BLOODBORNE PATHOGENS
Bloodborne Pathogens

This bloodborne pathogens training program is required annually for MIT personnel who may reasonably anticipate contact with blood, human materials or other potentially infectious materials (OPIM) during the performance of their duties.
Bloodborne Pathogens (BBP) Standard

This program is set up to meet the requirements of the Occupational Safety and Health Administration (OSHA) Occupational Exposure to Bloodborne Pathogens 29 CFR 1910.1030.

This standard applies to all workers who are at risk of exposure to pathogenic microorganisms associated with human blood.

Since 1991, this OSHA standard has been a federal law.
Transmission of Bloodborne pathogens

- Contact with the mucous membranes of the eyes, nose, and mouth
- Breaks in the skin (rashes, hang nails, cuts, punctures, abrasions, acne)
- Needles Sticks

Bandage non-intact areas of the skin and wear double gloves to prevent transmission through the affected area.
Methods of Prevention
Lowering Personal Risk

- Good work practices
  - Washing Hands
  - Cleaning work surfaces/equipment before and after work
- Engineering Controls
Universal Precautions

• Treat ALL human materials as if they are known to be infectious.

• No guarantees: even dried blood could potentially transmit infection.
Personal Protective Equipment
What are Bloodborne Pathogens?
Pathogenic Microorganisms

Blood borne pathogens are pathogenic microorganisms that are present in human blood or other potentially infectious materials (OPIM) and can cause disease. Pathogenic microorganisms include, but are not limited to:

- HIV
- Hepatitis B
- Hepatitis C
- Malaria
- Syphilis
- Brucellosis
Other Potentially Infectious Materials (OPIM)

- Blood products, semen, vaginal secretions, saliva
- Any body fluid that is contaminated with blood/of an unknown source
- Unfixed tissues or organs
- Untested cells or cultures (most commercially available cell lines unless otherwise noted)
- Blood, organs, or other tissues from experimental animals infected with BBP
- Introduction of human-derived materials (i.e. tumor cells) into animals
- Any obscure red material from an unknown source where there could have been a blood spill (i.e. red jelly like substance outside a hospital dumpster)
Hepatitis B (HBV)

- DNA virus that causes chronic infection of the liver which may lead to liver disease, liver cancer, and death.
- Transmitted through blood, bodily fluids, and OPIMs, and can survive outside the host for more than 1 week.
- Leading exposure risk when working with Bloodborne Pathogens.
Hepatitis B (HBV)

- Approximately 10% of individuals infected with HBV become carriers.
- Symptoms may not occur until 2-6 months after initial exposure, and include:
  - Fever
  - Vomiting
  - Jaundice
  - Loss of appetite
  - Dark colored urine
  - Aches in muscles/joints
Hepatitis B Vaccination

- Free to employees who have reasonable anticipated exposure to blood or OPIMs.
- Series of 3 shots and provides both protective levels of antibody and lifelong immunity.
- It is not mandatory—you may opt to decline the vaccination by signing a declination form; even so, you can still decide to receive the series anytime during your employment.
Hepatitis B Vaccination Form

- Acceptance/Declination Form:
  Please fill out. Keep the PINK copy return WHITE and YELLOW copies.

- To schedule an appointment for the vaccine or to have an antibody titer taken call MIT Medical: 253-8552

- MIT Medical is located at:
  25 Carlton St. Building E23
Hepatitis C (HCV)

• RNA virus that causes infection of the liver and is the leading cause for liver transplants in the United States.
• Approximately 8,000–10,000 people die every year from Hepatitis C related liver disease.
• 80% of individuals with Hepatitis C may have no symptoms, but are still carriers.
Hepatitis C: Acute & Chronic

- Acute infection is a short-term illness occurring within the first 6 months after exposure.
- Approximately 75%–85% develop chronic infection.
- Chronic Hepatitis C is a serious disease that can result in long-term health problems, including liver damage, liver failure, liver cancer, or even death.
Human Immunodeficiency Virus (HIV)

- RNA virus that irreversibly destroys the immune system by attacking the T4 lymphocytes and depleting their population.

