaminated. Other examples are: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, and amniotic fluid. OPIM also refers to: • Unfixed human tissue or organs • Cells, tissues, or organ cultures containing HIV, HBV, or HCV • Culture medium containing HIV, HBV, or HCV • Blood, organs, etc. from animal with HIV, HBV, or HCV or other bloodborne pathogens • **ALL** human body fluids that are undetermined nature or where blood is present are also considered to be an OPIM.
Occupational Exposure
Reasonably anticipated contact with human blood or other potentially infectious material that may result from the normal performance of an employer's job duties
Contamination
Human blood or OPIM on a surface, clothes, equipment, etc.

Decontamination
To make surfaces and equipment safe for handling, use, or disposal, by removing, inactivating, and destroying the infectious material

Exposure Determination

Employees working in the following job classifications are likely to be at risk for exposure to bloodborne pathogens. This list is by no means exhaustive.

- Lab research personnel
- Healthcare workers
- Physicians
- Clinical lab workers
- Campus police workers
- Fire and rescue personnel
- Environmental services personnel
- Occupational Health and Safety staff

Anyone coming in contact with human blood is at risk! Consult your lab specific Exposure Control Plan for the exposure determination in your lab. A copy of an Exposure Control Plan template can be found **here**.

Biohazard Precautions

Warning Labels

Biohazard warning labels must be:

- Red or fluorescent orange
- Imprinted with the universal biohazard symbol
- Placed on all biohazard storage areas, medical waste containers, work surface areas, or equipment (such as biosafety cabinets)
- Placed on sample containers when leaving the works areas

Exceptions to Labeling Requirement

No specific biohazard is required for clinical specimens if:

- The samples do not leave the facility
- Universal precautions are followed in the facility

Signage

The Biohazard Information sign should incorporate the universal biohazard symbol and:

- Posted on lab entrance
- List names of infectious agent(s) used within the lab
- List special entry requirements for the area

Infectious Diseases

Requirements

The OSHA Standard includes specific guidelines for research personnel working in HIV or HBV laboratories. There also may be additional specialized facility requirements.

Standard microbiological practices **SHOULD** be followed.

Workers in HIV, HBV, and HCV laboratories receive special training in addition to what is presented in this training program. Special work practices must be followed and specific containment equipment used. Please consult with your supervisor for more detailed information.

Hepatitis B

What is it?
Hepatitis B is a DNA virus that is made up of: a nucleocapsid core (HBcAg), an outer coat (HSsAG), and a soluble antigen "e".
Exposure Routes
Blood, human body fluids, or OPIM
Incubation Period
Range: 14 days-9 months Average: 60-90 days Blood from exposed individuals are infected **before** symptoms appear during the acute and chronic carrier stage
Signs and Symptoms
Flu-like illness, jaundice, dark urine, anorexia, nausea, joint pain, rash, and fever. Chronic effects: cirrhosis and cancer. Severity is variable, and some carriers are symptomatic.
Vaccination
Immunization requires three injections of vaccines into the muscle of the upper arm over a six month period. An antibody test to determine immunity may also be done. You **MUST** enroll in the Employee Health Program. Once enrolled, they will look at the work you will be doing and determine if you need the vaccine. If your work qualifies you for a vaccine, you will receive it at no cost to you.

If you choose to not be vaccinated, you must sign a formal statement of declination to be kept on file at OH&S Employee Health **OR** Hospital Employee Health. A copy of the **form** is available from OH&S.

Hepatitis C

What is it?
Hepatitis C is a single stranded, positive sensed RNA, enveloped, 50nm diameter virus.
Exposure Routes
Human blood and blood products, human body fluids, possibly OPIM (not definite)
Incubation Period
Ranges from 2 week to 6 months. Most commonly 6-9 weeks.
Signs and Symptoms
Anorexia, vague abdominal discomfort, nausea and vomiting, loss of appetite, progression to jaundice but less frequent than with HBV. Chronic effects (often **NOT** symptomatic): cirrhosis and cancer. Severity is variable.

