The Bloodborne Pathogens Standard

29 CFR 1910.1030

December 2014

Objectives

- The Standard
- Definitions
- Bloodborne Diseases
- Transmission
- Exposure Control
- Signs and Labels
- Hepatitis B Vaccine
- Exposure Incident Response
- References

The Standard

The Standard

- State and local government workers are excluded from Federal coverage under the Occupational Safety and Health Act of 1970.
- The Public Employment Risk Reduction Program (PERRP) adopted federal occupational safety and health standards.
  - Chapters 4167 of the Ohio Administrative Code and Ohio Revised Code
  - PERRP standard 29 CFR 1910.1030

For more information on PERRP, see the PERRP posters in the break rooms.

The Standard

- The Bloodborne Pathogens standard prescribes safeguards to protect workers against the health hazards caused by bloodborne pathogens.
- Its requirements address items such as:
  - Exposure Control Plans
  - Universal Precautions
  - Engineering Controls
  - Work Practice Controls
  - Personal Protective Equipment
  - Housekeeping
  - Hepatitis B Vaccination
  - Post-exposure Follow-up
  - Hazard Communication
  - Recordkeeping

The Standard

- The standard applies to all workers with *occupational exposure* to blood or other potentially infectious materials (OPIM).
  - *Occupational exposure* means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or OPIM that may result from the performance of an employee's duties.
  - This does not include "Good Samaritan" acts, such as assisting a co-worker with a nosebleed when rendering medical assistance is not one of your duties.

Definitions

Blood or Bloodborne: Humans

- *Blood* means human blood, human blood components, and products made from human blood.

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

OPIM: human body fluids, tissues, or organs

- *Other Potentially Infectious Materials* include:
  - 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
  - All body fluids in situations where it is difficult or impossible to differentiate between body fluids
  - Any unfixed tissue or organ (other than intact skin) from a human

OPIM: anything known to contain HIV or HBV

- *Other Potentially Infectious Materials* also includes:
  - HIV-containing cell, tissue, or organ cultures
  - HIV- or HBV-containing culture medium or other solutions
  - Blood, organs, or other tissues from experimental animals infected with HIV or HBV

HIV = Human Immunodeficiency Virus HBV = Hepatitis B Virus

Bloodborne Diseases

Bloodborne Diseases

- Hepatitis
  - "Hepatitis" means inflammation of the liver.
    - This affects the ability of the liver to process nutrients, filter blood, and fight infections.
  - Most often caused by a virus, but can also result from heavy alcohol use, toxins, medications and certain medical conditions.

Bloodborne Diseases

- Viral Hepatitis
  - A contagious liver disease that results from viral infection.
  - “Acute” infection develops within 6 months of exposure.
  - If the virus remains, it will lead to a “chronic” illness that, over time, can lead to serious health problems.

Bloodborne Diseases

- Viral Hepatitis Symptoms
  - Fever
  - Fatigue
  - Loss of appetite
  - Nausea
  - Vomiting
  - Abdominal pain
  - Grey-colored stools
  - Dark urine
  - Joint pain
  - Jaundice

Bloodborne Diseases

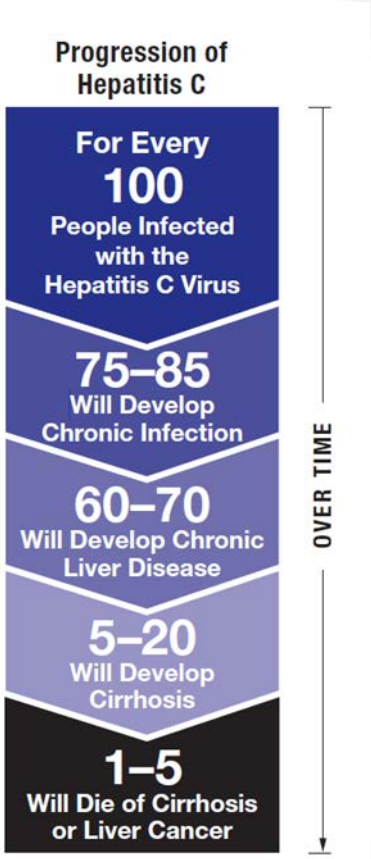
- Hepatitis B Virus (HBV)
  - In the US, ≈ 1.2 million people have chronic HBV and ≈ 3,000 die from HBV-related liver disease.
  - The number of new cases of HBV has decreased > 80% over the last 20 years.
    - Attributed to vaccination.
  - 15-25% of those with chronic HBV develop serious liver problems, including liver damage, cirrhosis, liver failure, and liver cancer.

