NCCU Bloodborne Pathogens Training for Healthcare Personnel

Fulfills initial and annual training requirement for Bloodborne Pathogens Standard [29 CFR 1910.1030]

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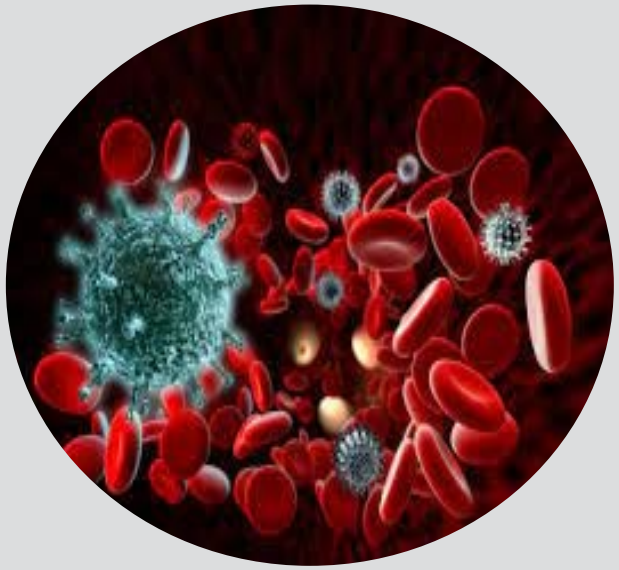
OSHA Bloodborne Pathogens Standard

On December 6, 1991, the Occupational Safety and Health Administration (OSHA) published the Bloodborne Pathogens (BBP) Standard (29 CFR 1910.1030) to keep workers with BBP risk safe.



The standard requires the employer to provide annual training regarding the occupational hazards of **Bloodborne Pathogens**.

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Objectives

Upon completion of this course, you will be able to:

- Describe BBP (HIV, Hepatitis B and C) and how they are transmitted in the healthcare setting
- Describe infection control practices that prevent exposure to blood and other potentially infectious materials (OPIM)
- Explain, when it is necessary to wear personal protective equipment (PPE)
- Describe what to do if you have had exposure to blood or OPIM

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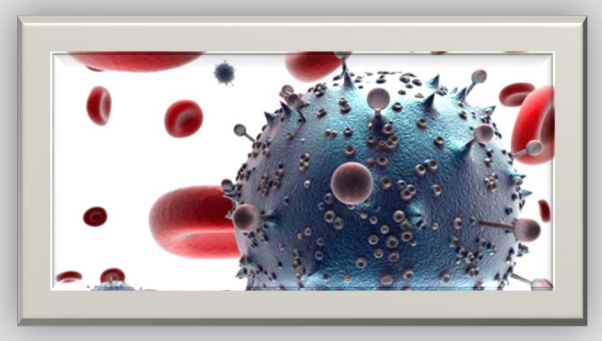
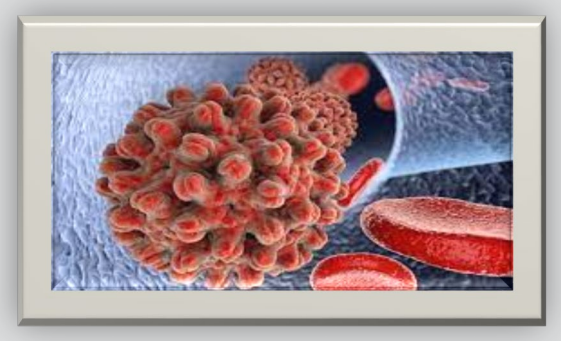
What are Bloodborne Pathogens?

- Bloodborne Pathogens are infectious microorganisms that may be present in human blood and can cause disease in humans.
- According to the CDC there are 200+ BBP
- Most common BBP are: HIV, HBV, and HCV
- Other BBP: Non-A hepatitis, *Treponema pallidum* (syphilis), *Plasmodium* spp. (malaria), *Brucella* spp., Arboviruses (mosquito transmitted) – chikungunya, Zika, Hemorrhagic fever viruses - Ebola

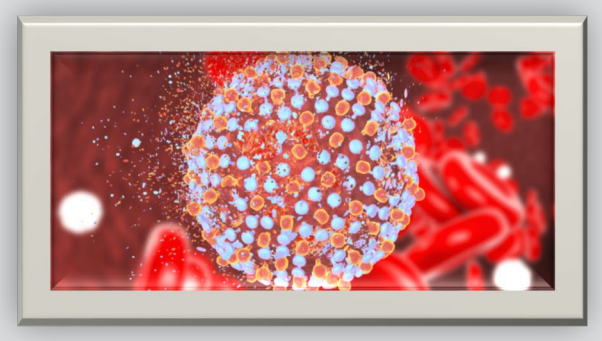
Human Immunodeficiency Virus
(HIV)



Hepatitis B Virus
(HBV)



Hepatitis C Virus
(HCV)



Click on each link to learn more about the specific virus at cdc.gov

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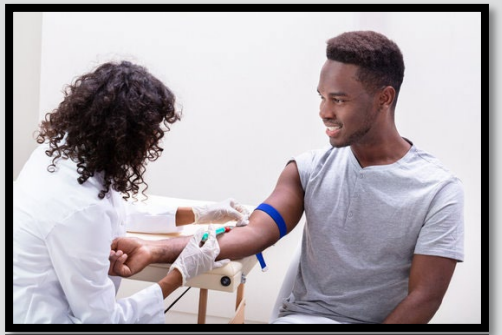
Other Potentially Infectious Materials (OPIM)

Exposure to human blood carries the greatest risk for acquiring the BBP.

