Bloodborne Pathogens Training

Compliance with OSHA Standard 29 CFR 1910.1030

This Training Will Cover

- Introduction to the OSHA Standard 29 CFR 1910.1030
- Epidemiology, symptoms and modes of transmission of bloodborne diseases
- Recognizing tasks that may involve exposure
- Work practices and other methods for reducing exposure
- Signage and labels
- Proper use of Personal Protective Equipment (PPE) and how to select PPE
- Specifics on the Hepatitis B vaccine
- Emergency procedures; including incident reporting, post-exposure evaluation and follow-up

29 CFR 1910.1030 History of the OSHA Standard

- OSHA published the final bloodborne pathogens standard in 1991 in response to the significant health risk associated with occupational exposure to blood and other potentially infectious materials.
- The standard applies to employees who have occupational exposure to the presence of blood or other potentially infectious materials in their job tasks.
- The standard was revised in 2001 to incorporate points from the Needlestick Safety and Prevention Act

What Are Bloodborne Pathogens (BBP)?

- *Bloodborne Pathogens* are pathogenic microorganisms present in human blood that can cause disease in humans.

Many types of microorganisms can be bloodborne, however the primary concerns of the OSHA standard include the human immunodeficiency virus (HIV) and the hepatitis B and hepatitis C viruses.

What Types of Materials are Included in the OSHA Standard?

Blood : human blood, human blood components, and products made from human blood.

Other Potentially Infectious Materials (OPIM) :

(1) Human body fluids such as semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids;

(2) Any unfixed tissue, organ, or cells *** from a human (living or dead); and

(3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

***Unless cells (cell lines, cell strains, explants) can be proven negative for **all known** Bloodborne Pathogens, they are considered OPIM under the BBP standard.

What Are The Risks of Working With Human Derived Materials?

- Occupational exposure to blood, blood products or OPIM could put you at risk of contracting Hepatitis B or Hepatitis C, which are serious diseases of the liver; or HIV, Human Immunodeficiency Virus.

Who Is Covered By the Standard?

- All personnel employed by UNH with occupational exposure to blood or other potentially infectious materials are covered by the standard.

- *Occupational Exposure* means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

Requirements of the Standard

- Implement Universal Precautions
- Identify and use engineering controls, work practice controls and Personal Protective Equipment (PPE)
- Provide **annual** Bloodborne Pathogens training
- Make the Hepatitis B vaccine available to all employees with occupational exposure
- Use signs and labels to communicate hazards.
- Provide employees an opportunity to evaluate and give input on safer engineered sharps devices and needleless systems used in their work
- Keep a log of all needle sticks that occur at work

Exposure Control Plan

UNH details work practices in the Exposure Control Plan.

This is a written plan to describe the process for eliminating or minimizing occupational exposures.

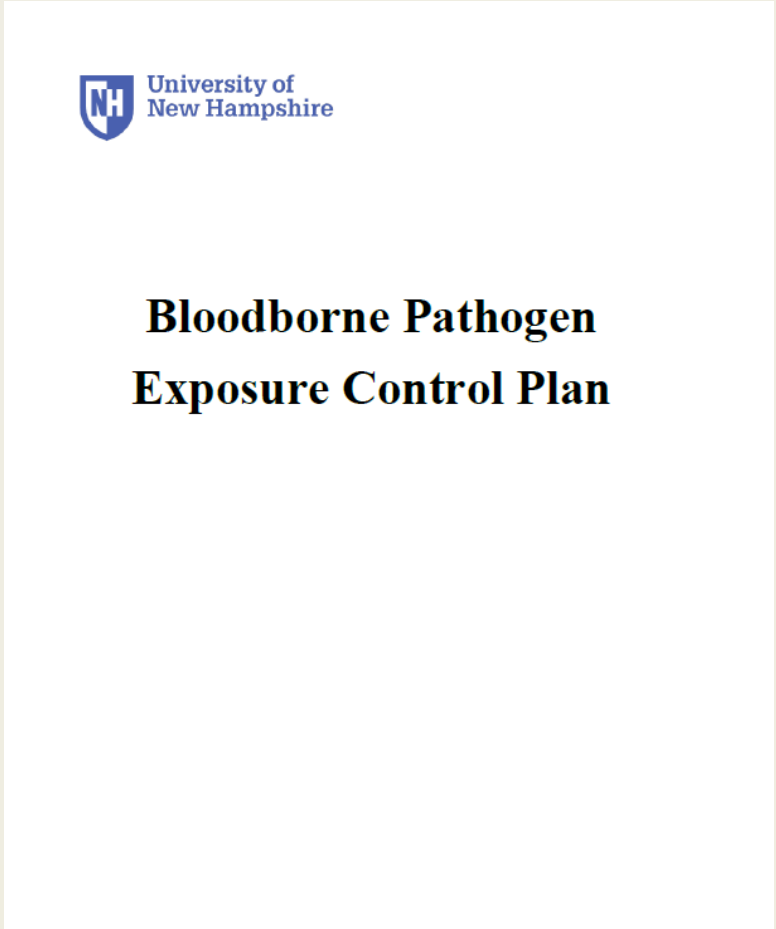
The Exposure Control Plan also documents UNH's Exposure Determination.