Bloodborne Diseases

- HBV
  - Symptoms of chronic HBV can take up to 30 years to develop and can be a sign of advanced liver disease.
  - HBV is diagnosed with specific blood tests.
  - Acute infection is treated with rest, proper nutrition, fluids, and monitoring.
  - Chronic infection requires evaluation for liver problems and regular monitoring.
  - Vaccination is the best way to prevent HBV.

Bloodborne Diseases

- Hepatitis C Virus (HCV)
  - In the US, ≈ 3.2 million people have chronic HCV and ≈ 12,000 die from HCV-related liver disease.
  - Each year ≈ 17,000 Americans become infected with HCV.



Picture: CDC Publication No. 21-1075

Bloodborne Diseases

- HCV
  - Symptoms of chronic HCV can take up to 30 years to develop and are often a sign of advanced liver disease.
  - Acute infection presents anytime from 2 weeks to 6 months after exposure.
  - HCV is diagnosed with specific blood tests.
  - Chronic infection requires evaluation for liver problems and regular monitoring.
  - There is currently no vaccine for HCV.

Bloodborne Diseases

- Human Immunodeficiency Virus (HIV)
  - In the US, 1.1 million people are living with HIV.
  - According to the United States Continuum of Care:
    - 82% were diagnosed
    - 66% sought medical care after diagnosis
    - 37% continued medical care over time
    - 33% were prescribed antiretroviral therapy
    - 25% achieved viral suppression
  - The only way to know if you are infected with HIV is to be tested.

The United States Continuum of Care is published in the CDC Division of HIV/AIDS Prevention's Annual Report.

Bloodborne Diseases

- HIV
  - HIV affects specific cells of the immune system and, over time, can destroy so many of these cells that the body can't fight off infections and disease.
  - Unlike some other viruses, the human body cannot get rid of HIV.
  - There is currently no vaccine for HIV.

Bloodborne Diseases

- HIV
  - HIV disease has a well-documented progression.
  - Untreated, HIV is almost universally fatal because it eventually overwhelms the immune system—resulting in acquired immunodeficiency syndrome (AIDS).
  - HIV treatment helps people at all stages of the disease, and treatment can slow or prevent progression from one stage to the next.

Bloodborne Diseases

- HIV – disease progression
  - Acute infection presents 2 to 4 weeks after exposure, resulting in flu-like symptoms.
  - This is called acute retroviral syndrome (ARS) and is the body's natural response to the HIV infection.
    - Not everyone develops ARS, and some people may have no symptoms.

Bloodborne Diseases

- HIV – disease progression
  - Acute Retroviral Syndrome
    - During this period of infection, the virus uses important immune system cells to make copies of itself and destroys these cells in the process.
    - The ability to spread HIV is highest during this stage because the amount of virus in the blood is very high.

Bloodborne Diseases

- HIV – disease progression
  - Eventually, the immune response will bring the amount of virus in the body down to a stable level.
  - At this point the HIV infection becomes chronic and this is called the clinical latency period.

Bloodborne Diseases

- HIV – disease progression
  - During the clinical latency period, HIV is still active, but reproduces at very low levels.
  - There may not be any symptoms or illness during this time.
    - People who are on antiretroviral therapy may live with clinical latency for several decades.
    - For people who are not, this period can last up to a decade, but some may progress through this phase faster.

Bloodborne Diseases

- HIV – disease progression
  - Toward the middle and end of this period, the viral load begins to rise and symptoms of HIV infection may return as the immune system becomes weak.
  - At this point the infection progresses to the final stage and this is called acquired immunodeficiency syndrome (AIDS).

Bloodborne Diseases

- HIV – disease progression
  - AIDS
    - This is the stage of infection that occurs when the immune system is badly damaged and the body becomes vulnerable to infections and infection-related cancers, called opportunistic illnesses.
    - Without treatment, people who are diagnosed with AIDS typically survive about 3 years.