In addition to blood, OPIM are considered to be potentially infectious with HIV, HBV or HCV.



These include:

- Saliva in dental procedures
- Any body fluids that is visibly contaminated with blood
- Any unfixed tissue or organ from a human (living or dead)
- Laboratory cells or tissue cultures
- Semen or vaginal secretions

Unless visibly contaminated with blood, other bodily fluids, such as urine, feces, vomit, tears, sweat, sputum, and nasal secretions are NOT considered to be OPIM of BBP.

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BBP Exposure Risk/Route of Infection

- Manipulating patient specimens
- Handling biological wastes
- Contaminated equipment or surfaces
- Medical/First aid activities
- Cleaning surfaces or handling waste contaminated by blood or OPIM

Common routes of infection in a healthcare setting

Inoculation

Accidental skin punctures with contaminated needles or other sharp objects.

Mucous Membrane Exposure

Direct contact of contaminated fluid with the eyes, nose, mouth, or broken skin (splash or splatter).

Blood Spill Cleanup

Cleanup crew members responsible for responding to spills of blood and OPIMs

Ingestion

Eating, drinking, applying cosmetics or storing food in units where blood or OPIM are present increase likelihood of infection via ingestion.

Inhalation

Spill or procedures such as centrifugation can generate aerosol, which could potentially present the risk of infection via inhalation.

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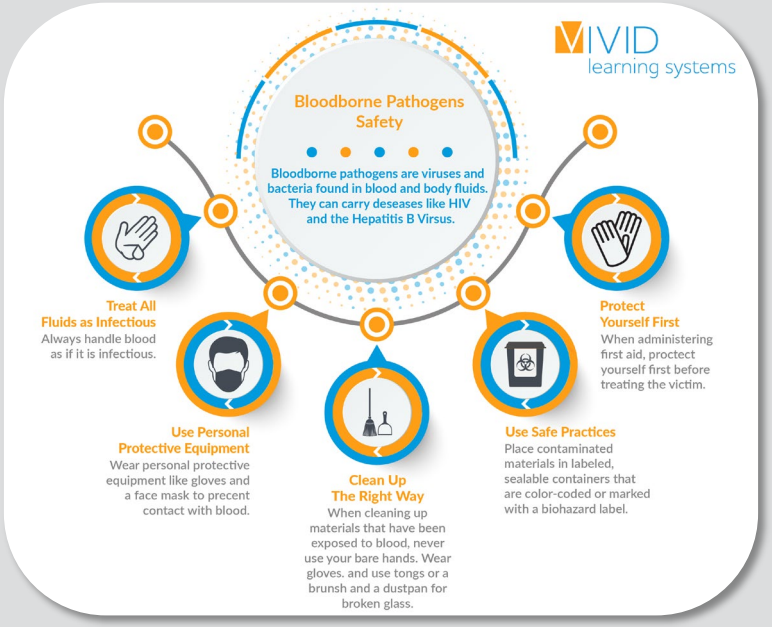
Infection Risk Factors

Not all the BBP exposure carry the same risk of infection from an occupational exposure.

The following factors impact the risk of becoming infected after exposure:

- Ability of virus to survive on environmental surface
- Nature of injury (percutaneous > mucosal, hollow bore needle > solid needle)
- Amount of virus present in the body fluid
- Individual health status



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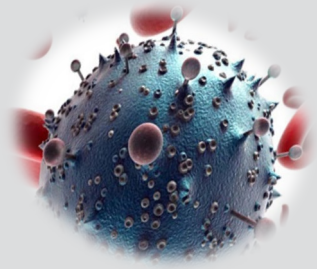
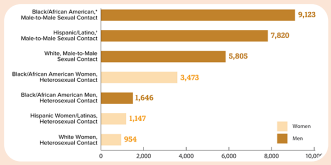
Human Immunodeficiency Virus (HIV)



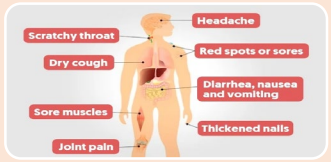


Statistics

- According to the CDC an estimated 1.2 million people in the United States had HIV at the end of 2019.
- The annual number of new diagnoses decreased 9% from 2015 to 2019.
- HIV does not survive long outside the human body, and it cannot reproduce outside a human host.

Preventative

- The primary prevention of exposure: standard precautions, safety devices, use of PPE
- Prompt medical evaluation of any potential exposures



Symptoms

- In its early stages, HIV infection often causes transient flu-like symptoms, such as fever, sore throat , rash, nausea and vomiting, diarrhea, fatigue, swollen lymph nodes, muscle aches, headaches, and joint pain. HIV attacks and destroys immune cells.

