Blood Borne Pathogen Training

Why is this training required?

OSHA estimates that 5.6 million workers are at risk of exposure to blood borne pathogens

the OSHA standard is available at www.osha.gov

search “blood borne pathogen”

This training should help you to become aware of what the dangers are and how you can protect yourself.
What can you do to minimize your risk? These 5 points will be discussed in this training

1. What are Bloodborne Pathogens?
   The Exposure Control Plan

2. Observe Standard (Universal) precautions
   Biosafety Level 2 Containment and Practices

3. Follow the Standard Operating Procedures – SOP in your lab

4. Make use of personal protective equipment - PPE

5. Report all accidents, spills and exposure incidents to your research advisor.
1. Blood Borne Pathogen Training

- F&M has an Exposure Control Plan that contains valuable information about risks, exposure potential and prevention and procedures to follow in the event of an exposure.
- There is a copy of the Exposure Control Plan in your lab.
- The Exposure Control Plan is available at the Environmental Health and Safety web page: search “Exposure Control Plan”
What are Blood Borne Pathogens?

- **Blood borne pathogens** are disease-causing bacteria, viruses & protozoa that are carried in human blood, blood products and OPIM.

- Pathogens include but are not limited to:
  - Hepatitis B
  - Human Immunodeficiency Virus – HIV
  - Hepatitis C
What is OPIM?

• OPIM or Other Potentially Infectious Material or includes:
  • body fluids such as saliva, semen, cerebrospinal fluid, etc.
  • any body fluids that are visibly contaminated with blood
  • human (and nonhuman primate) fixed or unfixed cells, tissues or organs

• In a research laboratory setting, OPIM also includes human and nonhuman primate cells that are being grown in tissue culture.
Pathogens include but are not limited to:

- Hepatitis B
- Hepatitis C
- Human Immunodeficiency Virus - HIV
Hepatitis B virus

• 10,000 new cases in the US every year and an estimated 2 million carriers
• Transmitted through blood to blood contact, unprotected sex, needles, piercings and tattooing.
  – Not transmitted casually
• Causes chronic inflammation of the liver, often leading to jaundice, cirrhosis and liver cancer
• Life long infection, with no cure
• There is a vaccine!
Hepatitis B Virus Vaccine

• There is a 3 shot vaccine that is protective.
  – You probably have received it. If not, you may consider receiving it now at no charge.
  – You may decline to be vaccinated, but in order to do so you must complete a declination statement and file it with Human Resources or Appel Health.
    • Students MUST have received the vaccine in order to work in BSL2 labs
  – You can change your mind later and accept vaccination, at no cost to you
Hepatitis C virus

- Causes chronic inflammation of the liver, often leading to jaundice, cirrhosis and liver cancer
- Life long infection, with no cure
  - Most common reason for liver transplant
- There is no vaccine.
Human Immune Deficiency Virus - HIV

• This virus infects and destroys cells of the immune system resulting in an acquired immunodeficiency syndrome or AIDS.

• There are drugs available that are often very successful in slowing or preventing the onset of AIDS. There is no cure or vaccine.
How are Blood Borne Pathogens Transmitted?

- Transmission occurs from one host to another through contact with infected
  - Blood and other body fluids
  - Tissues
  - OPIM:
    Human cells in tissue culture
Blood-borne pathogens may be introduced into a new host by:

– Broken skin
  • Cuts, abrasions, rash, acne
  • Needlesticks

– Any body opening or membrane
  • For example, eyes, nose or mouth
  • Droplets and aerosols
What is OPIM?
What is OPIM?

• OSHA defines OPIM as
  – Certain human body fluids
  – Any fixed or unfixed tissue or organ from a human (living or dead)
  – Human cell lines
What are bloodborne pathogens? Give an example.
What are Blood Borne Pathogens?

- **Blood borne pathogens** are disease-causing bacteria and viruses that are carried in the host’s blood and OPIM.

- Pathogens include but are not limited to:
  - Hepatitis B
  - Hepatitis C
  - Human Immunodeficiency Virus – HIV
How are blood borne pathogens transmitted?
Blood-borne pathogens may be introduced into a new host by:

- Broken skin
  - Cuts, abrasions, rash, acne
  - Needlesticks
- Any body opening or membrane
  - Droplets and aerosols
What can you do to minimize your risk? These 5 points will be discussed in this training

1. What are Bloodborne Pathogens?
   The Exposure Control Plan

2. Observe Standard (Universal) precautions
   Biosafety Level 2 Containment and Practices

3. Follow the Standard Operating Procedures – SOP- in your lab

4. Make use of personal protective equipment - PPE

5. Report all accidents, spills and exposure incidents to your research advisor.
What can you do to protect yourself from blood borne pathogens?