Transmission

Modes of Transmission

- Bloodborne diseases can be transmitted in several ways:
  - Unsafe sexual practices
  - Sharing of needles
  - Skin punctures or contact with non-intact skin
  - Exposure to eyes, mouth or nose
  - Mother to infant
  - Blood transfusion

Modes of Transmission

- Our primary concern in the laboratory is transmission by skin punctures or contact with non-intact skin, and exposure to eyes, mouth or nose.
- The risks of viral infection from needle sticks and environmental surfaces are different for these three viruses and are detailed in the following slides.

Risk for Occupational Transmission

- HBV
  - The risk of HBV infection from needle stick injuries ≈ 30%
  - Although percutaneous injuries are the most efficient modes of transmission, the majority of HBV infections are transmitted through contact with environmental surfaces.

Risk for Occupational Transmission

- HBV
  - HBV has been demonstrated to survive in dried blood at room temperature on environmental surfaces for at least 1 week.
  - Infection may result from direct or indirect blood or body fluid exposures that inoculated HBV into cutaneous scratches, abrasions, burns, other lesions, or on mucosal surfaces.

Risk for Occupational Transmission

- HCV
  - HCV is not transmitted efficiently through occupational exposures to blood.
  - The average incidence of HCV infection from needle stick injuries is 1.8%.
  - There is limited data on survival of HCV in the environment, but data suggest that environmental contamination does not pose a significant risk for transmission.

Risk for Occupational Transmission

- HIV
  - The average incidence of HIV infection from needle stick injuries has been estimated to be ≈ 0.3%.
  - HIV does not survive long outside the human body.
    - It is not spread by air, water, insects, or casual contact with other people or environmental surfaces.
    - Blood or OPIM must come in contact with a mucous membrane or damaged tissue or be directly injected into the bloodstream.

Risk for Occupational Transmission

- HIV
  - Studies suggest that several factors affect the risk of HIV transmission after an occupational exposure.
  - The risk is increased with
    - Exposure to large quantities of blood
    - Exposure to blood from source persons with terminal illness
    - Deep injuries
    - Injuries from hollow-bore needles

Exposure Control

Exposure Control Plan

- The standard requires a written Exposure Control Plan (ECP) that includes:
  - Determination of employee exposure
  - Methods of exposure control
  - Hepatitis B vaccination
  - Post-exposure evaluation and follow-up procedures
  - Procedures for evaluating circumstances surrounding an exposure incident
  - Employee training requirements
  - Recordkeeping requirements

Exposure Control Plan

- The ECP will be reviewed and updated at least annually and whenever necessary to reflect new or modified tasks and procedures which affect occupational exposure and to reflect new or revised employee positions with occupational exposure.
- If requested, the employee will be provided with a copy of the ECP free of charge within 15 days.
    - Requests are to be sent to the QA & Compliance/Safety Unit.

Exposure Control Methods

- Hierarchy of controls
  - Engineering Controls
  - Work Practice Controls
  - Personal Protective Equipment (PPE)
- Why is there a hierarchy of controls?
  - Engineering controls isolate or remove the hazard, while work practice controls and PPE reduce risk of exposure.
  - PPE is last line of defense and most likely to fail.

Exposure Control Methods

- Engineering Controls
  - *Engineering controls* means controls that isolate or remove the hazard from the workplace.
    - Such as sharps disposal containers, biological safety cabinets, or self-sheathing needles.
  - When used properly, they are viewed as the most reliable method of exposure control.
    - Note that they may have limitations, such as a reliance on public utilities or calibration requirements.

Exposure Control Methods

- Work Practice Controls
  - *Work practice controls* means controls that reduce the likelihood of exposure by altering the manner in which a task is performed.
    - Such as prohibiting recapping of needles.
  - These control measures have many limitations because the hazard itself is not actually removed or isolated.
    - They can also be difficult to implement and maintain.

Exposure Control Methods

- Universal Precautions
  - *Universal precautions* means all human blood and certain human body fluids are treated as if known to be infectious for bloodborne pathogens.
  - Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids are treated as if known to be infectious for bloodborne pathogens.

Exposure Control Methods

- Personal Protective Equipment (PPE)
  - *Personal protective equipment* is specialized clothing or equipment worn by an employee for protection against a hazard.
    - General work clothes, including scrubs, are not considered to be PPE.
    - There are extensive limitations to PPE including selection, fit and material.

Exposure Control Methods

- PPE
  - PPE will be selected and worn in accordance with standard operating procedures.
  - Should circumstances arise in which an employee is unsure of the appropriate PPE, the section supervisor or Laboratory Safety Officer is to be consulted.