Departments with personnel that have potential exposure to blood or OPIM must create a list of job classifications in which workers have occupational exposure. These classifications are accompanied by a list of the tasks and procedures performed by those workers that result in their exposure. This process is the Exposure Determination.

UNH's Exposure Control Plan

UNH's Exposure Control Plan can be found on the web at:

http://www.unh.edu/research/bloodborne-pathogens



UNIVERSAL PRECAUTIONS

The Exposure Control Plan lists a number of work practices based on job function to prevent exposures to Bloodborne Pathogens. In addition, all personnel utilize Universal Precautions when handling human derived materials.

"Universal Precautions" is an approach to infection control. According to the concept of Universal Precautions, **all human blood and OPIM are treated as if known to be infectious** for HIV, HBV, and other bloodborne pathogens.

Using strict handling practices is key to universal precautions.

The Pathogens

Hepatitis B Virus

Hepatitis B is an infectious liver disease. It is caused by the hepatitis B virus (HBV). Infections of hepatitis B occur only if the virus is able to enter the blood stream and reach the liver.

Once in the liver, the virus reproduces and releases large numbers of new viruses into the bloodstream.

10% of people who develop hepatitis B become carriers of the disease. Their blood remains infected for months, years, sometimes for life.

70% of carriers develop chronic persistent hepatitis B. Most do not appear to be ill.

The remaining 30% of carriers experience continuous (chronic) liver disease. This condition often progresses to cirrhosis of the liver and then, after 30 to 40 years, possibly to liver cancer.

Hepatitis B Transmission

- Sharps injuries, including needle sticks, are among the most efficient modes of HBV transmission. These exposures probably account for only a minority of HBV infections, however.
- The more common route of entry is direct or indirect blood or body fluid exposures that transmit HBV into scratches, abrasions, burns, other lesions in the skin, or on mucosal surfaces.
- HBV has been demonstrated to be very stable outside the body and can survive in dried blood at room temperature on surfaces or fomites.
  - Fomites are inanimate objects or substances, such as clothing, furniture, pens or personal electronic devices capable of transmitting infectious organisms from one individual to another.

More On Transmission

- The incubation period (the time between initial contact with the virus and onset of the disease) for hepatitis B ranges from 45 to 180 days.

- HBV is found in highest concentrations in blood and in lower concentrations in other body fluids (e.g., spinal fluid, wound exudates, etc.).

Hepatitis Symptoms

- An infection with Hepatitis B virus can cause
  - Nausea
  - Headache
  - Fatigue
  - Fever
  - Flu-like symptoms
- Infection may also cause no symptoms at all
- Jaundice, a yellowing of the whites of the eyes and/or skin, can also be symptomatic of a hepatitis infection

Protection From Hepatitis B

Vaccination prevents Hepatitis B infection.

The hepatitis B vaccine is a safe vaccine that includes 3 shots:

- 1st shot
- 2nd shot administered 1 month after the first shot
- 3rd shot administered 6 months after the first shot

A titer (measurement of antibodies in the blood) should be determined approximately 6-8 weeks after the third shot.

The vaccine and titer are available to all those employees covered by the Exposure Control Plan at no cost and can be received at any time during employment.

A vaccination form must be on-file at EHS following your initial Bloodborne Pathogens Training.

