

Bloodborne Pathogens



CHAPMAN UNIVERSITY

RISK MANAGEMENT

Environmental Health and Safety





Introduction

- ▶ 29 CFR 1910.1030, Bloodborne Pathogens (BBP) Standard
- ▶ Pathogenic microorganisms
- ▶ Found in human blood and other potentially infectious materials (OPIM)





OPIM

- ▶ Some body fluids that are OPIM:
 - Semen, vaginal secretions, amniotic fluid, and others listed in regulation
 - Saliva in dental procedures
 - Any body fluid that is visibly contaminated with blood
 - All body fluids where it's difficult to differentiate between body fluids
- ▶ OPIM does not include feces, urine, vomit, or ordinary saliva, unless visibly contaminated with blood



Safety and health risks

- ▶ Blood and OPIM can carry pathogenic microorganisms that can cause:
 - Hepatitis B
 - Hepatitis C
 - Human immunodeficiency virus (HIV)/Acquired immunodeficiency syndrome (AIDS)
 - Other diseases

Understand the dangers



Occupational exposure

- ▶ Reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or OPIM that may result from the performance of an employee's duties
- ▶ Protections and training required for employees with occupational exposure



What about good Samaritans?

- ▶ Not have occupational exposure by definition
- ▶ Not protected by the BBP Standard and not required to be trained
- ▶ However, good idea to be aware of risks and precautions



Today's agenda

14-15 essential elements:

1. Causes and modes of transmission of bloodborne pathogens
2. Symptoms of bloodborne diseases
3. Exposure control plan and how to obtain a copy of the written plan
4. Appropriate methods for recognizing tasks and other activities that may involve exposure to blood and OPIMs



Today's agenda

5. Use and limitations of methods that will prevent or reduce exposure
6. Types, proper use, location, removal, handling, decontamination and disposal of personal protective equipment
7. Basis for selection of personal protective equipment
8. Hepatitis B vaccine



Today's agenda

9. Appropriate actions to take and persons to contact in an emergency involving blood or OPIMs
10. Procedure to follow if an exposure incident occurs
11. Post-exposure evaluation and follow-up that the employer is required to provide
12. Signs and labels and/or color coding



Today's agenda

13. *(Only if applicable)* Additional training for HIV/HBV laboratories and production facilities
14. Explanation of Bloodborne Pathogen (BBP) Standard contents
15. Interactive questions and answers with the trainer



Causes and modes of transmission

- ▶ Exposure can be divided into two subgroups:
 - **Direct:** Microorganisms transferred without a contaminated intermediate object or person
 - **Indirect:** Transfer of infectious agent through contaminated intermediate object or person



Causes and modes of transmission

▶ Hepatitis

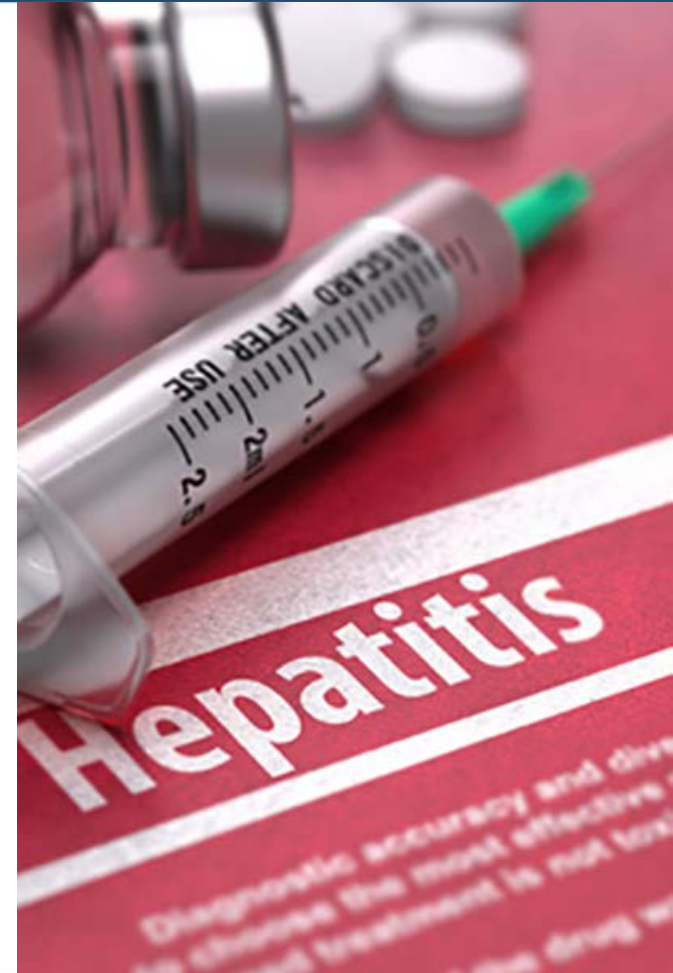
- Transmits through direct and indirect contact
- Affects the liver
- Causes can be due to:
 - Toxins
 - Certain drugs
 - Diseases
 - Heavy alcohol use
 - Bacterial and viral infections