Human Immunodeficiency Virus (HIV)

What is it?
Human Immunodeficiency Virus is a retro or RNA virus that attacks the body's T-4 lymphocytes. T-4 lymphocytes loss or damage cripples the immune system which can result in infection and other opportunistic diseases.
Exposure Routes
• **Percutaneous Route:** cuts with broken glass, syringes/needle stick, injury, scalpel incision during surgery, open sores or wounds, chapped skin, acne, cold sores, burns • **Mucous Membrane Route**: Splash of human blood on face or mouth, splash of HIV culture in eyes or mouth • **Needlestick:** needle recapping, autoinoculation, improper sharps disposal
Incubation Period
Approximately 5 years
Signs and Symptoms
AIDS Symptoms: collapse of immune system, opportunistic infections such as pneumocystis carinii, malignant tumors such as Karposi's sarcoma, neurological damage *ARC(AIDS-Related Complex) Symptoms*: enlarged lymph nodes, mycological oral infections, fatigue, weight loss

Controls

Engineering Controls
Sharps Containers
Sharps should always be placed in the proper sharps containers! These containers should be: • Made out of hard plastic • Designed for the storage of used sharps • Labeled with the universal biohazard symbol • Replaced frequently to prevent over filling
Mechanical Pipettes
Are used for transferring human blood or body fluids. **MOUTH PIPETTING IS PROHIBITED!**
Containment Devices
Are used for the manipulation of blood and body fluids. Also can be used for both sterile cultures and pathogen work.
Chemical and Mechanical Filters
Be sure that all vacuum lines are protected with both an inline chemical and mechanical filter.
Needleless System
A device that does not use needles for: • The collection or withdrawal of human body fluids that after initial venous or arterial access is established • The administration of medication or fluids • Any other procedure involving the potential for occupational exposure to bloodborne pathogens due to percutaneous injuries from contaminated sharps
Work Practice Controls
Work Areas
Must be: Cleaned and decontaminated daily with an appropriate disinfectant and after contact with blood or OPIM. Labeled with a biohazard sticker if used for storage or processing of human blood or OPIM
Hand washing
Wash your hands as soon as possible in the following situations: • After removal of gloves or other protective clothing • After direct contact with human blood or OPIM • Before leaving work area

- Before eating or drinking

Information for supervisors: If liquid soap and water are not immediately available for handwashing use, then antiseptic paper towels or antiseptic hand cleaning lotion that is administered with a towel may be used. A complete copy of the UAB Medical Waste Management Plan can be located **here**.

Additional Controls

In the lab

- **NO** eating, drinking, or smoking
- **NO** food or drink stored in the lab
- **DO NOT** apply cosmetics or lip balm
- **DO NOT** handle contact lenses

Before Eating

Remove all potentially contaminated protective clothing. Wash your hands and leave the work area.

Aerosol Generation

Aerosol generation should be minimized. Potential aerosol generating procedures can include: sonicating, grinding, slicing, centrifuging, and performing any other procedure which could potentially cause splashing or create aerosol droplets.

The following procedures must be performed in a biosafety cabinet or other containment system is aerosols are likely to be generated: specimen handling, packaging of specimens for transport, processing, culturing. Some processes cannot be performed in a biosafety cabinet. Attempts at reducing aerosols **MUST** be taken.

Medical Waste Containers

These containers must be leak proof, unbreakable, labeled with the universal biohazard symbol and have the ability to close.

Personal Protective Equipment

Personal protective equipment is specifically worn to prohibit human blood or OPIM from passing through to your clothing, skin, eyes, or mucous membranes.

ALWAYS wear personal protective equipment when working with human blood or OPIM.

Gloves

Types

- **ALWAYS** wear gloves when handling human blood or OPIM **AND** during clean up procedures or whenever there is a possibility of contamination on a work surface.
- **NEVER** use ripped or compromised gloves. **NEVER** reuse single use gloves!

Goggles, Surgical Mask, or Face Shields

- Must be worn if there is a splash hazard to the face
- Must be made of a material that does not absorb liquid

If you have questions about what PPE is proper for you, contact OH&S.

Handling & Disposal

Sharps

The term "sharps" refers to needles, syringes, scalpel blades, lancets, disposable medical instruments, broken glass and similar devices or materials sent through the waste stream with the potential to cut or puncture an individual or the transport liner in which it is placed.

When the sharps container is full, secure the lid. **DON'T** overfill containers and risk getting stuck. You should **NEVER** exceed the manufacturer's "fill to" line.

In certain specific areas there may be variations to this policy. All sharps activities that deviate from this policy must be reviewed by the OH&S prior to implementation. You should consult operating manuals and Standard Operating Procedures (SOPs) in your work area.

Containers must be disposed of as medical waste – whether contaminated or not – and never placed in the regular trash. Contact OH&S if you need assistance disposing of medical waste in your area. **ALL** needles, syringes and other sharps must be placed into rigid, red plastic sharps containers. Needles must not be removed from syringes. Do not cut, bend or recap needles. This policy applies to **ALL**

needles and syringes, whether (a) used or unused, (b) used together or separately, (c) used with human blood, or (d) used for any other purpose.