Treatment

- No effective cure or vaccine exists for HIV. However, with proper medical care, HIV can be controlled. The medicine used to treat HIV is called antiretroviral therapy or ART. ART decreases the viral load to undetectable level. At such stage effectively no risk of transmitting HIV exists.

Human Immunodeficiency Virus

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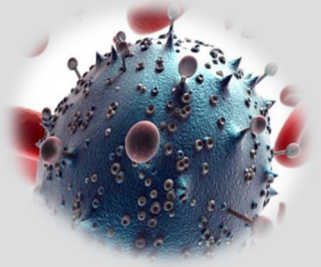
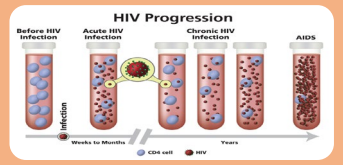
Human Immunodeficiency Virus (HIV)



People infected with HIV typically progress through three stages of disease.

Stage 1 – Acute HIV Infection

- People can experience flu-like illness 2 to 4 weeks after infection with HIV due to high levels of replicating virus. They are highly contagious at this time.



Stage 2 – Clinical Latency

- People infected with HIV may not have any symptoms during this phase since HIV is still active but reproducing at low level. This stage may last many years in untreated people and several decades in people taking HIV medication

Stage 3 -AIDS

- This is the most severe stage of the infection. Once a person is diagnosed with AIDS, they can have a high viral load and are able to transmit HIV to others very easily. Common symptoms of AIDS include chills, fever, sweats, swollen lymph glands, weakness, and weight loss. Without treatment, people typically survive for a couple of years.

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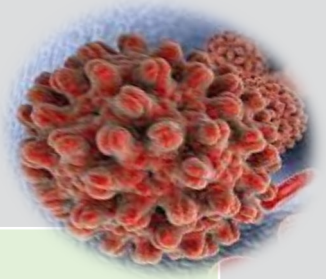
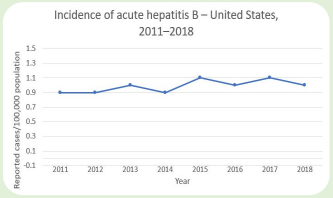
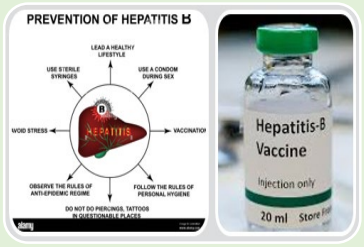
Hepatitis B Virus (HBV)





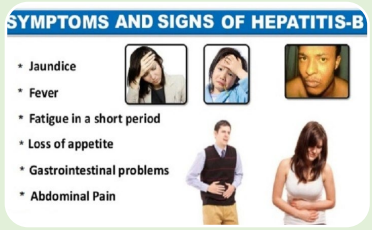
Statistics

• The estimated number of HBV infections among health care personnel in US has decreased from 17,000 in 1983 to 263 in 2010
• In 2016, an estimated 862,000 people were living with HBV infection.
• In 2018, a total of 3,322 cases of acute HBV were reported to CDC (rate of 1 cases per 100,000 population). However, the number is estimated to be 21,600 considering under-reporting.



Preventative

HBV can survive outside the body and remains infectious for at least 7 days.
- The highest risk for exposure to HBV in a health care settings is exposure to blood, however, many body fluids (i.e., OPIM and contaminated with blood) are considered infectious
- The best way to prevent HBV is to: (i) implement standard precautions, (ii) use of safety devices, and (iii) get vaccinated.
- All possible exposures are considered an urgent medical condition and the exposed individual needs to be evaluated as soon as possible



Symptoms

• Infects liver; **the most infectious of the BBP**.
• Fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine, clay-colored bowel movements, joint pain, jaundice (yellow color in the skin or the eye). If symptoms occur, they begin on average of 90 days (3 months) after exposure, but they can appear any time between 8 weeks and 5 months after exposure.

Treatment

- People with acute infection are provided supportive treatment depending on their symptoms. For people with chronic infection, several antiviral medications are available.

Hepatitis B Virus

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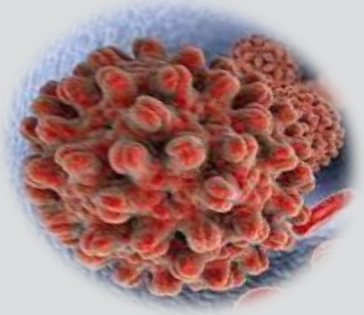
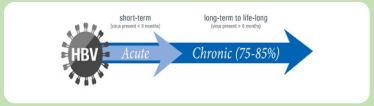
Hepatitis B Virus (HBV)

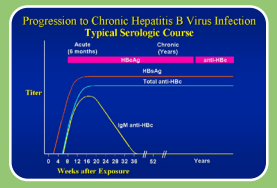


For some people, hepatitis B is a short-term illness, but for others, it can become a long-term. chronic infection.



Acute Hepatitis B

- Is a short-term illness that occurs within the first 6 months after someone is exposed to the hepatitis B virus. An acute infection can range in severity from mild illness with few or no symptoms to a serious condition requiring hospitalization. Some people, especially adults, are able to clear the virus without treatment.