Causes and modes of transmission

▶ Hepatitis

- Two of the most common types:
 - Hepatitis B virus
 - Hepatitis C virus





Causes and modes of transmission

▶ Hepatitis B virus

- Ranges in severity
- Transmits when infected blood or certain other body fluids enter body of non-infected person
- Exposes employees when:
 - Needles, syringes, or other drug-injection equipment are shared
 - Items such as razors are shared with an infected person
 - Direct contact with the blood (even dried blood spills) or open sores
 - Exposed to blood from needlesticks or other sharp instruments



Causes and modes of transmission

▶ Hepatitis B virus

- CDC says HBV is not spread routinely through:
 - Food or water
 - Sharing eating utensils
 - Hugging
 - Holding hands
 - Coughing
 - Sneezing



Causes and modes of transmission

▶ Hepatitis C virus

- Spreads through direct contact with infected blood
- Can cause serious health problems
- Is a leading cause of liver cancer
- Is not transmitted efficiently through occupational exposure



Causes and modes of transmission

▶ Hepatitis C virus

- Transmission methods include:
 - Blood transfusions and organ transplants
 - Sharing needles or other equipment to inject drugs
 - Body piercing or tattoos in unlicensed or informal facilities
 - Blood contamination
 - Sexual transmission, in rare cases
 - Childbirth



Causes and modes of transmission

▶ Hepatitis C virus

- CDC says HCV is not spread routinely through:
 - Casual or mouth-to-mouth contact
 - Hugging
 - Sneezing
 - Coughing
 - Sharing food
 - Sharing eating utensils
 - Sharing drinking containers



Causes and modes of transmission

- ▶ Human immunodeficiency virus
 - Spreads through direct and indirect contact with HIV
 - Leads to AIDS
 - Two types:
 - HIV-1
 - HIV-2
 - Destroys blood cells that help body fight diseases





Causes and modes of transmission

▶ Human immunodeficiency virus

- Transmission methods include:
 - Unprotected sex with someone who has HIV
 - Sharing needles, syringes, rinse water, or other equipment used to prepare illicit drugs for injection
 - Birth to an infected mother — HIV can be passed from mother to child during pregnancy, birth, or breast-feeding



Causes and modes of transmission

▶ Human immunodeficiency virus

- Less common transmission in workplace include:
 - Being “stuck” with an HIV-contaminated needle or other sharp object
 - Receiving blood transfusions, blood products, or organ/tissue transplants contaminated with HIV
 - Unsafe or unsanitary injections or other medical or dental practices
 - Being bitten and skin is broken
 - Contact between broken skin, wounds, or mucous membranes and HIV-infected blood or blood-contaminated body fluids



Causes and modes of transmission

- ▶ Human immunodeficiency virus
 - CDC says HIV cannot spread by:
 - Air or water
 - Insects, including mosquitoes
 - Ordinary saliva, tears, or sweat
 - Casual contact like shaking hands or sharing dishes
 - Closed-mouth contact



Causes and modes of transmission

- ▶ Other diseases caused by bloodborne pathogens include: malaria, syphilis, babesiosis, brucellosis, leptospirosis, arboviral infections, relapsing fever, Creutzfeld-Jakob Disease, Human T-lymphotrophic virus Type I, Viral Hemorrhagic Fever, Ebola, and others
- ▶ Visit www.CDC.gov to learn about causes and modes of transmission



Symptoms of bloodborne diseases

▶ Hepatitis B virus

- Symptoms of acute HBV, if they appear, include:
 - 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 eyes)



Symptoms of bloodborne diseases

▶ Hepatitis B virus

- Symptoms may appear:
 - 90 days (or 3 months) after exposure
 - Any time between 6 weeks - 6 months after exposure
 - 20 or 30 years after exposure

