Bloodborne Pathogens for Healthcare Students
Complying with OSHA Standard 29 CFR 1910.1030

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Training Objectives

• Understand the OSHA Bloodborne Pathogens Regulation (29 CFR 1910.1030)

• To recognize potential hazards associated with bloodborne pathogens

• To understand appropriate steps to minimize risks associate with bloodborne pathogens.

• To know procedures in the event of an exposure
Who Needs BBP Training?

• All personnel INCLUDING students who may reasonably anticipate any exposure to blood or other potentially infectious material

• This applies to all clinical or research activities where you may be exposed to human infectious material

• This even includes research working with even non-primate infectious material
Training Elements

Part I: The Bloodborne Pathogens Standard
Part II: Epidemiology and Disease Transmission
Part III: Exposure Control Plan (ECP)
Part IV: Components of BBP Plan
Part V: Exposure Management
Part VI: Conclusions
SECTION 1:
BLOODBORNE PATHOGEN STANDARD
Scope and Application

- Applies to every employer, employee as well as any students, trainees or volunteers

- It is the employer’s responsibility to ensure that they are in compliance with the OSHA standards
OSHA Bloodborne Pathogen Standard

Potentially Infectious Material

- Any blood, body fluid or fresh tissue from patients
- If your involved in research any blood, body fluids or fresh tissue from the following
  - Research animals infected with a BBP
  - Human cell lines
  - Non-human primate cell lines
  - Media and supernatants from human or non-human primate cell cultures
OSHA Bloodborne Pathogen Standard

• Pathogens that are routinely considered under the standard during an exposure evaluation are:
  
  – Human Immunodeficiency Virus (HIV)
  – Hepatitis B Virus (HBV)
  – Hepatitis C Virus (HCV)
  – Other potentially BBP include Malaria, Syphilis, Ebola, Leptospirosis and Epstein Barr Virus (EBV)
For Students and Trainees overall responsibility under the BBP Standard is the reasonability of the Office of the VP for Health Affairs and the HSC Deans

All trainees must understand the exposure control plan

All trainees must complete initial and annual refresher BBP training
PART II:

EPIDEMIOLOGY
Risk of Transmission

Dependent upon multiple factors

- Mode of Entry (needle stick vs. splash to eyes)
- Viral load in source material (viral particles/milliliter)
- Infectivity of Virus (ease of becoming infected)
- Immune status of the one exposed to the BBP
Risk of Transmission

Needle Sticks Most Common Exposure

- 800,000-1,000,000 accidental needle sticks reported annually

- 80% of exposures from:
  - Recapping needles
  - Cleaning up after procedures
  - Disposing of needles
  - Giving medications
  - Handling trash
Risk of Transmission

Who is at the Greatest Risk?

• 1st: Nursing Staff
• 2nd: Laboratory Personnel
• 3rd: Physicians
Exposures Among Resident Physicians

On average, exposure risk decreases for most residents as they progress through their training BUT……

Those who tend to report exposure tend to report more as they progress through their training.

Relative Risk by Agent

- HBV ...... 30.0% - Highest Risk
- HCV ...... 3.0%
- HIV ...... 0.3% - Lowest Risk
Hepatitis B

- Greatest risk of transmission of the BBP
- Risk of transmission is up to 30%
- Presence of “e” antigen increases risk of transmission
- Immunization is protective so long as antibody develops
Hepatitis B

High Risk Populations

- Have unprotected sex with multiple sex partners or with someone who's infected with HBV
- IV drug abusers
- Hemodialysis patients
- Asian Pacific Island birth place or descent
- Healthcare workers
- Travel to high risk areas such as Asian
Hepatitis B

Recognized Risk for Health Care Workers

- Incidence 10 times greater than in the general population
- Most of those infected could not recall a specific injury such as a needle stick
- Presence of “e” antigen is present; transmission rate is approximately 30%
- Virus can persist on hard surfaces such as light switches, counter tops for days.
Hepatitis C

Risk of Transmission from Occupational Exposures

- Transmission rate is approximately 3% for each exposure (About 10 X’S that of HIV)
- 85% or more of acute infections become chronic
- 70% of those infected develop chronic liver disease
- no vaccine
- immunoglobulin not protective
Hepatitis C

High Risk Populations

- Have unprotected sex with multiple sex partners or with someone who's infected with HCV
- IV drug abusers (70-90% infected can be infected)
- Hemodialysis patients
- Healthcare workers
- Individuals born between 1945 and 1965
- Any who receive a blood transfusion prior to 1992
- Anyone who received a clotting factors prior to 1987
Hepatitis C