Hepatitis B Form

- If you are a UNH employee covered by the Exposure Control Plan, download the Hepatitis B form at: http://www.unh.edu/research/bloodborne-pathogens

- Forward the completed form to:

  Office of Environmental Health and Safety

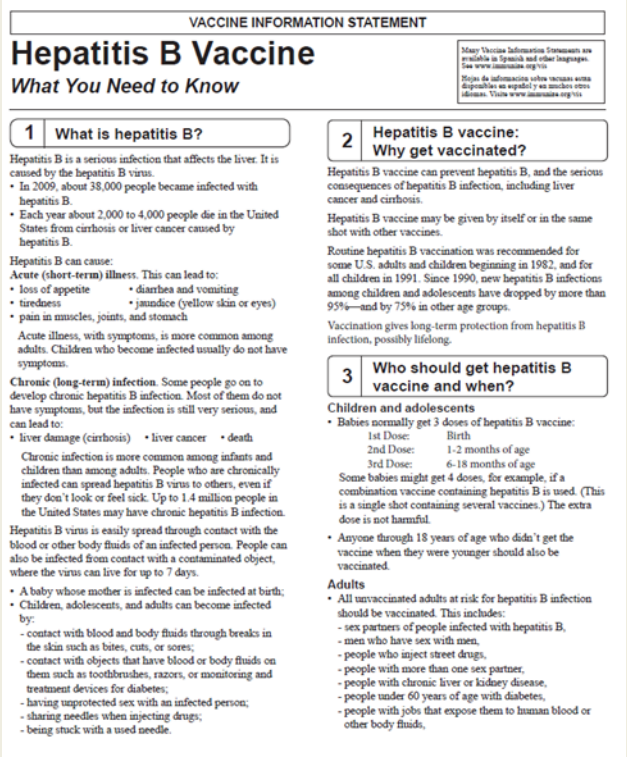
  Perpetuity Hall

  ATTN: Biosafety Officer

- If you do not have access to the internet, ask your supervisor to provide you with the form

Want To Know More?

If you would like more information on the Hepatitis B vaccine, ask the Biosafety Officer for the Centers For Disease Control Fact Sheet, or talk to the Occupational Health Physician or your Primary Care Physician.



VACCINE INFORMATION STATEMENT

Hepatitis B Vaccine

What You Need to Know

Many Vaccine Information Statements are available in Spanish and other languages. See www.immunize.org/vis

Hojas de información sobre vacunas están disponibles en español y en muchos otros idiomas. Visite www.immunize.org/vis

1 What is hepatitis B?

Hepatitis B is a serious infection that affects the liver. It is caused by the hepatitis B virus.

- In 2009, about 38,000 people became infected with hepatitis B.
- Each year about 2,000 to 4,000 people die in the United States from cirrhosis or liver cancer caused by hepatitis B.

Hepatitis B can cause:

Acute (short-term) illness. This can lead to:

- loss of appetite
- diarrhea and vomiting
- tiredness
- jaundice (yellow skin or eyes)
- pain in muscles, joints, and stomach

Acute illness, with symptoms, is more common among adults. Children who become infected usually do not have symptoms.

Chronic (long-term) infection. Some people go on to develop chronic hepatitis B infection. Most of them do not have symptoms, but the infection is still very serious, and can lead to:

- liver damage (cirrhosis)
- liver cancer
- death

Chronic infection is more common among infants and children than among adults. People who are chronically infected can spread hepatitis B virus to others, even if they don't look or feel sick. Up to 1.4 million people in the United States may have chronic hepatitis B infection.

Hepatitis B virus is easily spread through contact with the blood or other body fluids of an infected person. People can also be infected from contact with a contaminated object, where the virus can live for up to 7 days.

- A baby whose mother is infected can be infected at birth;
- Children, adolescents, and adults can become infected by:
  - contact with blood and body fluids through breaks in the skin such as bites, cuts, or sores;
  - contact with objects that have blood or body fluids on them such as toothbrushes, razors, or monitoring and treatment devices for diabetes;
  - having unprotected sex with an infected person;
  - sharing needles when injecting drugs;
  - being stuck with a used needle.

2 Hepatitis B vaccine: Why get vaccinated?

Hepatitis B vaccine can prevent hepatitis B, and the serious consequences of hepatitis B infection, including liver cancer and cirrhosis.