**Many people with HBV have no symptoms
but can still spread the virus**



Symptoms of bloodborne diseases

▶ Hepatitis C virus

- Symptoms of HCV:
 - Fever
 - Fatigue
 - Loss of appetite
 - Nausea
 - Vomiting
 - Abdominal pain
 - Dark urine
 - Grey-colored bowel movements
 - Joint pain
 - Jaundice (yellow color in the skin or the eyes)





Symptoms of bloodborne diseases

▶ Human immunodeficiency virus

- Symptoms of HIV:
 - Fever
 - Chills
 - Rash
 - Night sweats
 - Muscle aches
 - Sore throat
 - Fatigue
 - Swollen lymph nodes
 - Ulcers in the mouth



Symptoms of bloodborne diseases

- ▶ Human immunodeficiency virus
 - Symptoms may appear:
 - Within a few weeks after infection
 - Up to 10 years or longer

**Many people with HIV have no symptoms,
but it is still affecting their body**



Symptoms of bloodborne diseases

- ▶ Other diseases caused by bloodborne pathogens include malaria, syphilis, babesiosis, brucellosis, leptospirosis, arboviral infections, relapsing fever, Creutzfeld-Jakob Disease, Human T-lymphotrophic virus Type I, Viral Hemorrhagic Fever, Ebola, and others
- ▶ Visit www.CDC.gov to learn about symptoms



Exposure control plan

- ▶ Based on exposure determination
- ▶ Updated annually to reflect changes
- ▶ Contains employee input





Exposure control plan

- ▶ Elements of the plan:
 - Exposure determination
 - Implementation of universal precautions
 - Identification and use of engineering and work practice controls
 - Provisions for personal protective equipment
 - Housekeeping measures
 - Requirements for HIV/HBV research labs and production facilities
 - Availability of hepatitis B vaccinations for all employees with occupational exposure



Exposure control plan

- ▶ Elements of the plan:
 - Procedure for evaluating exposure incidents
 - Availability of post-exposure evaluation and follow-up for any occupationally exposed employee who experiences an exposure incident
 - Use of labels and signs to communicate hazards
 - Provision for information and training
 - Recordkeeping process
 - Documentation of annual consideration of safer medical devices
 - Documentation of solicitation of input



Methods to recognize exposure

- ▶ **Occupational exposure** to bloodborne pathogens is not limited to occupations or employment in one or a few industries.
- ▶ It is **based on** whether or not employees are **reasonably anticipated** to have 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**.



Methods to recognize exposure

- ▶ One way to determine occupational exposure is to recognize tasks such as:
 - Drawing blood
 - Processing and packaging blood and other biological specimens for shipping
 - Cleansing and bandaging cuts, burns, and other open wounds
 - Providing emergency treatment of traumatic wounds
 - Performing cardiopulmonary resuscitation
 - Cleaning up spilled blood or OPIMs



Methods to recognize exposure

- ▶ Decontaminating surfaces and reusable equipment
- ▶ Picking up waste baskets and bags which often contain needles
- ▶ Handling infectious waste
- ▶ Sorting or processing potentially contaminated laundry
- ▶ Collecting a blood specimen, cleaning and dressing wounds, and managing intrathecal, epidural, etc.
- ▶ Exposure to others who may bite



Controls to prevent exposure

- ▶ Systems used to prevent and control exposure:
 - Engineering controls
 - Work practices
 - Personal protective equipment





Controls to prevent exposure

- ▶ Engineering controls
 - Reduce exposure by either removing or isolating the hazard or isolating the worker from exposure
 - Are limited in effectiveness to proper selection, examination, and maintenance



Controls to prevent exposure

▶ Work practices

- Alter the manner in which a task is performed
- Can consist of:
 - Restricting eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses
 - Prohibiting mouth pipetting
 - Preventing the storage of food or drink in refrigerators or other locations where blood or OPIMs are kept
 - Routinely checking equipment for contamination and decontaminating it prior to servicing and shipping



Controls to prevent exposure

▶ Work practices

- Providing and requiring the use of hand washing facilities
- Washing hands when gloves are removed and as soon as possible after skin contact with blood or OPIMs
- Always using gloves when cleaning up any blood spills
- Prohibiting recapping, bending, removing, shearing, or breaking contaminated needles



Controls to prevent exposure

- ▶ **Personal protective equipment**
 - Must be used if engineering and work practice control do not eliminate exposure
 - Can consist of:
 - Gloves
 - Gowns
 - Laboratory coats
 - Face shields or masks
 - Eye protection
 - Other PPE
 - Appropriate only if it prevents blood or OPIMs from passing through or reaching clothes or body