2. Observe Standard Precautions:
   • Assume that all human tissues and cells, living or dead, are infectious.
   • Treat all human tissues and cells as if they are known to be contaminated with blood borne pathogens.
   • Observation of Standard Precautions will help to prevent contact with blood and OPIM and reduce the risk of exposure to bloodborne pathogens.
2. Standard Precautions, con’t

• Be aware of warning signs: the biohazard symbol
  • has a fluorescent red or orange background with the universal biohazard symbol in black
  • is used to alert workers to the presence of potentially biohazardous materials, such as OPIM

• Be aware of labeling procedures
  • Lab doors
  • Waste containers
  • Any equipment that could be contaminated with human samples or OPIM
The Biological Safety Level assigned to a lab describes the practices and containment that are appropriate for the biohazardous materials that are used or stored in the lab.

Biosafety level 2 practices are appropriate when infectious agents, such as bloodborne pathogens are assumed to be present.

**BSL2 precautions are more fully explained in the BSL2 training module.**
What can you do to minimize your risk? These 5 points will be discussed in this training

1. What are Bloodborne Pathogens? The Exposure Control Plan
2. Observe Standard (Universal) precautions Biosafety Level 2 Containment and Practices
3. **Follow the Standard Operating Procedures - SOPs** - in your lab
4. Make use of personal protective equipment - PPE
5. Report all accidents, spills and exposure incidents to your research advisor.
3. Standard Operating Procedures

• Description of the “rules of the lab”.
  – A copy is in your lab – ask where it is and review it!
  – It will help you to recognize and reduce hazards

• SOP’s serve as a resource to train new lab staff, supplement recurrent training and as a valuable reference in the event of an emergency.

Biosafety SOP for working with unfixed human- and mouse-derived materials in the laboratory of
This SOP reflects the use of BL2 precautions

Biosafety SOP for utilizing rDNA with E. coli, yeast, and Drosophila (cell lines and flies) in the laboratory of
This SOP reflects the use of BL1 precautions
3. What information is in the Standard Operating Procedures?

- NEVER eat, drink, apply cosmetics or lip balm, handle contact lenses in the lab. Do not store food or drinks in refrigerators in lab areas.

- Wash hands with a non-abrasive soap or antiseptic hand cleanser frequently
  - Before you eat, drink, apply cosmetics, handle contact lenses
  - Before and after using the rest room
  - After you remove gloves
What information is in the Standard Operating Procedures?

• **Needles and Sharps Precautions**
  
  • Because percutaneous exposure (through the skin) is a primary route of transmission of bloodborne pathogens, **extreme caution** should be taken with contaminated needles or sharps.
  
  • Sharps include items such as razor blades, scalpel blades, broken glass and plastic tips
  
  • Needles/contaminated sharps:
    • Must never be bent, recapped or removed unless there is no alternative
3. What information is in the Standard Operating Procedures?

• Needles and Sharps Precautions – Broken Glass
  – Wear gloves
  – Do NOT attempt to pick up pieces of broken glass with your gloved hands. The risk of being cut is too great.
  – Use tongs or a brush and dust pan-or even 2 pieces of stiff cardboard- to collect broken glassware.
3. What information is in the Standard Operating Procedures?

- **Proper Disposal of Needles, Sharps and Broken Glass**
  - Contaminated sharps must be placed in hard walled plastic containers labeled with the biohazard symbol.
  - If the sharps or pieces of broken glass are too large for the sharps container, the items must be placed in a puncture resistant container (such as a cardboard box) lined with a biohazard bag, clearly marked "GLASS AND SHARPS".
3. What information is in the Standard Operating Procedures?

- **Biohazardous Waste Management**
  - All solid biohazardous waste must be placed in red biohazard bags
    - These will be incinerated or steam sterilized before disposal.
  - All liquid biohazardous waste must be sterilized by autoclaving or treatment with approved disinfectant before drain disposal.
3. What information is in the Standard Operating Procedures?