Hepatitis B vaccine may be given by itself or in the same shot with other vaccines.

Routine hepatitis B vaccination was recommended for some U.S. adults and children beginning in 1982, and for all children in 1991. Since 1990, new hepatitis B infections among children and adolescents have dropped by more than 95%—and by 75% in other age groups.

Vaccination gives long-term protection from hepatitis B infection, possibly lifelong.

3 Who should get hepatitis B vaccine and when?

Children and adolescents

- Babies normally get 3 doses of hepatitis B vaccine:
  - 1st Dose: Birth
  - 2nd Dose: 1-2 months of age
  - 3rd Dose: 6-18 months of age

  Some babies might get 4 doses, for example, if a combination vaccine containing hepatitis B is used. (This is a single shot containing several vaccines.) The extra dose is not harmful.
- Anyone through 18 years of age who didn't get the vaccine when they were younger should also be vaccinated.

Adults

- All unvaccinated adults at risk for hepatitis B infection should be vaccinated. This includes:
  - sex partners of people infected with hepatitis B,
  - men who have sex with men,
  - people who inject street drugs,
  - people with more than one sex partner,
  - people with chronic liver or kidney disease,
  - people under 60 years of age with diabetes,
  - people with jobs that expose them to human blood or other body fluids,

http://www.cdc.gov/vaccines/hcp/vis/vis-statements/hep-b.pdf

Hepatitis C Virus

- Hepatitis C virus (HCV) infection is the most common chronic bloodborne infection in the United States; approximately 3.2 million persons are chronically infected.
- There were 1,778 reported cases of acute HCV in 2012—a 75% increase compared with the number of cases reported in 2010. This number represents an estimated 21,870 acute cases.
- The number of acute cases of hepatitis C reported in the United States increased 45%, from 1,229 in 2011 to 1,778 in 2012.

Hepatitis C: The Numbers

- Sixty to 70% of persons newly infected with HCV typically are asymptomatic or have a mild clinical illness.
- The average time from exposure to the virus and antibody detection is 8–9 weeks.
- Chronic HCV infection develops in 70%–85% of HCV-infected persons; 60%–70% of chronically infected persons have evidence of active liver disease.
- The majority of infected persons might not be aware of their infection because they are not clinically ill. However, infected persons serve as a source of transmission to others and are at risk for chronic liver disease or other HCV-related chronic diseases decades after infection.

HCV Transmission

- HCV is most efficiently transmitted through large or repeated exposure to infected blood.
- HCV is not transmitted efficiently through occupational exposures to blood.
- Transmission rarely occurs from mucous membrane exposures to blood, and no transmission has been documented from intact or non-intact skin exposures to blood.

At this time, there is no vaccine for Hepatitis C virus.

Hepatitis C Infection

- Symptoms of a Hepatitis C infection are similar to Hepatitis B and can include:
  - Mild flu-like symptoms
  - Feeling very tired
  - Sore muscles and joint pain
  - Fever
  - Nausea or poor appetite
  - Stomach pain

Human Immunodeficiency Virus (HIV)

- Human Immunodeficiency Virus is a virus that weakens your immune system by destroying important cells that fight disease and infection. Over time, HIV can destroy so many immune cells that your body can't fight infections and diseases anymore. When that happens, HIV infection can lead to Autoimmune Deficiency Syndrome, otherwise known as AIDS.
- Unlike other types of viruses, your immune system cannot rid your body of the virus. Once you have HIV, you have it for life.
- Not everyone who has HIV progresses to AIDS. Quick diagnosis of infection and proper treatment can control the virus so that a person with HIV can live a longer, healthier life and reduce the risk of transmitting the virus.

HIV: Fast Facts

- Occupational transmission of HIV to workers is extremely rare.
- CDC recommends proper use of safety devices and barriers to prevent exposure to HIV in the health care setting.
- For workers who are exposed, CDC has developed recommendations to minimize the risk of developing HIV.

