

BLOODBORNE PATHOGENS

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OSHA Bloodborne Pathogen Standard

- 29 CFR 1910.1030 - OSHA Bloodborne Pathogen Standard issued originally in 1991 <http://www.osha.gov/SLTC/bloodbornepathogens/index.html>
- In 2001 the Standard was revised with the Needlestick Reduction Act which includes:
 - Education and selection of sharps injury reduction devices (e.g., self-sheathing needles)
 - Maintenance of a contaminated sharps injury log

Texas Department of State Health Services Bloodborne Pathogen Control

- Prevention of contaminated sharps injuries, needlesticks
- Exposure control plan designed to minimize exposure of governmental entity employees to bloodborne pathogens

http://www.dshs.state.tx.us/idcu/health/bloodborne_pathogens/pathogen_control/

Introduction

Approximately 5.6 million workers in health care and other facilities are at risk of exposure to blood borne pathogens such as human immunodeficiency virus (HIV – the virus that causes AIDS), the hepatitis B virus (HBV), and the hepatitis C virus (HCV)

Bloodborne Pathogens (BBP)

Definition:

Pathogenic microorganisms that are present in human blood or other potentially infectious material (OPIM), and can infect and cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

Bloodborne Pathogens (BBP)

Examples:

- HIV
- HBV
- HCV
- *T. pallidum*
- Herpes Virus
- *M. tuberculosis* (typically an aerosol hazard)
- Human T-Lymphotropic Virus Type I (HTLV-I)

Bloodborne Pathogens (BBP)

Body fluids that can harbor BBP:

- Blood
- Semen and vaginal secretions
- Saliva involved in dental procedures
- Synovial fluid
- Cerebrospinal fluid
- Human tissue and cell cultures
- All body fluids containing blood

How does exposure occur?

- Most common: needle sticks
- Cuts from other contaminated sharps (scalpels, broken glass, etc.)
- Contact of mucous membranes (for example, the eye, nose, mouth) or broken (cut or abraded) skin with contaminated blood

Occupational Exposure

- Mucous membrane contact - splash to the eyes, nose or mouth
 - Percutaneous inoculation - misuse of sharps (broken glass, needles, scalpels)
 - Exposure to broken/damaged skin - risk increases if contact involves a large area of broken/damaged skin or if contact is prolonged
- * Risk increases with high titer levels in the source

Preventive Measures

Risk of exposure can be minimized or eliminated by using the following controls:

- Engineering controls
- Personal protective equipment (PPE)
- Administrative controls
- Work place practices

Preventative Measures continued...

- Written plan required
- Plan must be reviewed at least annually to reflect changes in:
 - ✓ Tasks, procedures, or assignments which affect exposure, and
 - ✓ Technology that will eliminate or reduce exposure
- Annual review must document employer's consideration and implementation of safer medical devices.
- Plan must be accessible to employees

Universal Precautions

- Treat all human blood and certain body fluids as if they are infectious
- Must be observed in all situations where there is a potential for contact with blood or other potentially infectious materials

Engineering Controls

- Leak-proof containers
 - ✧ Use for storage & transport of bloodborne pathogen material
- Sharps containers
 - ✧ Fill no greater than $\frac{3}{4}$ full
- Needleless devices
 - ✧ Use retractable syringes, self-sheathing needles
- Biosafety cabinet (BSC)
- Directional air flow
- High efficiency particulate air (HEPA) filtration
- Access control

Engineering Controls

These controls reduce employee exposure by either removing the hazard or isolating the worker.

Examples:

- ▣ Sharps disposal containers
- ▣ Self-sheathing needles
- ▣ Safer medical devices
 - Needleless systems
 - Sharps with engineered sharps injury protections



Personal Protective Equipment (PPE)

- Face protection
 - Goggles or safety glasses with side shields
- Clothing
 - Lab coats, scrubs, disposable gowns (long pants only and no open toed shoes!)
 - Replace immediately if contaminated & restrict to work area
- Gloves
 - Replace immediately if torn
 - Do not wear outside the lab area



PPE

Donning and doffing PPE for All Barrier Precautions

Personal Items including all rings, watches, bracelets, pagers, cell phones, or any other personal items should be removed prior to donning personal protective equipment (PPE) as described below:

- **Order for Donning PPE**

1. Gown (secured behind the neck and tied behind the back)
2. Mask (N95)
3. Protective eyewear (safety goggles)
4. Gloves (pull gloves up over gown sleeve cuffs)

- **Order for Doffing (removal) of PPE:**

1. Gloves
2. Protective eyewear (safety goggles)
3. Gown
4. Exit room, wash hands with an antimicrobial soap or apply an alcohol hand rub
5. Remove mask (N95)
6. Again wash hands with an antimicrobial soap or apply an alcohol hand rub

Administrative Controls

- Medical surveillance
 - TB skin test (PPD), baseline serum
- Immunizations
 - Hepatitis B series
- Training
- Management of staff (SOP compliance)
- Background checks, security clearance

Good Work Place Practices

- Follow SOPs
- Use standard precautions
 - Treat all human blood and body fluids as if known to be infectious for HIV, HBV or other potentially infectious material
- Survey work area
 - Note locations of all necessary equipment, waste containers, disinfectants, soaps
- Establish and maintain clean and dirty zones
- **NEVER** recap needles!!!

Good Work Place Practices (cont.)



- DO NOT eat, drink or apply cosmetics in work area
- Decontaminate work surfaces
 - At start and end of procedures, immediately after spill, and before removal of equipment
- Dispose of waste properly
- Label containers/hazard communication
 - Chemical & biological working stocks
- Wash hands frequently & always before leaving work area!

Hand Hygiene

- On average only **40%** of health care workers regularly wash their hands
- Hospital acquired infections result in transmission of:
 - **MRSA** – Methicillin resistant *S. aureus*
 - 1.2 million infections; 48,000 patient deaths yearly
 - **VRE** – Vancomycin resistant Enterococci
 - \$4.5 billion yearly cost for treatment
- Methods for contamination
 - Moving patients
 - Taking blood pressure
 - Touching bedrails

Source: Hand Hygiene Resource Center <http://www.handhygiene.org/>

The Inanimate Environment Can Facilitate Transmission

**X represents
VRE culture positive
sites**

*Contaminated surfaces
increase cross-transmission*

*Abstract: The Risk of Hand
and Glove Contamination after
Contact with a VRE (+) Patient
Environment*

*Hayden M, ICAAC, 2001,
Chicago, IL.*



Proper Hand Washing

Hand washing:

Use antimicrobial soap or antibacterial soap:

1. Thoroughly wet hands
2. Apply soap
3. Rub with friction all areas of hands and fingers for at least 10 to 20 seconds, under the fingernails and between fingers
4. Rinse hands thoroughly
5. Dry hands with a paper towel
6. Use a paper towel to turn off the faucet in the absence of foot controls