- How to control splashes, aerosols and droplet production
- Remember, bloodborne pathogens may be transmitted by membrane exposure to droplets and aerosols

Use of sealed centrifuge rotors

Use of a biological safety cabinet
What can you do to minimize your risk?
These 5 points will be discussed in this training

1. What are Bloodborne Pathogens?
   The Exposure Control Plan

2. Observe Standard (Universal) precautions
   Biosafety Level 2 Containment and Practices

3. Follow the Standard Operating Procedures – SOP – in your lab

4. Make use of personal protective equipment - PPE

5. Report all accidents, spills and exposure incidents to your research advisor.
4. Use of Personal Protective Equipment

The minimum PPE required for the BSL-1 and BSL-2 laboratory is gloves, safety glasses (or goggles) and buttoned lab coats.

Additional PPE such as surgical masks or face shields may be required for procedures with a high probability for splashes, splatters and droplets or aerosol generation.
4. Use of Personal Protective Equipment

The minimum PPE required for the BSL-1 and BSL-2 laboratory is gloves, safety glasses (or goggles) and buttoned lab coats.

Additional PPE such as surgical masks or faceshields may be required for procedures with a high probability for splashes, droplets or aerosol generation.
Proper Use of Gloves

• Gloves should NOT to be worn outside of the work area.
  – DO NOT wear gloves to open doors or touch equipment (i.e. keyboards or door handles) that others will be handling without gloves.

• Gloves must be replaced as soon as possible after they become contaminated, torn, punctured or compromised.
  – Be extremely careful when using a flame- do not catch the gloves on fire!

• Disposable gloves cannot be reused.

• Gloves must be removed CORRECTLY prior to washing hands and leaving the laboratory.
  – With both hands gloved, pinch the top of one glove, carefully pull it off so that it is inside out and hold it in the gloved hand.
  – Using the ungloved hand, grab the inside top of the second glove and pull it off so that it is inside the first glove.

• PPE must be disposed of as biohazardous waste.
Proper Use of Lab Coats and Goggles

• Lab coats should be BUTTONED to protect your street clothing
• You must NOT take potentially contaminated lab coats home.
  • Handle soiled lab coats as little as possible, using gloves.
  • Place soiled lab coats in autoclavable bags; they may be laundered and reused after sterilization
• Eye/face protection should be used if splashes or sprays are a possibility when working outside a biosafety cabinet.
What are Standard Precautions?
What can you do to protect yourself from blood borne pathogens?

2. Observe Standard Precautions:
   • Assume that all human tissues and cells, living or dead, are infectious.
   • Treat all human tissues and cells as if they are known to be contaminated with blood borne pathogens.
What color are biohazard waste bags?
What types of materials go into biohazard waste bags?
3. What information is in the Standard Operating Procedures?

• Biohazardous Waste Management
  – All solid biohazardous waste must be placed in red biohazard bags
    • These will be incinerated or steam sterilized before disposal.
  – All liquid biohazardous waste must be sterilized by autoclaving or treatment with approved disinfectant before drain disposal.
3. What information is in the Standard Operating Procedures?

• Proper **Disposal** of Needles, Sharps and Broken Glass
  • Contaminated sharps must be placed in hard walled plastic containers labeled with the biohazard symbol.
  • If the sharps or pieces of broken glass are too large for the sharps container, the items must be placed in a puncture resistant container (such as a cardboard box) lined with a biohazard bag, clearly marked "GLASS AND SHARPS".
What is a standard operating procedure?
What is a standard operating procedure?

• Description of the “rules of the lab”
  – Recognize and reduce hazards
  – NEVER eat, drink, apply cosmetics or lip balm, handle contact lenses in the lab.
  – Wash hands with a non-abrasive soap or antiseptic hand cleanser frequently
  – Dispose of sharps, broken glass, and all potentially biohazardous waste properly
  – When to use PPE
  – Control of aerosol / droplet production
Hazard Recognition / Reduction

• Think before you do anything
  • What could happen? What is the worst thing that could happen?
  • What can I do to prevent it?
  • What will I do if I can’t prevent it?
What can you do to minimize your risk? These 5 points will be discussed in this training

1. What are Bloodborne Pathogens? The Exposure Control Plan
2. Observe Standard (Universal) precautions Biosafety Level 2 Containment and Practices
3. Follow the Standard Operating Procedures – SOP in your lab
4. Make use of personal protective equipment - PPE
5. Report all accidents, spills and exposure incidents to your research advisor.
5. What should you do in the event of a spill?