HIV Symptoms

- As with the other two viruses, HIV can cause symptoms such as:
  - Fever
  - Headache
  - Weakness
  - Flu-like symptoms

Potential For Exposure

Tasks That May Cause Exposure

Each department at UNH that is covered by the Bloodborne Pathogens Standard has identified tasks that may cause exposure to the pathogens. Examples include:

Nursing and Health Services

- Handling patients
- Manipulating needles/syringes
- Testing blood/OPIM

Housekeeping

- Cleanup of blood spills
- Removal of waste

Athletics and Recreation

- Handling needles and syringes
- Wound care and first aid

Academic Classes Using Blood

- Handling vials
- Using needles/syringes

Tasks That May Cause Exposure In Labs or a Clinical Setting

Many lab and clinical procedures have the potential for injection exposure, mucous membrane exposure, or dermal exposure. These include:

- Use of needles or other sharps
- Splash, splatter or aerosols associated with centrifugation, sonication, or vortexing
- Exposure into cuts, abrasions, burns or other compromised skin conditions

Recognize Exposure Risks

The tasks mentioned are just examples of exposure related tasks. For the full list, review the Exposure Determination for your department in the Exposure Control Plan.

Be aware of any procedures in your work day that use sharps, create aerosols, or have the potential to generate splashes.

Biosafety and Prevention

Engineering Controls

Engineering Controls are the primary means of protection from potential exposure.

Engineering Controls include:

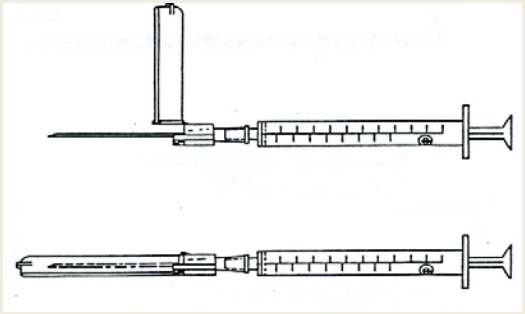
1. Sharps disposal containers
2. Safer medical devices, such as sharps with engineered sharps injury protections and needleless systems
3. Biological Safety Cabinets (BSC) used when splash, splatter or aerosols may occur

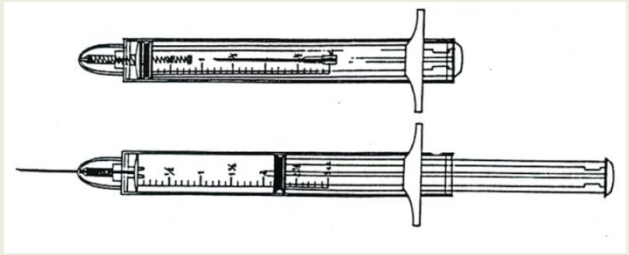
1. Sharps Containers

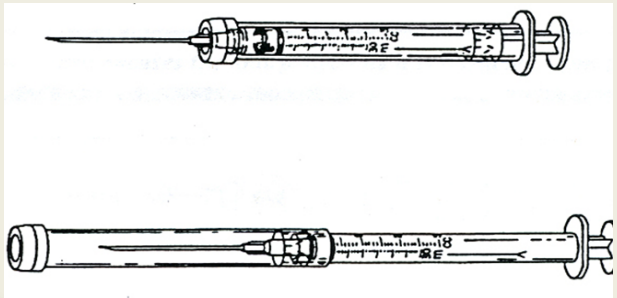
- Sharps containers are hard-walled containers that snap closed when full.
- These containers should never be overfilled; snap the lid closed when the container is approximately ¾ full.
- The container must be labeled with the biohazard symbol.

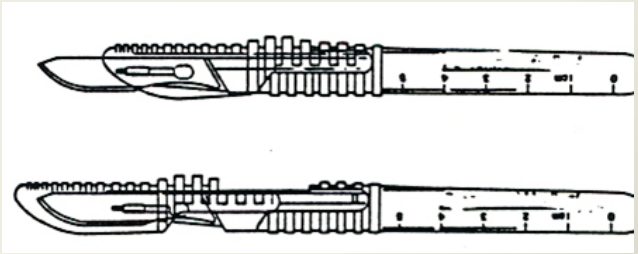
2. Safety Engineered Sharps

- A sharp or needle device with a built-in safety feature that reduces the risk of an exposure is a “Safety Engineered Sharp”
- Employees that use sharps in their work are encouraged to use safety engineered sharps, such as these examples:



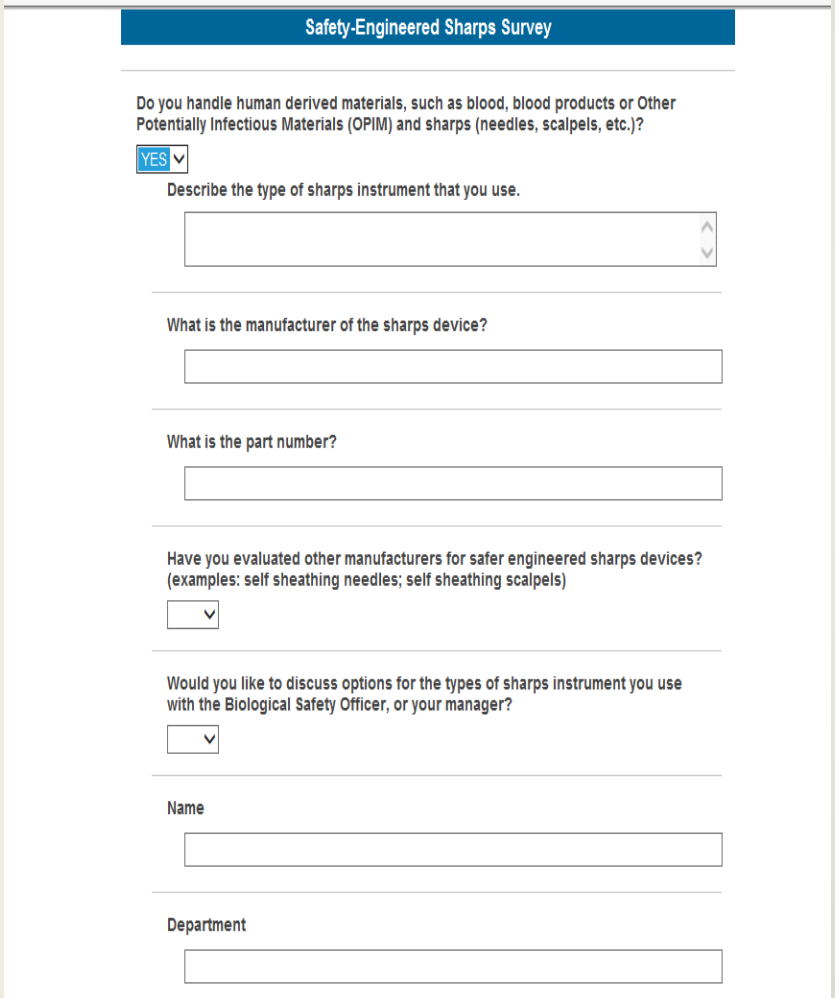






Sharps Survey

- If you use sharps in your workday, you are encouraged to complete the safety engineered sharps survey in UNH CEMS
- Log on to CEMS at https://cems.unh.edu with your ITID and Password
- Look for the section “Safety-Engineered Sharps Survey”



3. Biological Safety Cabinet

- Biological Safety Cabinets (BSC) are used in lab and clinical settings
- They utilize a high efficiency particulate air filter (HEPA) to filter out infectious particles that may be present in aerosols
- Any procedures using blood or OPIM that may create aerosols must be done in a Biological Safety Cabinet

For more information on types of BSCs, or how to use them, contact the Biological Safety Officer, or reference the training on Biosafety Level 2 procedures from the Office of Environmental Health and Safety.

Work Practices

The secondary means of protection from exposure are Work Practice Controls.

Work Practice Controls reduce the likelihood of exposure by altering the manner in which a task is performed.

- Some work practice controls that UNH uses are:
  - Sharps are limited and allowed for use only when absolutely necessary
  - Needle re-capping is not allowed
  - Training is developed for specific tasks that may put an employee at increased risk
  - Research work with blood or OPIM is done in a Biosafety Level 2 (BSL-2) laboratory with strict BSL-2 practices

Disinfection/Decontamination/Antisepsis

- In areas where blood or OPIM are handled, all surfaces must decontaminated at the end of each day with an EPA registered disinfectant.
  - A product with sodium hypochlorite (bleach) is very effective against Bloodborne Pathogens
- Liquid waste produced from work with blood or OPIM is disinfected with 10% bleach solution (1:10) prior to sink disposal
  - No other hazards, such as chemicals, can be present in the liquid waste that gets disposed in the drain
- Hand washing is an excellent method of antisepsis, which is the prevention of infection by inhibiting the growth of microbial agents. Hands must be washed with soap and water after removing gloves when working with human blood or OPIM.

