Welcome to the UConn Health’s
Annual Bloodborne Pathogen Training Module

The Occupational Safety and Health Administration (OSHA) requires that any individual potentially exposed to human blood and/or body fluids in a clinical or research setting must be trained annually, and that this training be documented. Exposure to a human blood or body fluid means the possibility you will be splashed, sprayed, contaminated, stuck with a used needle or cut with a device that could be contaminated with someone else’s blood or body fluid.

Thank you for your cooperation with this regulatory requirement
Bloodborne Pathogen Training

- Employees must report any occupational accident, illness, or hazardous exposure to their supervisor AND by phone to Human Resources (x4589).
- Contact Environmental Health & Safety x2723 if you have any questions
- Contact Employee Student Health Services for medical questions (x2893)
- Contact (JDH Staff) Epidemiology Department (x4376 – “GERM”) for infection control issues.
Use Engineering Controls to Reduce Risk of Bloodborne Pathogen Exposures from Needlesticks

“safety” syringe/needle systems must be used where applicable to reduce the risk of a contaminated needlestick exposure (when the needle will pierce human skin or be used with human blood, cells, body fluids, infectious agents, etc.) This requirement applies to all clinical and laboratory (research) activities.

“Hierarchy of Safety/Control”
Instructions for Use

1. Open MONOJECT MAGELLAN package by peeling back paper tab.
2. Remove protective needle sheath.
3. Draw up medication and administer injection, according to institutional protocol.
4. Lock the safety shield using any of the following methods:
   - Thumb
   - Finger
   - Flat surface
5. Verify locked position through audible and tactile "click". Locked position will completely cover needle tip.
6. Once safety shield is locked, immediately dispose of needle and syringe in an approved sharps container.

Needle Gauge Colors

All MONOJECT MAGELLAN Safety Needles are ISO color-coded.
Bloodborne Pathogen Training

UConn Health Bloodborne Pathogen Exposure Control Program

- Identifying Those at Risk
- BBP Training
- Offering Hep. B Immunizations
- Preventing Exposures
- Evaluating & Treating Exposures
- Properly Disposing of Waste
In addition to blood, other fluids may also present an infection risk. OSHA defines these as “Other Potentially Infectious Materials” or OPIM. These are listed below.

- Synovial Fluid
- Pleural Fluid
- Semen
- Amniotic Fluid
- Peritoneal Fluid
- Saliva in Dental Procedures
- Pericardial Fluid
- Vaginal Secretions
- Cerebrospinal Fluid
- HIV or HBV Cultures
- Bloody Body Fluids
- Unfixed Human Tissue
- Unfixed Human Cell Lines
Bloodborne Pathogens are disease causing microorganisms that could be present in human blood, tissue or cells.

While Hepatitis B, Hepatitis C and HIV (Human Immunodeficiency Virus) are emphasized in the health care setting, there are certainly other viral or bacterial infections which could be of concern.
Bloodborne Pathogen Training

Employer Responsibilities Include

- Implementing a written plan.
- Enforcing good work practices that include disinfecting surfaces, following standard precautions, and proper waste disposal.
- Controlling exposures through the appropriate use of sharps containers, biosafety cabinets, needleless IV systems, and self-sheathing needles.
- Training employees initially and through annual updates.
- Providing Personal Protective Equipment (PPE): gloves, gowns/aprons, eye protection (i.e., goggles, faceshields, side shields) and surgical mask
- Identifying hazards by proper labeling of: incubators, freezers and centrifuges
- Managing biomedical wastes properly.
Bloodborne Pathogen Training

Individual Responsibilities

Your Actions are key to good exposure control. These include:

- Attending/completing training.
- Complying with and enforcing UConn Health’s Exposure Control Plan.
- Promptly reporting exposures.
- Segregating medical waste properly.
- Properly selecting, wearing, removing, and disposing of Personal Protective Equipment (PPE).
- Promptly reporting non-compliance to senior administration.
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Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV)

- Bloodborne viruses
- Can produce chronic infection
- Transmissible in healthcare settings
- Transmissible in research settings
- Data from multiple sources (e.g., surveillance, observational studies, serosurveys) used to assess risk of occupational transmission
Based on CDC estimates, 384,325 (95% CI 311,091 - 463,922) percutaneous injuries are sustained by healthcare personnel in US hospitals annually.