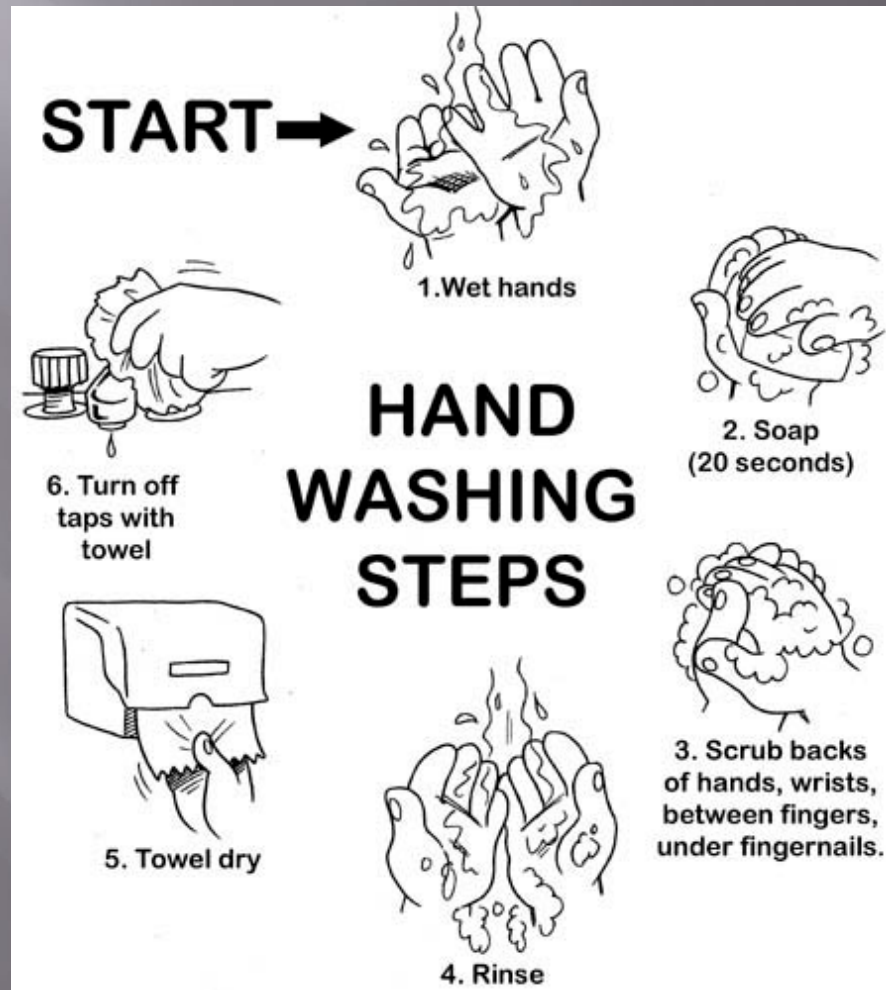
Proper Hand Washing

- Always done between patients and procedures!
- Wet hands with warm (not hot) water
- Apply soap on hands
 - Liquid soap is better because germs can live on wet soap bars
- Rub hands together for at least 15 seconds
 - Wash longer if there is visible dirt on hands
 - Cover all surfaces of hands and fingers - including between fingers, backs of hands, thumbs, under fingernails
- Rinse hands thoroughly with warm water
- Dry hands thoroughly
 - If using blow dryer, push button with elbow
 - If available, use towel to turn off water

What song is about 15 seconds long....

Source: Hand Hygiene Resource Center <http://www.handhygiene.org/>

Proper Hand Washing



Where do we miss?



■ Areas most frequently missed during hand washing

■ Less frequently missed

■ Not missed

(Adapted from Taylor L (1978), An evaluation of hand washing techniques - I, Nursing Times, 12 January, pp 54-55)

Proper Hand Washing

Waterless Alcohol Hand Rub

(If hands are visibly soiled, wash hands with soap prior to application of alcohol hand rub)

- 1. Apply enough alcohol-based **product** to **cover the entire surface** of hands and fingers.
- 2. Rub the **solution vigorously** into hands until dry.
 - a) Use of alcohol hand rub may result in a sticky residue on hands

Proper Hand Washing (cont.)

Alcohol sanitizers

- 62% ethyl alcohol
- Accepted as effective under certain conditions
- Should not be used when there is visible dirt or grime



Proper Hand Washing (cont.)

- Clostridium Difficile:
 - The elderly and people with certain medical problems
 - Spores usually live outside for a very long time and present on very common things – Ex: Bathroom Fixtures
- Do not use alcohol hand rub
- Do not use lotion soap
- Wash hands with anti microbial soap and water only

Most Cited Sources of Needlestick Injuries

- Improper sharps disposal
 - Overfilled sharps containers
- Uncooperative patients
- Improper lighting
- Not familiar with device
- Improper handling
 - Improper passing of sharps to other personnel
 - Improper suture technique

Needlestick/Possible Exposure

- Apply routine first aid immediately
 - Clean site of injury with soap and flush with warm water for **at least 15 minutes**
 - antiseptics may be used if available
 - Flush mucous membranes with water or saline for **at least 15 minutes**
- Notify supervisor
 - Complete First Report of Injury
 - Used to process insurance claims, helps identify trends
- Seek medical attention
 - Needlestick Hotline (24hr): 1-800-770-9206
 - Employee Health: 713-500-3267

Medical Surveillance

- Baseline Labs
 - HIV antibody (with consent)
 - RPR (Syphilis)
 - Hepatitis B surface antibody
 - HCV antibody
 - If source is known to be Hepatitis C⁺, also obtain liver function & HCV RNA tests
 - CBC with differential and platelets, chemistry profile, urine pregnancy test if source is known HIV⁺ and if exposed personnel chooses to utilize post-exposure prophylaxis
- Hepatitis B Vaccination
- Tuberculosis skin test, Quantiferon test