- Every lab member working at BSL-2 must follow the proper protocol in the event of a biohazardous spill to:
  - contain the contamination
  - minimize exposure to others

- Be familiar with your lab’s Standard Operating Procedure for spills and exposures.

- Household bleach at a 1/10 dilution is a very effective disinfectant. Other effective commercial disinfectants may be available in your labs.
5. What to do in the event of a spill

- Use appropriate PPE: gloves, goggles and lab coat
- If there is broken glass, it should be cleaned up using tongs or a dust pan and placed into either a sharps container or a biohazard bag that is inside a cardboard box.
5. What to do in the event of a spill cont’d

- Small spills should be treated with disinfectant-soaked absorbent material for at least 10 minutes
  - 10% bleach and paper towels are fine
  - If you are pouring disinfectant onto the spill, avoid generating splashes and aerosols.
- The paper towels should be placed in biohazard bag.
- Repeat the disinfection process.
5. What to do in the event of a spill, con’t

- All PPE should be placed into biohazard waste and hands thoroughly washed before leaving the lab.
- Report the incident to your PI immediately.
  - Complete an Incident and Accident Report Form
  - If the spill is large and/or you need assistance, contact the Biosafety Office
5. What to do in the event of an exposure

- Follow the procedure in your lab’s SOP and the F&M Exposure Control Plan.
  - Wash the affected area with disinfectant for 5-15 minutes.
  - For membrane exposure (eyes, nose, mouth) flush with water for 15 minutes.
  - Cover the wound.
Blood-borne pathogens may be introduced into a new host by:

– Broken skin
  • Cuts, abrasions, rash, acne
  • Needlesticks

– Any body opening or membrane
  • For example, eyes, nose or mouth
  • Droplets and aerosols

Secondary contact
5. What to do in the event of an exposure

• Report the incident to your PI immediately and to the Biosafety Officer (Dr. Stoehr – LSP 254D, 358-5975, sstoehr@fandm.edu)

• Exposure may require an immediate evaluation by a medical practitioner.
  – Go to Appel Health or Lancaster General Hospital

• Complete a Laboratory Incident and Accident Report Form - found in the back pocket of the Biosafety Manual notebook.

• Complete a Blood and Body Fluid Exposure form – found in Appendix C of the F&M Exposure Control Plan and in the back pocket of the Biosafety Manual notebook.
If you have any questions.... ever

• Ask your research advisor
• Check out the lab SOP, F&M Biosafety Manual and/or the F&M Exposure Control Manual
• Ask the Biosafety Officer
  – Dr. Stoehr
  – LSP254D
  – 358-5975
  – sstoehr@fandm.edu
Summary: Hazard Recognition / Reduction

- Think before you do anything
  - What could happen? What is the worst thing that could happen?
  - What can I do to prevent it?
  - What will I do if I can’t prevent it?
What should you do in the event of an exposure?
What to do in the event of an exposure

• Follow the procedure in your lab’s SOP and the F&M Exposure Control Plan.
  • Wash the affected area with disinfectant or flush for 5-15 minutes.
• Report the incident to your PI immediately and to the Biosafety Officer
• Exposure may require an immediate evaluation by a medical practitioner.
• Do the paperwork
  – Complete a Laboratory Incident and Accident Report Form
  – Complete a Blood and Body Fluid Exposure form
What should you do in the event of a spill?
What to do in the event of a spill

- Use appropriate PPE: gloves, goggles and lab coat
- If there is broken glass, it should be cleaned up using tongs or a dust pan and placed into either a sharps container or a biohazard bag.
- Small spills should be treated with disinfectant for 10 minutes, cleaned with absorbent material like paper towels. The paper towels should be placed in biohazard bag. Repeat the disinfection process.
What to do in the event of a spill, con’t

• All PPE should be placed into biohazard bag and hands thoroughly washed before leaving the lab.

• Report the incident to your PI immediately.
Who can answer your questions?
If you have any questions.... ever

- Ask your research advisor
- Check out the lab SOP, laboratory safety plan or the F&M Exposure Control Manual
- Ask the Biosafety Officer
  - Dr. Stoehr
  - LSP254D
  - 358-5975
  - sstoehr@fandm.edu
Take the Test!

When you are ready, you can take the Bloodborne Pathogen Training Post Test. It will be graded automatically and you will be able to determine if you passed. Passing requires a 100% Test score.

Good luck!