Out of 100 Individuals Infected with Hepatitis C

MF 80 chronic infection

MF 15 will develop cirrhosis

MF 5 develop liver cancer
Hepatitis C

Genotypes US vs World

Type 1 most common in US and easiest to treat

Genotype

Type 1 most common in US and easiest to treat.
Hepatitis C

Prevention is the best strategy

- Reducing risk is the best strategy when trying to reduce Hepatitis C exposures as there is no vaccine
- Post exposure prophylaxis with antivirals or immunoglobulin is not recommended
- Currently there is no vaccine
HIV

- More than 1 million infected in US
- Recent resurgence in IV Heroin use is causing local outbreaks of HIV and Hepatitis C especially in southern Indiana
- No vaccine
High Risk Fluids

- Blood
- Semen
- Vaginal fluids
- Spinal fluid
- Pleural fluid
- Peritoneal fluid
- Pericardial Fluid
- Amniotic fluid
- Synovial fluid
- Saliva (bloody)
- Any bloody fluid
Low or Non-Risk Fluids

Assuming that the following fluids are non-bloody, they are considered low or non-risk:

- Emesis
- Feces
- Urine
- Sweat
- Nasal discharge
- Saliva
- Tears
HIV

Occupationally Acquired HIV Cases

- As of 2010, 57 confirmed and 143 probable conversions
  - 48 percutaneous (needle/cut)
  - 5 mucocutaneous
  - 2 both mucocutaneous and percutaneous

- No confirmed new cases since 1999

- Last possible case reported in 2009
HIV

Transmission Risk

- Risk of transmission is 0.3% (1/200-250) from all needle stick injuries
- Risk of transmission is 0.09% for splash injuries
- Risk of transmission via skin exposure is unknown but **REAL**
- Simultaneous exposure to both HIV and Hep C increases risk of transmission
HIV

Transmission Risk

- There have been three instances of delayed HIV conversion after the recommended follow up period of 6 months.
- In 2 of the cases, hepatitis C infections were identified which is believed to have caused the delayed response

Take Away Message:

Simultaneous infection with Hepatitis C and HIV may delay seroconversion
PART III:

EXPOSURE CONTROL PLAN
Exposure Control Plans

- OSHA required written document addressing
  - BBP and other infectious hazards in each workplace
  - exposure prevention plan

- Each facility your train in will have its own exposure control plan.
PART IV:
COMPONENTS OF BBP PLAN
Five Principals of BBP Plan

• Universal Precautions
• Pre-exposure Prophylaxis
• Personal Protective Equipment
• Workplace Practice Controls
• Post-exposure Prophylaxis
Universal Precautions

Most occupational exposures can be avoided with proper safety precautions
Universal Precautions

Treat all blood, body fluids or tissues are treated as if they are infectious.
Universal Precautions

If its wet and it’s not yours,

DON’T TOUCH IT

--unless you have proper personal protective equipment
Pre-exposure Prophylaxis

• Immunizations to prevent transmission of a BBP if you are exposed

• Immunization of healthcare workers against Hepatitis B is an example

• Immunization is the best way to prevent transmission
Pre-exposure Prophylaxis

Definition

- Immunizations to prevent transmission of a BBP if you are exposed
  - Immunization of healthcare workers against Hepatitis B is an example
Hep B Immunization Protocol for HEALTHCARE workers

• Primary series with 3 doses of vaccine

• Surface antibody levels should always be measured 4-8 weeks after the last shot of the series

• If no or insufficient antibody response, complete second series of 3 doses of vaccine.
Hep B Immunization Protocol for HEALTHCARE workers

- Once antibody positive titers do not need to be rechecked and booster doses of vaccine are not required

- Know your antibody status… it’s your best protection
Pre-exposure Prophylaxis

Hep B Vaccine Protocol for Vaccine Non-Responders

• If trainee fails to develop Hepatitis B Surface Antibodies after the completion of 2 Hepatitis B vaccine series THEN:
  – Must be counseled on how to respond in the event of a Hepatitis B exposure.
  – If exposed, individual should receive Hepatitis B Immune Globulin (HBIG) up to 7 days following exposure
    • Ideally give HBIG 1-2 days after exposure (70%) effective
Personal Protective Equipment

- Must be provided
- Commonly known as PPE
- Includes gloves, masks, gowns, booties, face masks, face shields, masks
- Respirators include N95 masks (orange duck bill) in addition to full blown respirators
- Powered Air Breathing Respirator (PAPR) is a hood with a HEPA filtration unit which attaches at the waist
Examples of PPE

- Eye Shields
- Face Mask
- Gowns
- Shoe Covers
- Face Shield
- Face Mask
- Goggles
- Gloves
- N95 Respirator
- PABR
Occasionally you might even need this much personal protective equipment.