Controls to prevent exposure

▶ Housekeeping

- Work practices related to housekeeping:
 - Cleaning and decontaminating the environment that has been contaminated with blood or OPIM
 - Decontaminating work surfaces after completion of procedures; immediately after spills of blood or OPIMs
 - Removing and replacing protective coverings when contaminated



Controls to prevent exposure

▶ Housekeeping

- Work practices related to housekeeping:
 - Regularly inspecting and decontaminating reusable receptacles that are likely to become contaminated
 - Using mechanical means to pick up contaminated broken glass
 - Storing or processing reusable sharps in a way that ensures safe handling
 - Placing discarded contaminated sharps in labeled or color-coded containers that are closable, puncture-resistant, and leak-proof



Controls to prevent exposure

▶ Housekeeping

- Work practices related to housekeeping:
 - Keeping sharps containers upright during use, replaced routinely, closed when moved, and not overfilled
 - Placing other regulated waste in closable, leak-proof, and labeled or color-coded containers
 - Handling contaminated laundry as little as possible and using appropriate PPE
 - Placing wet contaminated laundry in labeled or color-coded leak-proof containers
 - Bag contaminated laundry without sorting or rinsing in area of use



Controls to prevent exposure

▶ Universal precautions

Precautionary measures based on the principle that all blood and OPIM are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

- These include:
 - Hand hygiene
 - Use of gloves, gown, mask, eye protection, or face shield, depending on the anticipated exposure; and
 - Safe injection practices



Proper PPE use and handling

- ▶ For PPE to be effective, observe the following precautions:
 - Remove protective equipment when contaminated and before leaving work area
 - Place in appropriately designated areas or container
 - Remove garments when saturated with blood or OPIMs
 - Wear appropriate gloves when contact with blood or OPIMs is reasonably anticipated
 - Dispose of and replace gloves if torn, punctured, contaminated, or no longer function as a barrier



Proper PPE use and handling

- ▶ Never wash or decontaminate disposable gloves for reuse
- ▶ Only decontaminate utility gloves if integrity is not compromised
- ▶ Wear face and eye protection whenever risk of splashes, sprays, spatters, or droplets of blood or OPIMs
- ▶ Wear protective body coverings when occupation exposure is anticipated
- ▶ Wear caps, hoods, and/or shoe covers or boots where gross contamination is reasonably anticipated



Selecting PPE

- ▶ The selection of PPE is based on anticipated contamination with blood or OPIMs





Hepatitis B vaccine

- ▶ This vaccine is:
 - Free of charge to workers with occupational exposure
 - Best way to prevent hepatitis B
 - Given in 3-4 shots over a 6-month period



Hepatitis B vaccine

- ▶ Possible side effects of vaccination:
 - May still get the illness after an exposure incident if body does not respond to the vaccine
 - Fever or soreness at injection site
 - Allergic reactions



Hepatitis B vaccine

- ▶ If covered employee declines vaccine, he/she:
 - Must sign declination form, which says he/she knows the risk, and vaccine was made available, but declined by employee
 - May get free vaccine later if still have occupational exposure



Emergency action

- ▶ Your response to an injured or ill person:
 - Depends on assigned job role
 - Consists of the actions identified by your employer

- ▶ If there's an emergency, you should take these actions:
 - Use universal precautions and treat all blood and OPIM as if known to be infectious
 - Notify those who are trained and equipped to respond properly



Emergency action

- ▶ If you're a designated and trained first responder or cleanup person, also:
 - Use PPE
 - Follow safe work practices
 - Use proper cleanup, disposal, and labeling procedures
 - Recognize biohazard markings



Report exposure incident

- ▶ If exposure incident occurs, follow procedures identified by your employer





Post-exposure

- ▶ If exposure incident occurs:
 - Understand that medical evaluation and follow-up will be available at no cost
 - Evaluation and follow-up will be performed by or under supervision of licensed health care professional
 - Laboratory tests will be conducted by an accredited laboratory at no cost



Post-exposure

- ▶ Medical evaluation and follow-up involves:
 - Documenting exposure route and circumstances
 - Identifying and documenting the source individual
 - Testing the source individual's blood
 - Making the results of testing available to exposed employee
 - Collecting exposed employee's blood
 - Providing post-exposure measures
 - Providing counseling
 - Evaluating reported illnesses



Post-exposure

- ▶ Health care professional will be provided:
 - Copy of OSHA regulation 1910.1030
 - Description of exposed employee's duties in relation to exposure incident
 - Documentation of exposure route and circumstances
 - Results of source individual's blood testing
 - All relevant medical records appropriate for treatment