Chronic Hepatitis B

- Is a lifelong infection with the hepatitis B virus. Most individuals with chronic hepatitis B do not have any symptoms, do not feel ill, and can remain symptoms free for decades. Over time, chronic hepatitis B can cause serious health problems, including liver damage, cirrhosis, liver cancer, and even death.

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Hepatitis B Vaccine

- The hepatitis B vaccine is the most effective intervention to prevent hepatitis B transmission after potential exposure
- Vaccination gives long-term protection from hepatitis B infection and prevents acute and chronic consequences of HBV infection, including liver cancer and cirrhosis
- Persons at NCCU with any risk of exposure to are offered the Hepatitis B vaccination at hire
- Can request Hepatitis B vaccine any time during employment
- Vaccine given in 3 doses
- Vaccine is provided free to everyone enrolled in the NCCU Bloodborne Pathogens program
- Employee may decline the vaccination by signing the Hepatitis B Vaccination and Information form

*See **NCCU Exposure Control Plan** for more details:*

https://myeol.nccu.edu/sites/default/files/2020-06/NCCU-Exposure-Control-Plan.pdf

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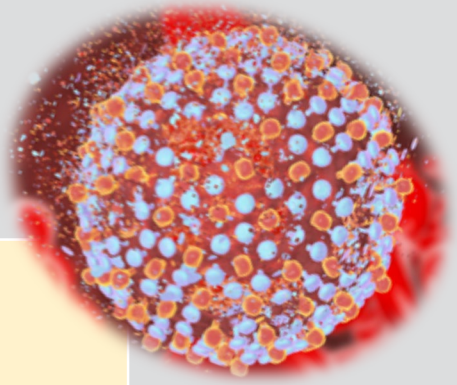
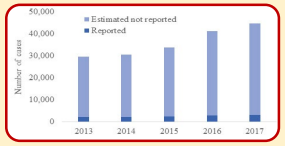
Hepatitis C Virus (HCV)



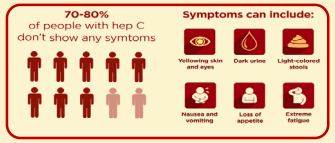


Statistics

- An estimated 2.4 million people in U.S. were living with HCV infection during 2013-2016.
- In 2018, a total of 3,621 cases of acute HCV were reported to CDC (rate of 1 cases per 100,000 population. However, After adjusting for under-reporting or under-ascertainment, an estimated 50,300 acute hepatitis C occurred.

Preventative

- HCV transmission occurs through occupational exposure to blood, but less efficiently than with HBV
- The prevalence of antibodies to HCV among healthcare personal in US is similar or lower than in general population
- The best way to prevent HCV is by implement standard precautions and use of safety devices



Symptoms

- People with new (acute) HCV infections usually do not have symptoms or they have mild symptoms.
- Fever, fatigue, dark urine, clay-colored bowel movements, abdominal pain, loss of appetite, nausea, vomiting, joint pain, jaundice (yellow color in the skin or the eye).
- In those people who do develop symptoms, the average period from exposure to symptoms onset is 2-12 weeks.

Treatment

- There is no vaccine for hepatitis C.
- There are several antiviral medications available to treat chronic HCV. Over 90% of HCV infected persons can be cured of HCV infection with 8-12 weeks of oral therapy.

Hepatitis C Virus

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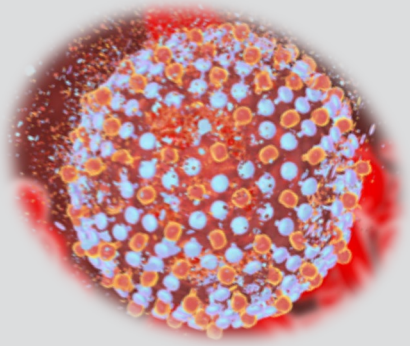
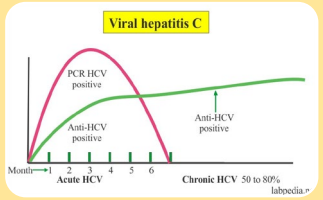
Hepatitis C Virus (HCV)

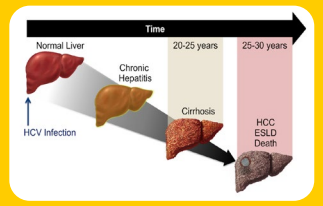


Hepatitis C can be a short-term illness, but for most people, acute infection leads to chronic infection.



Acute Hepatitis C

- People with **new (acute) HCV** infection usually do not have symptoms or have mild symptoms, In those people who develop symptoms from acute infection, the average time from exposure to symptoms ranges from 2 to 12 weeks. People who are infected with the HCV may not know they are infected because they do not look or feel sick and can pass it on to others.



Chronic Hepatitis C

- Can be a lifelong infection with HCV, if left untreated. Left untreated, chronic hepatitis C can cause serious health problems, including liver damage, cirrhosis, liver cancer, and even death over several decades. Approximately 75-85% of people who become infected with HCV will develop chronic infection.
- Most common chronic BBP in the U.S.