  Alcohol gels are fine for use until soap and running water is available.

Hand Hygiene

- Hand washing with soap and water is the single most important measure for preventing transmission of bloodborne pathogens.
- You must wash thoroughly to be effective.

Personal Work Practices

- Eating, drinking, smoking and applying cosmetics while working with blood and OPIM are prohibited.
- Contact lenses should never be manipulated when handling blood or OPIM.
- If liquid materials will be pipetted, never pipet by mouth. Use a mechanical pipettor or bulb to draw up liquids.

Signage and Labels

- The universal biohazard symbol is used as a warning that an item contains potentially infectious materials.
- This warning is on door signs at UNH where blood or OPIM may be present.
- Other items that must have the biohazard symbol on them are:
  - Equipment used to store or hold blood or OPIM
    - Refrigerators
    - Incubators
    - Freezers
    - Transport containers, including shipping containers
  - Biohazardous waste boxes and sharps containers

Labels

If a piece of equipment must be sent out for repair or disposal, the equipment must be decontaminated with an appropriate disinfectant and the biohazard label removed before it leaves the facility.

Biohazardous Waste Procedures

- All biohazardous solid waste (non-sharps) generated in areas handling blood or OPIM must be disposed in red bag waste.
  - Contact EHS at 2-4041 for biohazard boxes for red bag waste
- Biohazard containers must remain closed when not in use.
- Biohazard boxes must not be overfilled.
  - If the box weighs more than 50lbs, the employee will be required to repack it and this creates a safety hazard, so be aware of the approximate weight of items added to the box.
- Biohazard boxes cannot be leaking or wet.
- All boxes and sharps containers are sealed at the point of use.
  - Proper sealing is required.
  - Call EHS for a waste pickup.

Biohazard Box Instructions

Turn over and seal bottom flaps with tape

Check markings; make sure box orientation is correct

Line box with 2 red bags

Twist the neck of the bag and secure with a knot, twist tie or tape

Seal top of box with tape

Do NOT alternate box flaps!
Bags cannot be protruding.
Boxes cannot weigh >50lbs.
Boxes cannot be leaking.

PPE

The last level of protection is the use of Personal Protective Equipment (PPE).

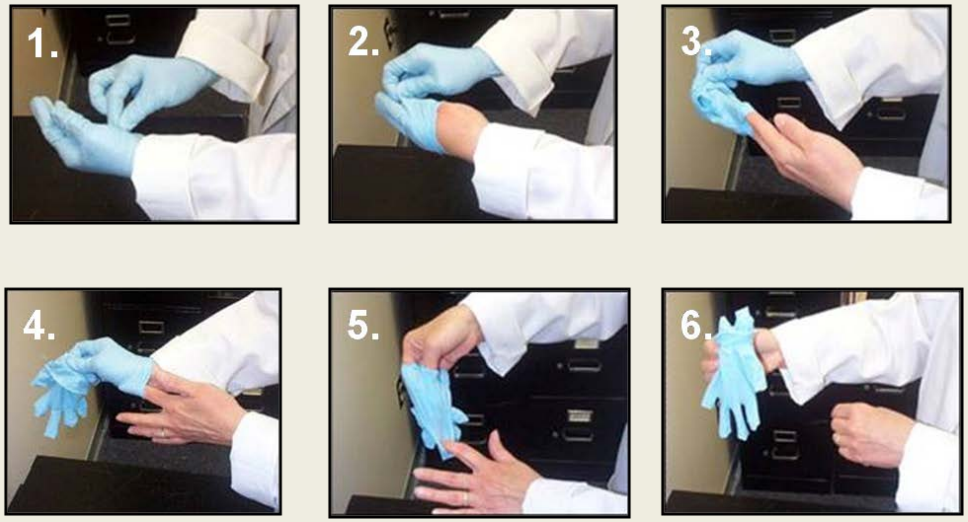
PPE is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g. pants/skirts and shirts) not intended to function as protection against a hazard are not considered to be personal protective equipment.