DO NOT recap needles! **ALWAYS** out sharps in the proper sharps container.

Laboratory Glassware

Uncontaminated Glass

ALL uncontaminated glassware (broken or unbroken) **MUST** disposed of as broken glass.

Uncontaminated glassware **MUST** never be placed directly into the regular trash can. This applies to glass items from medical, research, and teaching labs including containers, pipettes, tubing, glass slides, and cover slips, etc. Glassware must be placed in a rigid container that is puncture resistant (i.e., cardboard boxes, plastic or metal drums). This rigid container **MUST** be labeled "Caution-Broken Glass." When the container becomes full, secure the top of the container with tape. The waste can be placed in the regular trash as long as it's in a rigid container first.

Contaminated Glass

Contaminated glassware which may be contaminated with infectious agents should be placed in approved sharps containers. The containers can then be treated as described in the UAB Medical Waste Management Plan.

Disinfection

Autoclaving

Autoclaving is a commonly used procedure for treating medical (infectious) waste. ASTDM compliant bags that are strong, pliable, and puncture resistant are recommended for autoclaving infectious materials.

Do not place needles, broken glass or other sharps in autoclave bags. Following autoclaving, these bags are placed in transport containers for pick up by the contractor or UAB Support Facility Staff and disposed of as medical waste. The waste is then rendered non-recognizable, and the byproduct may then be safely disposed of in the landfill.

UAB uses red bags to designate infectious waste that must be treated. Red bags should not be used for any other purpose. Regardless of their contents, do not place red bags in the regular trash for disposal. Untreated medical waste placed in a landfill is against the law. This practice can result in regulatory action, fines, and even loss of landfill privileges.

Chemical Disinfection

Some materials, those containing volatile chemicals or radioactive materials, must not be autoclaved. They may require chemical disinfection. Contact Chemical Safety or Radiation Safety as appropriate.

Use the following table to aid in the selection of disinfectants. Follow manufacturer's recommended concentrations and contact times.

Disinfectant	Uses
Alcohols	Ethyl or isopropyl alcohol at 70 – 80% concentration is a good general purpose disinfectant; not effective against bacterial spores.
Phenols	Effective against vegetative bacteria, fungi, and viruses containing lipids; unpleasant odor.
Formaldehyde	Concentration of 5 – 8% formalin is a good disinfectant against vegetative bacteria; spores, and viruses; known carcinogen; irritating odor.
Quaternary Ammonium Compounds	Cationic detergents are strongly surface active; extremely effective against lipoviruses; ineffective against bacterial spores; may be neutralized by anionic detergents (i.e., soaps).
Chlorine	Low concentration (50 – 500 ppm) are active against vegetative bacteria and most viruses; higher concentrations (2,500 PPM) are required for bacterial spores; corrosive to metal surfaces; must be prepared fresh; laundry bleach (5.25% chlorine) may be diluted (one part bleach to 9 parts water) and used as a disinfectant.
Iodine	Recommended for general use; effective against vegetative bacteria and viruses; less effective against bacterial spores.
Glutaraldehyde	Very good disinfectant; Is an irritant

Incidents

If you are exposed to human blood or OPIM:

- Wash affected areas with soap and water, and flush mucous membranes with water
- Immediately notify your supervisor
- Contain spilled materials and decontaminate

Reporting

- On campus, contact UAB Hospital Employee Health Rapid Response Team at 934-3675 or page RRT at 934-3411
- Consult with the one the job injury program outlined in the **You and UAB Handbook**
- Consult with your supervisor, and complete the required **Incident Report Form**.

After a report of an exposure incident, a potentially exposed employee will be offered, at no cost:

- A confidential medical exam

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

Conclusion

So what should you remember from this course? There are certain practices that you can implement to better protect yourself and your co-workers. Your area's Exposure Control Plan should contain everything that you need to know about working with and/or around the specific bloodborne pathogens that could be in your area.

This concludes the Bloodborne Pathogens (BIO 300) Initial Training course. If you have not taken the assessment, please do so now. You must score at least 80% or higher to pass.

Retain the certificate in your lab file. You may be asked to present proof of your training.

If you have any questions about Bloodborne Pathogens, UAB Policies and Procedures pertaining to biological safety, or other related topics, please contact UAB's Occupational Health and Safety at 205-934-2487.