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Exposure Control Plan

Required by OSHA BBP Standard

- Identifies tasks with exposure potential
- Lists job descriptions with exposure potential
- Defines methods of exposure control
  - Standard precautions
  - Engineering, administrative and PPE controls
  - Hepatitis B vaccination
- Housekeeping controls
- Medical waste procedures
- Incident reporting procedures
- Process for post-exposure evaluation and follow-up
- Information and training
- Documentation and recordkeeping

The **NCCU Exposure Control Plan** can be found at:
https://myeol.nccu.edu/sites/default/files/2020-06/NCCU-Exposure-Control-Plan.pdf
and is **required to be reviewed as part of this training.**

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Preventing BBP Exposures

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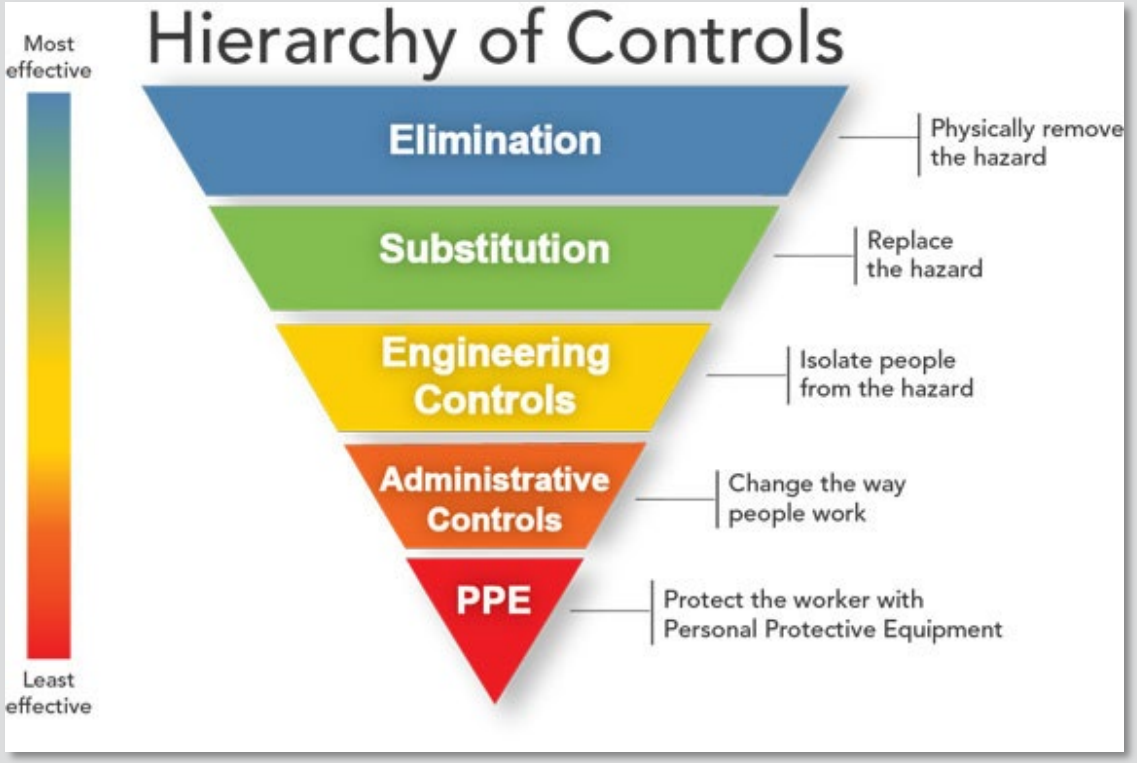
HIERARCHY OF CONTROLS

- Determine effective & feasible risk mitigations
- In most laboratories/clinical facilities, the most feasible and efficient mitigations are engineering controls



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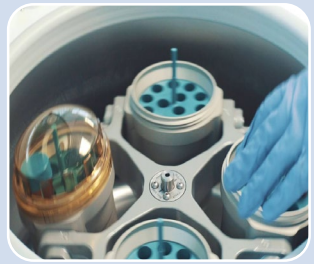
Engineering Controls

Engineering controls physically isolate or remove a hazard from the workplace (“safety devices”).

Examples of work practice controls:

- Centrifuge
- Sharps safety devices
- Single-use lancets with retractable needle
- Needleless IV infusion system
- Protective (re-sheathing) IV catheter
- Sharps containers/disposal
- Contaminated solid waste containers/disposal



Centrifuge

To avoid possible exposure to aerosol created during centrifugation, safety cups, sealed rotors or buckets are required when handling infectious or potentially infectious materials.

Sharps Safety Devices

Proper use of devices with needles that retract or are covered by a sheath or shield, needleless systems that do not use a needle or sharp at all are to reduce sharps injuries and prevent exposure of healthcare professionals.

Sharps Disposal

Contaminated items likely to cause skin puncture (e.g., needles, razor blades, broken glass) must be immediately disposed of in appropriate puncture-resistant, leak-proof containers.

Solid Waste Disposal

Contaminated solid waste from laboratories, clinics, and morgues are placed into red, leak-proof, puncture-resistant containers and lined with a red biohazard bag.