A lab coat, safety glasses and disposable gloves should be worn whenever handling blood or OPIM.

Depending on your work circumstances, additional PPE may be required; such as face shields or face masks for splashes and splatters, or N95 respirators for potential aerosol exposures.

PPE: Gloves

- It is critical that you use the correct glove for the hazardous materials you are handling.
  - Latex disposable gloves are fine for biological materials, but not solvents.
  - Nitrile disposable gloves are best in most settings.
- Taking off (a.k.a. doffing) your gloves in a manner that does not contaminate your hands is very important.



PPE: Eye and Face Protection

- Safety eyewear must be ANSI Z87 rated

- Face masks and shields are used for splash/ splatter protection

- N95 respirators are used for aerosol protection
  - These come in many types: with/without valves, “dustmask” type, “duckbill” type

Laundry

- If a lab coat becomes soiled with blood or OPIM, lab coats must be autoclaved prior to laundering in a University laundry facility.

Do NOT bring clothing or PPE home that has been exposed to blood or OPIM.

What To Do In An Emergency

Situations That Might Occur

- Emergency situations that must be reported include, but are not limited to:
  - Needle sticks
  - Known exposures due to splash or splatter
  - Known exposures to non-intact skin, such as cuts or abrasions
  - Cuts with broken glass or to other sharps known to be contaminated with human derived materials
  - Spills of human materials (any size)

First Response to Potential Exposure

- Wash exposed area immediately with soap and water
- Flush splashes to nose, mouth, or skin with water
- Irrigate eyes with clean water, saline, or sterile wash
- Notify a Supervisor as soon as possible following the incident
- Seek post-exposure care. Contact Health Services for a medical evaluation.
- If it is an emergency, dial 911 to call for an ambulance.

Spill Procedures

- For all size spills, if it is safe to do so, right the container and segregate the area of the spill prior to clean up
- Cover biohazardous spills with paper towels or spill pads. Place enough absorbent materials on the spill to soak up liquid.
- Disinfect the spill with freshly prepared bleach solution. Work from the outside perimeter of the spill toward the middle of the spill.
- Allow 30 minute contact time for disinfection.
- If sharps are present in the spill, such as broken glass, use a dustpan/broom to remove sharps after disinfection. Place sharps in a sharps disposal container.
- Pick up all absorbent materials and place them in the closest red biohazard waste container.

Spill Procedures, continued

- Once all absorbent material has been picked up, go over the spill area again with disinfectant. Place clean-up materials in the biohazardous waste container.

For large scale spills, or spills of known infectious materials, leave the area of the spill immediately prior to attempting cleanup. Do not re-enter the area for 30 minutes, allowing aerosols to settle prior to proceeding with cleanup

Incident Reporting

- File an incident report with EHS as soon as possible following a potential exposure and medical evaluation. The report should be filed within 24-48 hours.
- The supervisor should review and sign off on all incident reports.
- An incident investigation will be conducted after receiving the incident report.

Post Exposure Follow Up

- If an employee has a known exposure, follow up prophylaxis may be prescribed by Health Services or your Primary Care Physician.
- Attempts should be made to gather as much information about the materials you were exposed to regarding infectious status. This data should be provided to the Physician for proper medical evaluation and consult.

Summary

BBP Summary

- Human derived materials have the potential to contain bloodborne pathogens such as HBV, HCV and HIV.
- Universal precautions help prevent exposure to potential bloodborne pathogens.
- Read and understand the UNH Exposure Control Plan.
- Utilize engineering controls and work practice controls to protect yourself from potential exposure.
- Use personal protective equipment (PPE), such as gloves and face shields, every time there is a potential for exposure to blood or body fluids.
- Be careful with sharps! Dispose of them properly and use safety engineered sharps when possible.
- The Hepatitis B vaccine is available to all UNH employees at no cost.
- Disinfect, decontaminate and wash hands at the end of every procedure/end of day.
- Know what to do in an emergency!

QUESTIONS?

Contact the Office of Environmental Health and Safety immediately with any questions about the content of this training.

862-4041

Talk to the Biosafety Officer about additional training, Hepatitis B vaccine, exposure determination, work practices, or any issue related to the Bloodborne Pathogens standard.