Frequency of percutaneous injury varies by occupational group and healthcare setting.

At UConn Health (campus wide) there were 40 reported blood and body fluid exposures from January 1, 2016 – December 31, 2016.
**Bloodborne Pathogen Training**

**Risk of Bloodborne Virus Transmission After Occupational Percutaneous Exposure in Susceptible Hosts if Left Untreated**

<table>
<thead>
<tr>
<th>Source</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBV</td>
<td></td>
</tr>
<tr>
<td>HBeAg +</td>
<td>22.0-30.0%</td>
</tr>
<tr>
<td>HBeAg -</td>
<td>1.0-6.0%</td>
</tr>
<tr>
<td>HCV</td>
<td>1.8%</td>
</tr>
<tr>
<td>HIV</td>
<td>0.3%</td>
</tr>
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</table>
Important Steps in Preventing Transmission of Bloodborne Viruses in Healthcare Settings

- Obtain hepatitis B vaccination
- Treat all human blood, body fluids, unfixed tissue and human cells as potentially infectious
- Use barriers (PPE) to prevent contact
- Use appropriate safety devices and proper work practices to minimize exposure risks
- Safely and promptly dispose of sharps and blood-contaminated materials in appropriate receptacles
Factors Influencing Occupational Risk of Bloodborne Virus Infection

- Prevalence of infection among patients
- Nature and type of exposure, for example splash to mucous membranes, cut, needlestick, non-intact skin contamination
- Quantity of blood involved and concentration of organism in the source blood
Hepatitis B - Symptoms

Only a small portion of acute Hepatitis B infections may be clinically recognized.

Symptoms may include:

- Loss of appetite
- Vague abdominal discomfort
- Nausea and vomiting
- Joint pain and rash
- Jaundice or yellowing of the skin
- Fever
Hepatitis B can be transmitted in three ways:

1. Sexual transmission
   - Either homosexual or heterosexual

2. Occupational transmission
   - Such as an injury with contaminated needles and sharps. Hepatitis B has been transmitted from percutaneous, mucosal exposures, and human bites. It can survive outside the body for at least 7 days in the environment and still cause infections.

3. Perinatal transmission
   - Virus can be transmitted from a mother to her infant during pregnancy and/or delivery
Hepatitis B - Vaccine Available

A safe and effective vaccine against Hepatitis B is available to all “potentially at risk” UConn Health individuals.

You are “potentially at risk” if you have direct contact with blood and other potentially infectious body fluids. It doesn’t matter how frequently you have contact or that you take precautions when you do.

The vaccine is provided at no cost to you and available through Employee Student Health Services (x2893).
Hepatitis C Virus

- Most common chronic bloodborne infection in U.S.
- 3.9 million Americans (1.8%) have current or past infection with HCV
- 40% of chronic liver disease HCV-related, leading to 8-10,000 deaths annually
- HCV-associated end-stage liver disease most common indication for liver transplants in U.S. adults
### Patient-to-HCW Transmission of HCV After Exposures to HCV-Positive Blood

<table>
<thead>
<tr>
<th>Type of Exposure</th>
<th>No. (Range) Tested</th>
<th>Seroconverted No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needlestick/sharps</td>
<td>911 (50-436)</td>
<td>16 (1.8)</td>
</tr>
<tr>
<td>Hollowbore</td>
<td>311</td>
<td>4 (1.2)</td>
</tr>
<tr>
<td>Other</td>
<td>105</td>
<td>0</td>
</tr>
<tr>
<td>Mucous membrane</td>
<td>114 (29-85)</td>
<td>0*</td>
</tr>
<tr>
<td>Nonintact skin</td>
<td>165 (40-125)</td>
<td>0</td>
</tr>
</tbody>
</table>