Work Practice Controls

"Work Practice Controls" means performing a task in a way to prevent exposure to blood and OPIM

Washing Hands

Persons must wash their hands after working with potentially hazardous materials and before leaving the workplace.

Make sure to use hot, soapy water and wash hands for at least 20 seconds. Rinse and dry. Use paper towel to turn off tap.

Sharps Precautions

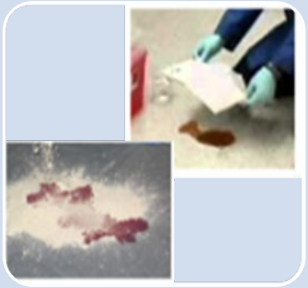
Contaminated needles are not to be bent, broken, recapped, or removed from the syringe.

Sharps used during the procedures are to be passed in a basin or on a tray.

Disposing of sharps in the sharps container helps keep yourself and other safe. Wear gloves and use tongs or a brush and dust pan to collect sharps.

Preventing Ingestion

Eating, drinking, smoking, handling contact lenses, applying cosmetics, and storing food for human consumption must not be permitted in clinical area.



Minimize Splashes

Place paper towel over the spill site prior to pouring disinfectants

or

Use absorbent powder on the spill followed by cleanup with scoop and then disinfecting.

Communication of Hazards

Biohazard labels are used to alert others of the potential presence of biohazardous materials. It must be used when contaminated instruments or infectious specimens are transported.

PPE

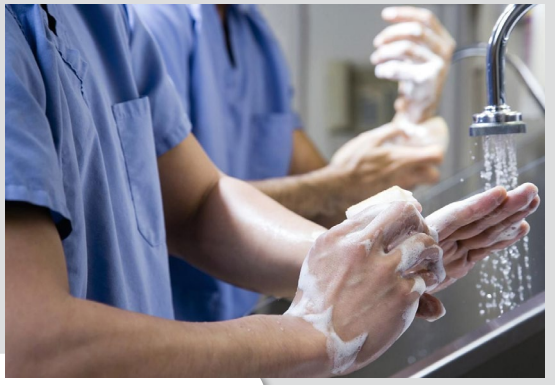
PPE must be always utilized when there is a potential for exposure to blood or OPIM

PPE must be removed and placed in designated container

Handle laundry (uniforms, soiled clothing) soiled with blood as little as possible. Do not take home for cleaning.

Administrative Controls

- Policies and **S**tandard-**O**perating-**P**rocedures
- Exposure Control Plan
- Training
- Hand washing



North Carolina Central University
Exposure Control Program Plan

https://myeol.nccu.edu/sites/default/files/2020-06/NCCU-Exposure-Control-Plan.pdf

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Handwashing & Removing Safely Gloves

Handwashing is the most effective administrative control performed:

- between all direct patient contact
- before donning and after removing gloves
- after handling soiled or contaminated equipment or instruments
- after leaving the room of a patient on isolation precautions
- immediately or as soon as possible if contaminated with blood or OPIM

- Wash hands including all surfaces of hands and up to wrists
  - Wet hands with warm running water
  - Lather with soap and scrub between fingers, backs of hands and under nails for at least 20 seconds
  - Rinse and dry
  - Use a paper towel to turn off tap

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Personal Protective Equipment (PPE)

PPE are garments worn to protect personnel from contact with blood and body fluids.

Choose the right combination of PPE to protect your skin, eyes, nose, and mouth.

Eye Protection - wear when splashes, sprays, or spatters, or droplets of blood and/or OPIM pose a hazard to the eyes.

Face mask/shield – wear when splashes, sprays, or spatters, or droplets of blood or OPIM pose a hazard to the nose or mouth.

Gloves - wear appropriate gloves when it is reasonably anticipated that there may be hand contact with blood or OPIM, and when handling or touching contaminated items or surfaces. Replace gloves if torn, punctured or contaminated, or if their ability to function as a barrier is compromised. Do not wash or reuse gloves. Do not handle personal items while wearing gloves.

Disposable apron - should be worn during spill cleanup of blood or OPIM. If it is penetrated by blood or OPIM, it must be removed immediately or as soon as feasible.

Foot protection - should be worn to protect shoes from contaminated floors when cleaning up blood or OPIM.

Remove and dispose PPE before leaving the work area and perform hand hygiene.

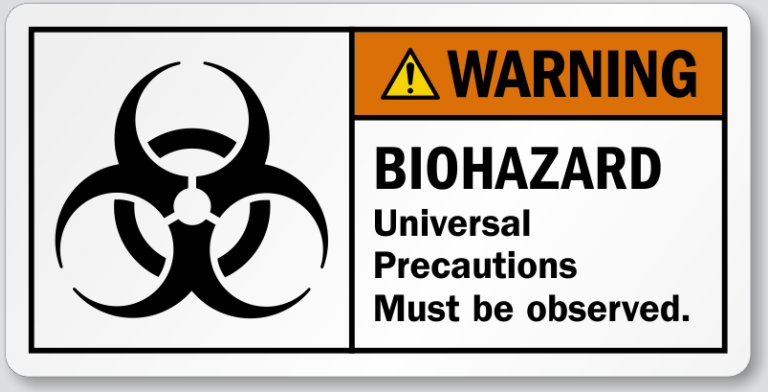
Do not wear PPE (e.g., gloves) in the hallway.