Post-exposure

- ▶ Exposed employee will receive a copy of evaluating health care professional's written opinion within 15 days of completion of evaluation



Signs, labels, color-coding

- ▶ Warning labels will be affixed to items such as:
 - Containers of regulated waste
 - Containers of contaminated reusable sharps
 - Refrigerators and freezers containing blood or OPIMs
 - Containers used to store, transport, ship blood or OPIMs
 - Contaminated equipment being shipped or serviced
 - Bags or containers of contaminated laundry





Signs, labels, color-coding

- ▶ Labels will:
 - Be fluorescent orange or orange-red, with lettering and symbol in contrasting color
 - Be affixed as close as feasible to the container



Signs, labels, color-coding

- ▶ Items that do not need labels:
 - Labeled containers of blood released for clinical use
 - Regulated waste that is decontaminated



Signs, labels, color-coding

- ▶ Biohazard signs and tags used to:
 - Signify actual/potential presence of biohazard
 - Identify equipment, containers, rooms, etc., which contain or are contaminated with, viable hazardous agents
- ▶ Signs are for ongoing biological hazards
- ▶ Tags are for out of the ordinary, unexpected, or not readily apparent biological hazards



HIV/HBV labs and production facilities

- ▶ Standard practices, techniques, and operations you must follow include, but are not limited to:
 - Decontaminate/Autoclave/Incinerate regulated waste before disposal
 - Keep doors closed





HIV/HBV labs and production facilities

- Place contaminated materials in proper containers
- Only authorized personnel in work areas and in animal rooms
- Place warning signs on access doors when hazards are present
- Don't work with potentially infectious materials on an open bench
- Use biological safety cabinets or other containment devices



HIV/HBV labs and production facilities

- Wear appropriate PPE when handling OPIM
- Do not wear PPE outside the work area
- Decontaminate clothing before laundering
- Protect vacuum lines with HEPA filters and liquid disinfectant traps
- Check vacuum lines routinely and maintain/replace as needed



HIV/HBV labs and production facilities

- Use the right needle or syringe for the task
- Never bend/shear/replace a needle in the sheath or guard
- Never remove a used needle from the syringe following use
- Use caution when handling needles/syringes
- Place used needles/syringes in a sharps container and decontaminate/autoclave before reuse or disposal



HIV/HBV labs and production facilities

- Report all spills/accidents immediately
- Read, follow, and practice instructions in biosafety manual
- Use protective clothing/respirators when exposed to droplets/splashes/spills/aerosols



BBP Standard contents

- ▶ Copy of the 29 CFR 1910.1030 is available (*enter your location*)
- ▶ Under BBP Standard, we must do 12 core things:
 1. Identify job classes, tasks, procedures with occupational exposure
 2. Train covered employees at initial assignment and annually
 3. Establish, review, and update written Exposure Control Plan and make it available



BBP Standard contents

- ▶ These 12 things include two preventive measures:
 4. Offer free hepatitis B vaccinations to covered employees
 5. Ensure employees use universal precautions





BBP Standard contents

- ▶ Control measures are part of BBP Standard:
 6. Identify/Use engineering and work practice controls
 7. Provide appropriate PPE
 8. Ensure proper disposal of contaminated sharps and other regulated waste
 9. Ensure biohazards are communicated with labels or color-coding



BBP Standard contents

- ▶ Should you experience exposure incident, we:
 10. Offer post-exposure evaluation and follow-up at no cost

- ▶ Under BBP Standard, we also:
 11. Preserve/Maintain employee medical and training records



BBP Standard contents

12. (*Only if applicable*) Further protections are provided to employees in research labs and production facilities engaged in the culture, production, concentration, experimentation, and manipulation of HIV and HBV



Questions and answers?

- ▶ Understanding what you've learned is critical, so please ask questions





Conclusion

- ▶ Key elements to take away:
 - Know the causes and modes of transmission
 - Recognize the symptoms of bloodborne diseases
 - Know how to obtain a copy of exposure control plan
 - Recognize tasks and other activities that may involve exposure to blood or OPIMs
 - Be aware of and use the available engineering controls and follow safe work practices
 - Properly select and use PPE
 - Take universal precautions



Conclusion

- ▶ Key elements to take away:
 - Understand your rights to vaccination, medical evaluation, and follow-up
 - Take appropriate actions in an emergency or incident
 - Be aware that signs, labels, and colors can alert you to biohazards
 - Be aware that you can access the Bloodborne Pathogens Standard for more information