* Two case reports of transmission from blood splashes to the eye
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Postexposure Prophylaxis for HCV

- Currently no post-exposure prophylactic treatment exists
- Early identification is critical in managing the disease and improving outcomes
Post Exposure Management:
Follow-up HCV Testing of HCW

- If HCV-positive source, test for anti-HCV and ALT 3-6 months after exposure
- Perform HCV-RNA at 4-6 weeks for earlier diagnosis of HCV infection, if symptoms appear or if ALT increases
HIV - Symptoms

Within several weeks to several months after infection with the human immunodeficiency virus (HIV), many individuals, if left untreated, develop an acute self-limiting mononucleosis-like illness lasting for a week or two. These individuals remain infected and can transmit the infection to others.

Infected people may then be free of clinical symptoms for many months to years before clinical manifestations, including opportunistic infections and constitutional and neurological symptoms appear.
HIV - Modes of Transmission

- Blood Contacts – needlestick and exposure of non-intact skin and mucous membranes
- Sexual Contact – exchange of vaginal secretions and/or semen
- **Mother to Infant** – transmission can occur throughout the perinatal period – during pregnancy, at delivery & through breastfeeding
HIV - No Vaccine Available

- Currently there is no vaccine available for the prevention of HIV infection.
- Research continues toward the development of an “AIDS” vaccine.
- The best option, following an exposure, is prompt treatment with antiviral medication.
Segregating Medical Waste
How do I choose appropriate personal protective equipment?

First, determine the potential for contact with blood and other potentially infectious materials (OPIM). Then select the items that will prevent your skin, mucous membranes, and clothing from becoming contaminated.
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I’ve Been Stuck!!

Promptly wash or flush the affected area and notify your supervisor! The CDC currently recommends treatment within 2 hours of exposure.

Do not squeeze (milk) the wound site.

Avoid the use of bleach and caustic agents.
When should I be evaluated?

Promptly! You need to be evaluated as soon as possible after the exposure so that the severity of the injury can be assessed.

Serious exposures will require the initiation of drug therapies that are believed to be most effective when given within a few hours of the exposure.
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Where do I go to be evaluated and treated?

Employee Student Health Services is open Monday – Friday from 8:00 AM – 4:30 PM for occupational exposures to blood and body fluids. They are located at the Outpatient Pavilion floor 2 East, Phone: 860-679-2893.

A shuttle bus can bring you to the Outpatient Pavilion.

Employee Student Health Services
x2893
Where do I go to be evaluated and treated?

The Emergency Department will provide preliminary post-exposure treatment for occupational exposures when Employee Health Service is not open. Generally, this would include evenings, nights, weekends and major holidays. The Emergency Department will assess the exposure and administer appropriate therapy. Employee Health Service will then follow-up on the next working day.

It is critical that you also obtain follow-up care with Employee Student Health Services the next business day by calling X-2893.

The Emergency Department is located on the basement level of the new University Tower.
Must I do anything else?

YES! UConn Health employees, after appropriate medical evaluation, need to call Human resources (x4589) and complete an Occupational Injury/Illness report over the phone. Non-UConn Health employees should file their employer’s required form.
Signs & Labels

The biohazard symbol is reserved for indicating material with potential infection risks.