Sequence for donning and doffing of PPE: https://www.cdc.gov/hai/pdfs/ppe/ppeposter148.pdf

Universal Precautions

Under Universal Precautions, Personal Protective Equipment (PPE) is required when there is a reasonable expectation that you may come into contact with blood, blood products, certain body fluid visibly contaminated with blood.

"Treat everything as if it were infectious."



OSHA required label

The universal Biohazard sign is used to alert healthcare personnel when containers, specimen refrigerators, medical equipment, or containers used to transport specimens contain infectious materials. The sign is orange or red/orange with contrasting letters and have universal biohazard symbol.

Centrifuge

Lab Specimen Bag

Specimen refrigerator

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Contaminated Clothing

As soon as possible, clothing contaminated with blood or OPIM should be carefully removed, avoiding contact with the garment's outer surface to prevent skin contamination (using gloves if necessary)

Garments contaminated with blood or OPIM should be placed in a plastic bag with a biohazard label.

NEVER take home closing contaminated with blood or OPIM.

Contaminated Medical Devices

Medical devices such as blood pressure cuffs and stethoscopes must be cleaned if contaminated with blood or OPIM using EPA-registered disinfectant detergent, bleach wipe or a 1:10 dilution of bleach and water.

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Blood & Body Fluid Spill Cleanup

To cleanup a blood or OPIM spill, you must:

- Be trained in biological spill procedures with hazardous substance spill risk
- Be knowledgeable about the presence of Biological Spill kit
- Be trained in proper wearing of the appropriate PPE (https://www.osha.gov/training/library/materials)

Spills must be cleaned up as soon as possible using the following steps:

Step 1

- Wear gloves and other appropriate PPE

Step 2

- Small spills should be cleaned using a 1:10 dilution of sodium hypochloride (household bleach) or an EPA-registered disinfectant

Step 3

- If broken glass is involved remove it using tongs or forceps (NEVER pick up by hand)
- Place the broken glass in a sharps container

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Regulated Medical Waste

North Carolina has its own rules and regulations regarding the management and disposal of medical waste and waste produced in a clinical setting.

Regulated medical waste includes:

- Microbiology specimens
- Pathology specimens that have not been treated
- >20cc (mL) of blood or blood products in containers that cannot be easily opened and emptied (e.g. pleurevacs and evacuated containers)
- Full sharps containers
- Items used in the preparation and administration of hazardous drugs

Regulated medical waste must be:

- Placed in a plastic bag inside of rigid fiberboard box or drum that prevents leakage of the contents
- The outer surface must be labeled with biohazard symbol
- Labeled with the words “infectious waste” or “medical waste”
- Stored in the manner not to create odor or encouraging the presence of vermin
- Stored in the manner that maintains the integrity, including labels and markings
- Accessible only to authorized personnel

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Contaminated Linen

- Contaminated linen, linen potentially soiled with the blood or body fluids, should not be sorted or handled any more than necessary for disposal.
- Fluid resistant linen bags should be used when disposing of used linen.
- Linen should be double-bagged only if the bag becomes contaminated.
- Linen hampers should have a cover or lid.

Exposure Management

Persons with occupational risk must be trained how to identify an exposure or potential exposure and what to do after an exposure/potential exposure

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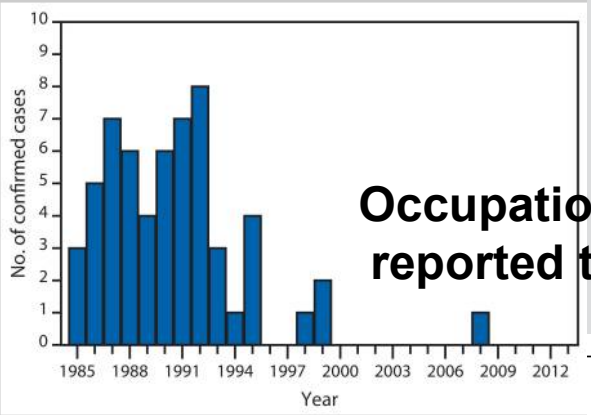
Demonstrated Occupational Risk



Occupationally acquired AIDS/HIV reported to CDC (U.S. 1985-2013)

	Confirmed (N = 58)		Possible (N = 150)	
Occupation	**No.**	**(%)**	**No.**	**(%)**
Nurse	24	(41.4)	37	(24.7)
Laboratory technician, clinical	16	(27.6)	21	(14.0)
Physician, nonsurgical	6	(10.3)	13	(8.7)
Laboratory technician, nonclinical	4	(6.9)	—	—
Housekeeper/maintenance	2	(3.4)	14	(9.3)
Technician, surgical	2	(3.4)	2	(1.3)
Embalmer/morgue technician	1	(1.7)	2	(1.3)
Hospice caregiver/attendant	1	(1.7)	16	(10.7)
Respiratory therapist	1	(1.7)	2	(1.3)
Technician, dialysis	1	(1.7)	3	(2.0)
Dental worker, including dentist	—	—	6	(4.0)
Emergency medical technician/paramedic	—	—	13	(8.7)
Physician, surgical	—	—	6	(4.0)
Technician/Therapist, other	—	—	9	(6.0)
Other health care occupations	—	—	6	(4.0)

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4646046/

The prevalence of HCV infection in health care personnel is similar to that observed in general population, while that HBV may be more efficiently transmitted than HCV in the health care settings. (Thomas, D.L. et al, 1993).