Exposure Control Methods

- PPE
  - Gloves
  - Safety glasses
  - Goggles
  - Face shields
  - Lab coats
  - Aprons
  - Sleeves
- The employer will
  - Clean
  - Launder
  - Dispose
  - Repair as necessary
  - Replace as necessary
  - Provide training on use

Exposure Control Methods

- PPE
  - Appropriate types and sizes will be available in work areas and are available from the Laboratory Safety Officer (Bldg. 4, Room 110).
  - All PPE is to be removed prior to leaving the work area and immediately after contact with blood or OPIM.
    - Used disposable PPE is to be disposed of in regulated waste containers.
    - Used reusable PPE is to be washed or decontaminated as necessary.

Exposure Control Methods

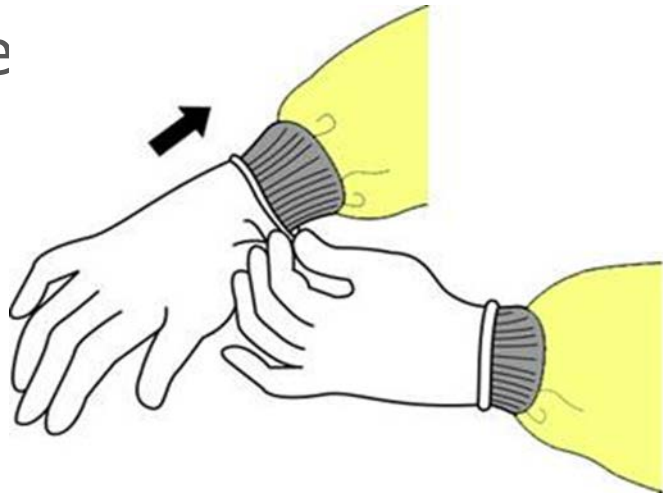
- PPE
  - Hand Protection
    - Gloves are to be worn when it can be reasonably anticipated that employees may have hand contact with blood or OPIM and when handling or touching contaminated items or surfaces.
    - Hypoallergenic gloves, glove liners, powder-free gloves, or other similar alternatives will be provided for those with allergies.

Exposure Control Methods

- PPE
  - Hand Protection
    - Disposable gloves
      - Must be replaced if contaminated or when the ability to function as a barrier is compromised.
      - May not be washed or decontaminated for reuse.
    - Utility gloves
      - May be decontaminated for reuse if the integrity is not compromised.
      - Must be disposed if they show signs of deterioration.

Exposure Control Methods

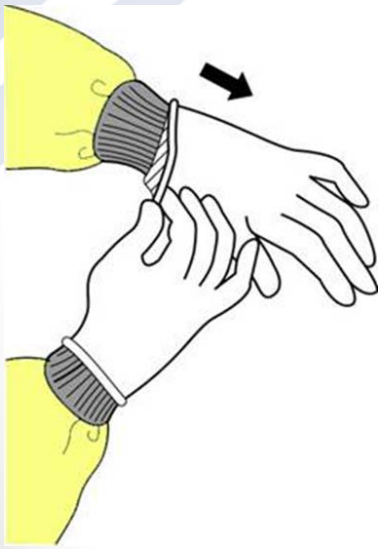
- How to Don Hand Protection
  - Select correct type and size
  - Insert hands into gloves
  - Extend gloves over cuffs

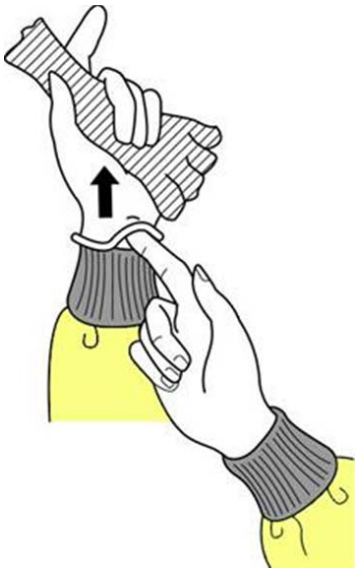


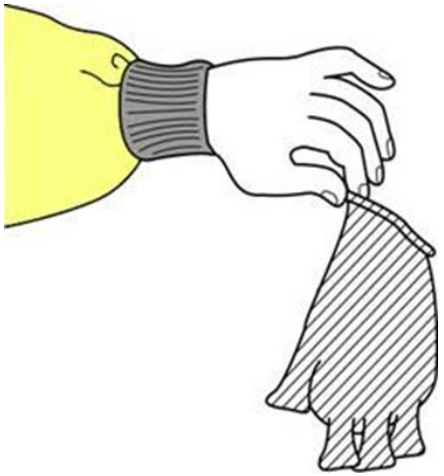
Picture: CDC Guidance for the Selection and Use of Personal Protective Equipment in Healthcare Settings