At UConn Health universal precautions are used – all samples with blood/body fluids are considered infectious.
Bloodborne Pathogen Training

Signs & Labels

The biohazard symbol is not needed for specimens of human materials remaining in the UConn Health that are easily recognized as requiring bloodborne pathogen controls.
Bloodborne Pathogen Training

Signs & Labels

Refrigerators, incubators, and freezers containing or contaminated with biohazardous materials require a biohazard symbol and be stored in a secure/restricted area or kept locked at all times.
Bloodborne Pathogen Training

Shipping Specimens & Infectious Agents

Human specimens or infectious agents sent from UConn Health or sent here, must be labeled and packaged according to DOT regulations. These regulations also require that you be trained. Contact Environmental Health & Safety to arrange for shipping.
Other Issues

Sharps containers must be changed frequently enough so that they never become overfilled. UConn Health has contracted with a private vendor to manage the sharps program. To reduce the potential of injury due to an overfilled container, replace the sharps container when it is ¾ full. If you have any questions, contact Facilities Development & Operations at x2125.
Bloodborne Pathogen Training

Other Issues

One of the best techniques for the prevention of infection is the adherence to hand hygiene guidelines.

Wash your hands!
You are at risk for occupational exposure to Bloodborne Pathogens. UConn Health’s Exposure Control Plan outlines the steps necessary to reduce infection risk. A copy is available from Environmental Health & Safety, x2723.

When accidents occur, prompt medical attention is necessary. The CDC recommends treatment within 2 hours.

Prevention is the key.
BSL-2 is required for research involving biological agents of moderate* potential hazard to personnel and the environment.

At UConn Health, BSL-2 containment is considered equal to or better than Universal Precautions; many of the same principles apply.

At UConn Health, the 5th Edition (2007) of *Biosafety in Microbiological and Biomedical Laboratories* (BMBL; CDC/NIH) and any lab-specific safety protocols are considered the “Biosafety Manual” for research laboratories. BSL-2 requirements may be found in Section IV of the BMBL online.

UConn Health has its own Biosafety Webpage (http://research.uchc.edu/rcs/ehs/biosafety) which is meant to be a comprehensive and UConn Health specific resource.

* Immunization or antibiotic treatment is often available. Extreme precaution with contaminated needles or sharp instruments.
Bloodborne Pathogen Training for Research Staff

- Requirements* under the law for research staff who are potentially exposed to human blood and “other potentially infectious [human] material” are identical to those for Health Care Workers:
  - Initial BBP Training and Annual BBP Training annually thereafter. (Environmental Health & Safety has records of this - x2723.)
  - Medical Surveillance, including the HBV vaccination or documented declination. (The Employee Student Health Services has records of this - x2893.)

- A detailed explanation of all necessary institutional training requirements for researchers can be found at http://research.uchc.edu/rcs/ehs/biosafety/ibc-training.
Examples of agents frequently assigned to BSL-2:

- Bloodborne Pathogens as defined above (except in strict HIV or HBV research, which requires higher containment)
- Other Potentially Infectious [Human] Material (OPIM):
  - Human body fluids/particularly when visibly contaminated with blood
  - Human primary cultures and established cell lines.
- Herpes, EBV, Hepatitis C viruses
- *Listeria monocytogenes*, *Salmonella* spp.
- Non-Human Primate cell lines, primary cells, body fluids or tissues.
There is a clarification in the OSHA documentation* about established cell line cultures:

- If they are capable of propagating viruses, they are considered OPIM under the law unless:
  - They have been tested, shown to be free of all human pathogens and documented as such by the institution.
- They should be manipulated at BSL-2. (Cell lines, to protect the culture are already usually manipulated in biosafety cabinets. To achieve BSL-2, add the operator-protective aspects of BSL-2 containment.)

ATCC BSL classifications and the fact that human (or non-human primate) cell lines come from ATCC does not assure that the cell lines have been tested and are free of pathogens. See http://www.atcc.org/support/faqs/26699/Biosafety%20level%20for%20ATCC%20cultures-9.aspx

See the OSHA letter of interpretation at:
See the double asterisk at the bottom of the letter.
Your first defense at BSL-2 containment is standard microbiological practices, including:

- Limited access to BSL-2 containment. Post a biohazard sign when manipulating biohazardous materials.
- Wash hands after handling infectious material (even after gloves).
- No eating, drinking, handling contact lenses, applying cosmetics, food storage, in containment. For contacts, wear goggles.
- No mouth pipetting. Use mechanical pipettes.
- Follow safe handling rules for sharps.
- Be careful to minimize aerosols. For techniques that cause aerosols, e.g., centrifugation, the aerosols are contained in a biological safety cabinet.
- Decontaminate work surfaces after use and after spills.
- Disinfect cultures before they go into regulated medical waste.
- Lab directors provide adequate training, have evidence of staff proficiency and require medical surveillance for staff.
Bloodborne Pathogen Training for Research Staff

Biosafety Level 2 - Facility Design (Secondary Barriers)
Biosafety Level 2 - Facility Design (Secondary Barriers)

Requirements including:

- Laboratories have lockable doors
- Sink for hand washing
- Work surfaces easily cleaned/disinfected
- Bench tops are impervious to water
- Biological safety cabinets installed as needed (certified annually)
- Adequate illumination
- Eyewash readily available
- Air flows into lab without re-circulation to non-lab areas
Restricted access when work in progress.
Bloodborne Pathogen Training for Research Staff

Biosafety Level 2 - Laboratory Facilities
(Secondary Barriers) BSL - 1 Facilities PLUS:

- Autoclave available
- Eyewash station available
  - Flush unit weekly
Biosafety Level 2 – Safety Equipment (Primary Barriers)

- Personal Protective Equipment (PPE) and Engineering Controls including:
  - Dermal protection: gloves, labcoat, eye/face shielding
  - Respiratory protection:
    - Use certified (annually) Class II biosafety cabinets (BSC) for work with infectious agents involving:
      - Aerosols and splashes
      - Large volumes
      - High concentrations
    - Respirators do not replace BSCs; BSC’s are first choice for protection. Respirators may be added.
Biosafety Level 2 - Safety Equipment (Primary Barriers)

- Class II Biosafety Cabinet (BSC)
  - Airflow
  - Equipment/workflow layout:
  CLEAN>>>>>>>>>>>>>>>>>>>>>>>>>DIRTY

Diagram:
- HEPA filter
- Room Air
- Potentially contaminated air
- HEPA Filtered air
- Positive pressure
- Negative pressure

Section View
Front View
Supervision
- Supervisor is a competent scientist with increased responsibilities and authorization to use agent
  - Limits access to persons with proper training and medical surveillance, e.g., immunizations.

Lab Personnel
- Have proper training & medical surveillance
- Aware of potential hazards
- Proficient in practices/techniques
Bloodborne Pathogen Training for Research Staff

Biosafety Level 2 - Special Practices

- Policies and procedures for entry
- Biohazard warning signs
- Biosafety manual specific to lab
- Training with annual updates
Bloodborne Pathogen Training for Research Staff

Biosafety Level 2 - Special Practices

Biological Safety Officer (x3781)

- Answer questions
- Ensure compliance
- Assist with hazard/risk assessment
- Review protocols
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Biosafety Level 2 - Special Practices

Needles & Sharps Precautions

- Use sharps containers
- DON’T break, bend, re-sheath or reuse syringes or needles
- DON’T place needles or sharps in office waste containers
- DON’T touch broken glass with hands
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Biosafety Level 2 - Special Practices

- Use leak-proof transport containers
- Immunizations
- Baseline serum samples
- Protocol approvals
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Biosafety Level 2 - Special Practices

- Decontaminate work surfaces
- Report spills and accidents to Environmental Health & Safety x2723,
- For emergencies, x7777
- Clinical post exposure policies/procedures also apply to the research community. (ex: seek treatment within 2 hours)

Disinfectants do not replace standard microbiological practices or good hygiene!
The Federal Government restricts the possession, use or shipping of certain “Select Agents” and prosecutes those not complying. Go to the CDC website http://www.selectagents.gov/SelectAgentsandToxinsList.html or call the Biological Safety Officer (x3781)
You have now completed your annual Bloodborne Pathogen Refresher training.

THANK YOU!
Think Safety First!