- Does not survive well outside the host: ~90-99% reduction of virus particles occurs within several hours.
Human Immunodeficiency Virus (HIV)

- Early Symptoms (6 weeks to 3 months)
  - Flu like symptoms
  - Fever
  - Rash
  - Muscle Aches
  - Swollen lymph nodes and glands

- Later Symptoms
  - Chronic yeast infections
  - Fever and/or night sweats
  - Easy bruising
  - Bouts of extreme exhaustion
  - Unexplained body rashes
  - Purplish lesions on skin or inside mouth
  - Sudden unexplained weight loss
  - Chronic diarrhea
Risk from a single needle stick or cut**

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<tr>
<td>HBV</td>
<td>6-30%</td>
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<td>HCV</td>
<td>2-10%</td>
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<td>HIV</td>
<td>0.3%</td>
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** from a known infected source
Human Cells/Tissues & Non-Human Primates
Primary Human Cells/Tissue & Primate Materials

- Materials should be handled at BL2 (including materials for injections and dosing in animals).
- **Primary human cells and primates present the greatest risk.**
- Culture collections are beginning to test human cell lines for standard latent viruses (ex. HIV, HBV, CMV, HCV, HTLV’s).
- MIT & EHS encourage researchers to use human cell lines that have been tested.
Research Blood Components tests for the following:

- HBsAg (Hepatitis B Surface Antigen),
- HBc (Hepatitis B core),
- HCV (Hepatitis C Virus),
- HIV (Human Immunodeficiency Virus),
- HTLV (Human T-cell Lymphotropic Virus),
- STS (Serological Test for Syphilis)

Other illnesses caused by BBPs:
- Malaria, Babesiosis, Brucellosis, Leptospirosis, Arboviral infections, Creutzfeldt-Jakob disease, Viral hemorrhagic fever
Appropriate Disinfectants for BBP

- OSHA mandates use of one of the following for disinfection of human-derived material

  - Diluted bleach solution (10% household bleach)
  - EPA-registered disinfectants effective against HIV and HBV ([http://www.epa.gov/oppad001/chemregindex.htm](http://www.epa.gov/oppad001/chemregindex.htm))

  - Must have EPA registration number that indicates it is effective for use with bloodborne pathogens
  - OSHA will NOT accept 70% Ethanol
Exposure Control Plan (ECP)

- Details policies and procedures to describe how employees will be protected from hazards presented by BBP encountered in the workplace.

- Available on site in the workplace, from your supervisor/PI, or from the MIT Biosafety program.

- Employees should be familiar with the ECP and know where it is located in the laboratory.
What Should I Do If I…
...Am Exposed to a BBP?

• Flush the wound/affected area thoroughly with water for 15 minutes. Use the eyewash, shower station, or lukewarm water at the sink.

• Go to MIT Medical for an evaluation.

• Report to your supervisor as soon as possible to document route of exposure, how it happened, time, place, etc.
MIT Medical

- E23– 25 Carlton St.
- Appt hrs: M-F
  - 8:30a-5p
- Urgent Care: Daily
  - 7a-11p
- Outside hours:
  - Call 617-253-4481
References and Image Sources

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• http://static.ddmcdn.com/gif/light-virus-1.jpg
• http://www.examiner.com/images/blog/wysiwyg/image/hand_washing%281%29.jpg
• http://www.thecuresafety.com/v/vspfiles/photos/S95P-2T.jpg
sign up for MIT Alert

• Sign up for MIT Alert
  http://emergency.mit.edu/mitalert

• Program your phone
  617-253-1212  (fire/ injury/ police 24/7)

This is part of the Institute's comprehensive emergency notification system. You will receive an SMS message on your cell phone in the event of life safety or public health emergencies.