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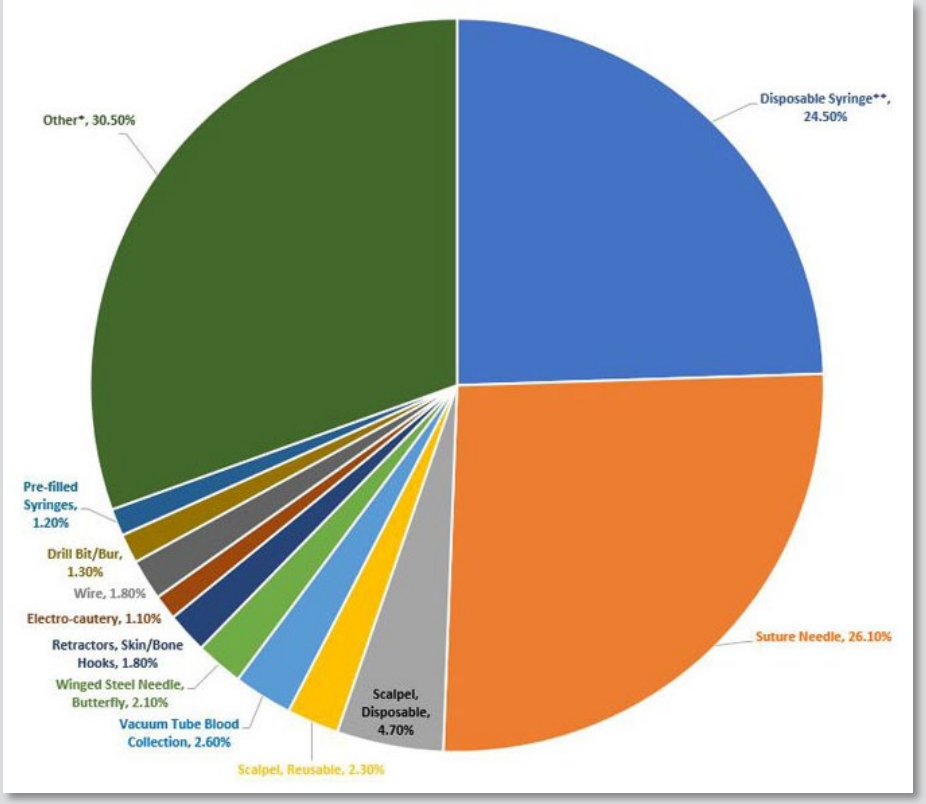
Exposure & Potential Exposure

Exposure

- Known, unplanned, contact with infectious agent
  - Needle stick or cut with sharp object
  - Spill/splash into mucous membrane
  - Entry through broken or intact skin

Potential exposure

- Failure of control mechanism (engineering or PPE)



% of total percutaneous injuries reported and associated with certain medical devices (https://www.cdc.gov/nora/councils/hcsa/stopsticks/sharpsinjuries.html)

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Percutaneous Exposure Procedures

REMOVE GLOVES IF WORN

FORCE WOUND TO BLEED

WASH WOUND WITH SOAP AND WATER FOR 5 MINUTES

UTILIZE FIRST AID KIT IF NECESSARY

NOTIFY SUPERVISOR

REPORT INCIDENT

Cut, scrape or puncture with contaminated or potentially contaminated item

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Eye Exposure Procedures

- Flood eyes with water at faucet for 15 minutes
- Hold eyes open to ensure effective rinsing behind both eyelids
- Notify your Supervisor
- Report incident

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Post-Exposure

- All exposures (known or potential) should be reported immediately to Supervisor to obtain medical evaluation and follow-up
- Report to EHS at https://nccu.edu/ehs
- Complete the Workers' Compensation Employee Statement Form and Supervisor's Accident/Incident Investigation Report Form and submit to Workers' Compensation Administrator within 24 hours even if you do not seek immediate medical care

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Reporting Healthcare-Associated Infections to NCDHSS

The NC Department of Health and Human Services (NCDHSS) requires all health care personnel who perform surgical, obstetrical, or dental procedures and/or assist in these procedures to notify the State Health Director in writing if they are or become infected with HIV or HBV (10A NCAC 41A.0207).

More information can be found at:
https://epi.dph.ncdhhs.gov/cd/hiv/providers.html

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Almost Done…

- Review Exposure Control Plan
- If you have not already completed one or are unsure if you have
  - Complete Hepatitis B Vaccination and Information Form and submit to EHS (ehs@nccu.edu)
- Take quiz and score ≥ 80%
  - You will receive a training confirmation to supply to your Supervisor once the quiz is successfully completed

Please contact ehs@nccu.edu if you have any questions

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