Exposure Control Methods

How to Remove Hand Protection: Grasp outside edge near wrist, peel away from hand, turning glove inside-out and hold in opposite gloved hand. Slide ungloved finger under the wrist of the remaining glove, peel off from inside, creating a bag for both gloves.





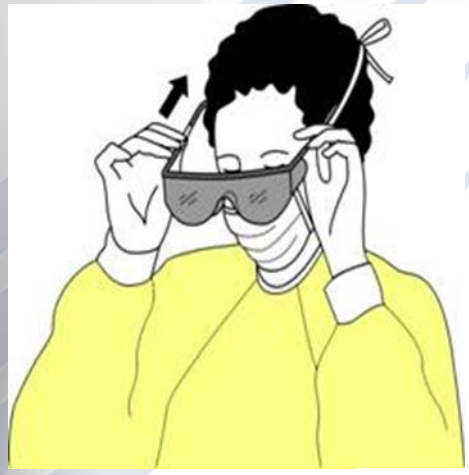


Picture: CDC Guidance for the Selection and Use of Personal Protective Equipment in Healthcare Settings

Exposure Control Methods

- PPE
  - Face Protection
    - Protective devices, such as goggles, glasses or face shields, must be worn whenever splashes, spray, spatter, or droplets of blood or OPIM may be generated and eye, nose and/or mouth contamination can be reasonably anticipated.
  - Body Protection
    - Appropriate protective clothing, such as lab coats, aprons and sleeves, or similar outer garments are to be worn in the work area.

Exposure Control Methods



- How to Don Face Protection
  - Position protective device over eyes and secure to the head using the ear pieces or headband
  - Position face shield over face and secure on brow with headband
  - Adjust to fit comfortably

Picture: CDC Guidance for the Selection and Use of Personal Protective Equipment in Healthcare Settings

Exposure Control Methods

How to Remove Face Protection: Grasp ear or head pieces with ungloved hands. Lift away from face.

Picture: CDC Guidance for the Selection and Use of Personal Protective Equipment in Healthcare Settings

Exposure Control Methods

- How to Don Body Protection
  - Select appropriate type and size
  - If opening is in the back, secure at neck and waist
  - If opening is in the front, button or snap closed

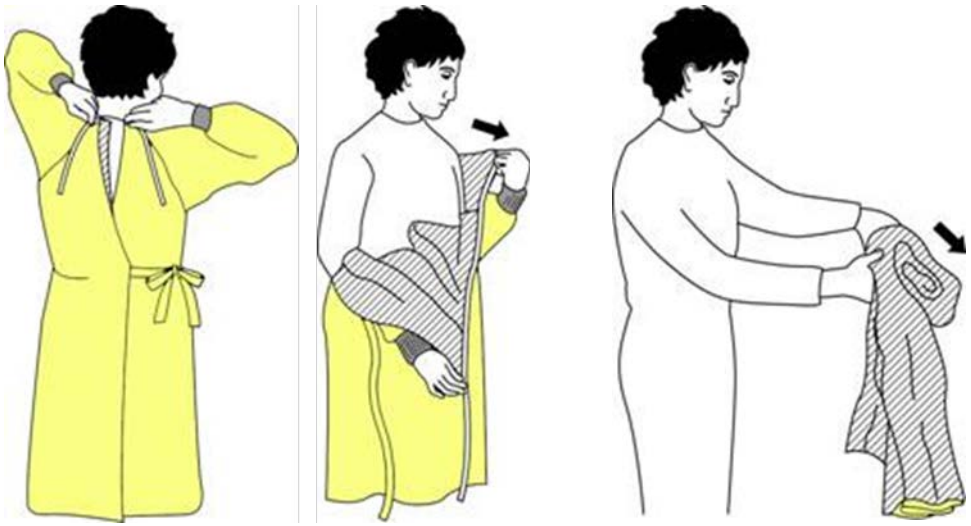
Picture: CDC Guidance for the Selection and Use of Personal Protective Equipment in Healthcare Settings