Notice the use of mask with PAPR

This is similar to what the staff used at Emory Hospital with the recent Ebola outbreaks.
Work Place Practice Controls

Definition

Processes and/or equipment employed throughout an organization to minimize the risk of acquiring a BBP infection.
Examples Practice Controls

- Needleless IV Systems
- Retractable Needle Syringes
- Biohazardous Waste Containers
- Safety Needles
Post-Exposure Prophylaxis

• Utilization of medications, vaccines and/or immunoglobulin in the event of an TRUE BBP

• ONLY happens in in cases where all other components of BBP program fail
PART V:
EXPOSURE MANAGEMENT
Exposure Criteria

In order to have an exposure, two things must happen:

1. The body fluid must contain live organisms
2. The contaminated fluid must enter the body
I think I was exposed!

Now what?

Healthcare Workers EXPOSED to BBP!
Was I exposed?

Only you can ultimately determine if you had an exposure

Example:
Did something get splashed into your eyes?
Exposure Management

Initial Steps

- Local wound care
  - Wash the wound well with soap or irrigate the area
  - Splashes to eyes should be irrigated with water for 15 minutes

- Gather information about the source patient
Source Patient Information

- If possible, gather the following information on the source patient in order to help determine how to manage your exposure:
  - Source Patient’s HIV, Hepatitis B and C status if known
  - Source Patient’s viral loads if HIV or Hep C positive
Exposure Management

Call for Help

After treating the wound and gathering information about the patient—

CALL THE HOTLINE

502-852-6446

(Answered 24 hours a day)
Exposure Management

Risk Assessment

• Once it has been determined that an exposure has occurred risk is determined by:
  – Source Patient’s HIV, Hepatitis B and C status if known
  – Source Patient’s viral loads
  – Volume of fluid/material
Pathogens

- Pathogens that are routinely considered during an exposure evaluation are:
  - Hepatitis B
  - Hepatitis C
  - HIV

- Depending on the patient’s history and diagnosis, other microbial agents may be important to consider.
Exposure Management

Your testing is not urgent and can wait for 2-3 days.

Getting the source patient tested is what is urgent.
Exposure Management

Initial Testing

- **Source Testing**
  - Hepatitis B Surface Antigen
  - Hepatitis C Antibody
  - RAPID HIV Antibody (SUDS)
  - Viral load/CD4 count if known positive for HIV

- **Student/Resident**
  - Hep B Antibody if unknown
  - Hep C Antibody
  - HIV Antibody
  - Pregnancy testing if starting medications
Exposure Management

Post Exposure Prophylaxis (PEP)

- Thirty day course of treatment provided FREE to students covered under the HSC Health Fee when recommended by Campus Health Services

- Residents and fellows receive the same coverage through Worker’s Compensation
Exposure Management

Post Exposure Prophylaxis (PEP)

• Thought to reduce HIV transmission by 80%

• Ideally should be started within one hour of exposure

• Initiation of PEP is dependent up the amount of fluid and the viral load of the source patient
  • Low Risk - No therapy vs ? AZT or Combivir
  • Moderate - Combination antivirals + protease inhibitor
  • High - Combination antivirals + protease inhibitor
Exposure Management

Follow Up Testing

• Low Risk
• Usually no follow up report
• Moderate and High Risk
  • Repeat HIV testing at 6 weeks, 12 weeks and 6 months
  • Hepatitis C testing at 6 weeks with PCR if source is positive
Special Situations

• Consider how you will initiate antiviral therapy on off-site and out of town rotations especially international including mission trips

• Ideally access to appropriate drugs should take no longer than 1 hour

• Emergency departments may not be prepared to deal with these types of exposures
Conclusions

• Be sure to complete your immunizations. It's your best protection against Hepatitis B

• Know your antibody status for Hepatitis B in the event of an exposure
Conclusions

• Keep your exposure card with your ID and badges.

• Call the hotline if you have been exposed or need help in evaluating if you were exposed.
Conclusions

- Always carry your exposure card with your University ID
- Call whenever you have a problem or a question