Exposure Control Methods

How to Remove Body Protection:

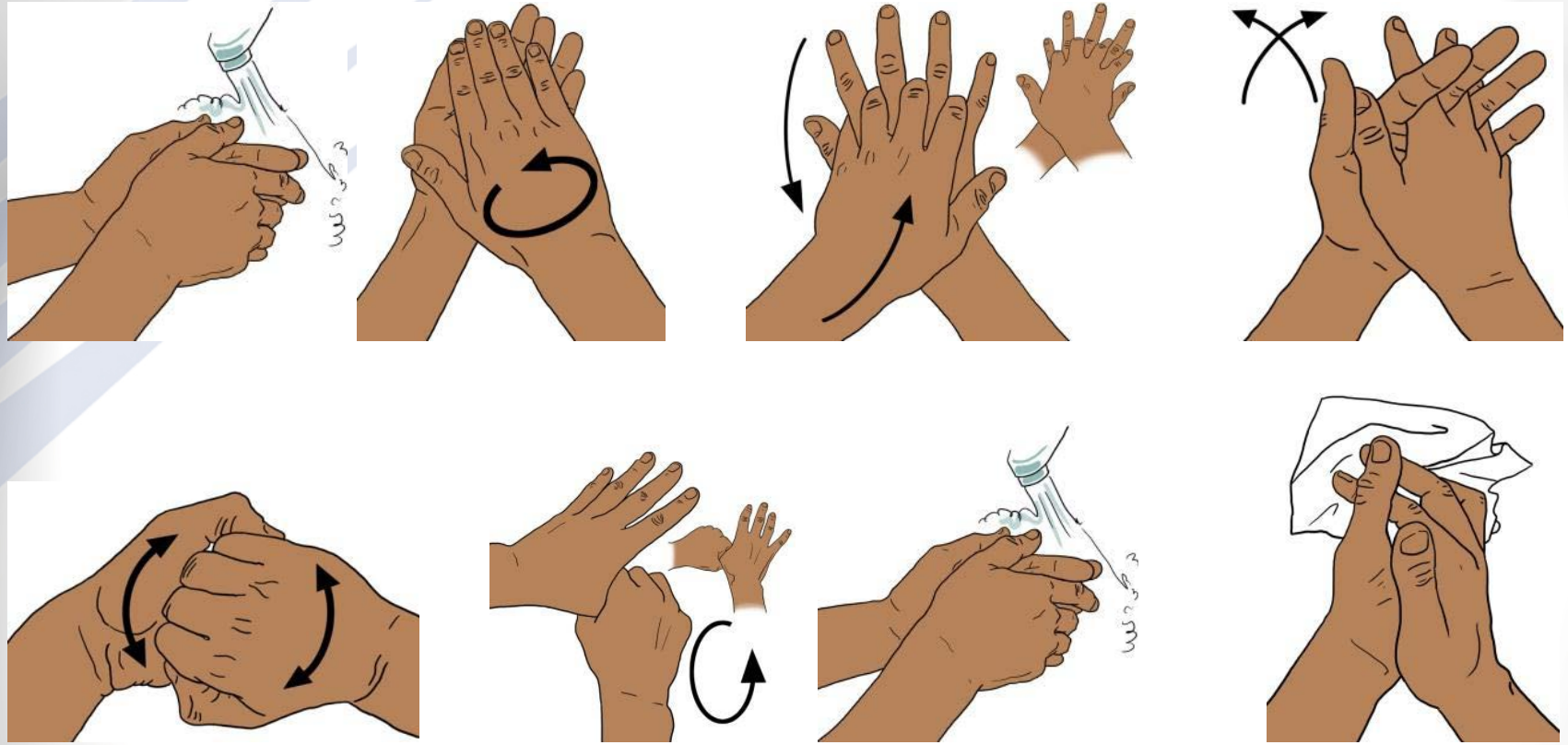
If opening is in the back: Unfasten ties, peel away from neck and shoulder, turn contaminated outside toward the inside and fold or roll into a bundle.

If opening is in the front: Unbutton or unsnap.



Picture: CDC Guidance for the Selection and Use of Personal Protective Equipment in Healthcare Settings

Hands are to be washed after removal of PPE



Picture: WHO How to safely collect blood samples from persons suspected to be infected with highly infectious blood-borne pathogens (e.g. Ebola)

Signs and Labels

Signs

- Signs are posted at the entrance to work areas where blood or OPIM are handled.
- Signs include the word "BIOHAZARD" and the biohazard symbol.
- They are fluorescent orange, orange-red or predominantly so, with lettering and symbols in a contrasting color.

Picture: 29 CFR 1910.1030

Labels

- Warning labels are affixed to containers of regulated waste, refrigerators and freezers, and other containers used to store or transport blood or OPIM.
- They are affixed by a method that prevents their loss or unintentional removal.

Labels

- Labels include the word “BIOHAZARD” and the biohazard symbol.
- Labels are fluorescent orange, orange-red or predominantly so, with lettering and symbols in a contrasting color.

Picture: 29 CFR 1910.1030

Hepatitis B Vaccine

Hepatitis B Vaccine

- The HBV vaccination series is available at no cost within 10 working days of initial assignment to all employees who have occupational exposure.
  - Employee may decline by signing a declination form.
  - Any employee that has signed the declination form may request and obtain the vaccination at a later date.

Hepatitis B Vaccine

- The vaccination consists of three intramuscular injections, the second and third administered 1 and 6 months after the first.
- Vaccination will be provided by a commercial occupational health service.
- Vaccination is recommended due to the increased risk of becoming infected.

Hepatitis B Vaccine

- Who should not get the vaccine?
  - Anyone with a life-threatening allergy to yeast or to any other component of the vaccine.
  - Anyone who has had a life-threatening allergic reaction to a previous dose of hepatitis B vaccine should not get another dose.
  - Anyone who is moderately or severely ill when a dose of vaccine is scheduled should wait until they recover before getting the vaccine.

Hepatitis B Vaccine

- The vaccine contains non-infectious material, and cannot cause hepatitis B infection.
- Mild problems that may be experienced include pain and redness at the injection site, headache, fatigue, a vague feeling of discomfort, and a temperature of 99.9°F or higher.

Hepatitis B Vaccine

- Severe problems are extremely rare, but may include severe allergic reaction, very high fever, or behavior changes.
    - Signs of a severe allergic reaction can include hives, swelling of the face and throat, difficulty breathing, a fast heartbeat, dizziness, and weakness. These would start a few minutes to a few hours after the vaccination.

Exposure Incident Response

Exposure Incident Response

- *Exposure incident* means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or OPIM that results from the performance of an employee's duties.
- If an exposure incident occurs, following initial first aid, the employee will work with their supervisor to complete the Injury/Illness Report (ADM 4303) and the ODH Supervisor Accident Report (HEA0332).

Post-Exposure Evaluation

- The Laboratory Safety Officer will determine whether the exposure requires completion of the PERRP Sharps Injury Form (and) Needlestick Report (SH-12).
- The employee will be provided with a CareWorks identification card and an immediate medical evaluation will be conducted by the Emergency Department at Mount Carmel East or another Bureau of Workers' Compensation (BWC) certified medical provider.

For more information on BWC certified medical providers, please contact the Ohio BWC at 1-800-OHIOBWC or visit their website at bwc.ohio.gov.

Follow-Up Procedures

- In addition to the post-exposure evaluation, the employee will receive follow-up care, counseling and an evaluation of any reported illnesses.
- Employees will also receive a copy of the health care professional's written opinion, indicating that they have been informed of the results of the evaluation and any medical conditions resulting from their exposure which require further evaluation or treatment.

References

References - International

- World Health Organization
  - How to safely collect blood samples from persons suspected to be infected with highly infectious blood-borne pathogens (e.g. Ebola)

http://www.who.int/csr/resources/publications/ebola/blood-collect-en.pdf?ua=1

References - Federal

- Occupational Safety & Health Administration

  www.osha.gov

- Centers for Disease Control and Prevention

  www.cdc.gov

  - Updated U.S. Public Health Service Guidelines for the Management of Occupational Exposures to HBV, HCV, and HIV and Recommendations for Postexposure Prophylaxis

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  - Guidance for the Selection and Use of Personal Protective Equipment in Healthcare Settings

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- Ohio Administrative Code

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- Ohio Revised Code

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