CDC Exposure Risk

Percutaneous injury transmission rates with blood or blood products:

- HBV 2- 40%
- HCV 3- 10%
- HIV 0.2- 0.5%

Mucosal contact or contact with injured/broken skin not well quantified, but plausible with HCV and documented with HBV and HIV

TB Presentation & Isolation

- Cough
- Chest pain
- Coughing up blood
- Weakness
- Fever and/or night sweats
- Weight loss



TB Presentation & Isolation (cont.)

- Routinely ask all patients:
 - History of TB disease?
 - Symptoms suggestive of TB?
- Patients with history or symptoms of undiagnosed TB:
 - Refer promptly for medical evaluation of possible active infection
 - Wear surgical mask
 - Provide urgent care in TB isolation areas (i.e., negative pressure rooms)

Rights

In the event of a possible exposure to bloodborne pathogens, the employee is entitled to:

- Confidential medical evaluation and follow-up
- Documentation of routes of exposure
- Identification, documentation, testing and results of the source individual
- Counseling
- Evaluation of reported illness

Post Exposure - Prophylaxis

Unknown – First aid

Seek Medical Help

As required

Case by Case Scenario

What to do if an exposure occurs?

- Wash exposed area with soap and water
- Flush splashes to nose, mouth, or skin with water
- Irrigate eyes with water or saline
- Report the exposure
- Direct the worker to a healthcare professional

Occupational Exposure to Bloodborne Pathogens

If you have an occupational exposure to a bloodborne pathogen, follow these four steps:

STEP 1: Wash the area immediately.

STEP 2: Flood or irrigate properly your eyes, nose, and/or mouth (if exposed).

STEP 3: Notify your supervisor or manager at once.

STEP 4: Seek Help by going to the Employee Health Center or the Emergency Department after hours and on holidays.

Note: Step 1 and Step 2 can be performed interchangeably depending on the exposure.

Post-Exposure Follow-Up

- Document routes of exposure and how exposure occurred
- Record injuries from contaminated sharps in a sharps injury log, if required
- Obtain consent from the source individual and the exposed employee and test blood as soon as possible after the exposure incident

Post-Exposure Follow-Up (cont'd)

- ▣ Provide risk counseling and offer post-exposure protective treatment for disease when medically indicated in accordance with current U.S. Public Health Service guidelines
- ▣ Provide written opinion of findings to employer and copy to employee within 15 days of the evaluation

Blood (or OPIM) Spill Clean up

- Clean all blood (or OPIM) spills with a 10% solution of household bleach or another EPA-approved disinfectant
- Apply the approved disinfectant to perimeter of spill, slowly proceed inwards
- Allow a minimum of 15 minutes of disinfectant contact time
- Dispose all materials used to clean up spill (e.g., towels, gloves) in a **biohazard bag**

Bio-Hazard Warning Labels

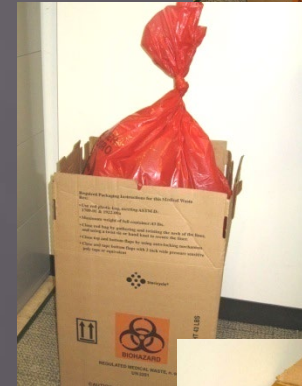
- Warning labels required on:
 - Containers of regulated
 - waste
 - Refrigerators and freezers
 - containing blood and other
 - potentially infectious materials
 - Other containers used to store, transport, or ship blood or other potentially infectious materials
- Red bags or containers may be substituted for labels



Biological Waste Disposal

Off-Site Shipments

- Utilize a biological waste box or reusable red tub with a red liner
- Close red liner by tying the bag into a single knot
- Attach a complete biological waste label to the box or tub (designate incineration only by attaching a yellow shipping label)
- MSB, MSE, or SONSCC please call PPD housekeeping or Safety to request collection
- SRB, DBB, DAC, RAS please close the box or tub and place in the regional biological waste storage room



Place sharps in an appropriate sharps container. Call the hazardous waste (936-468-6034) to request collection

Biological Waste Disposal

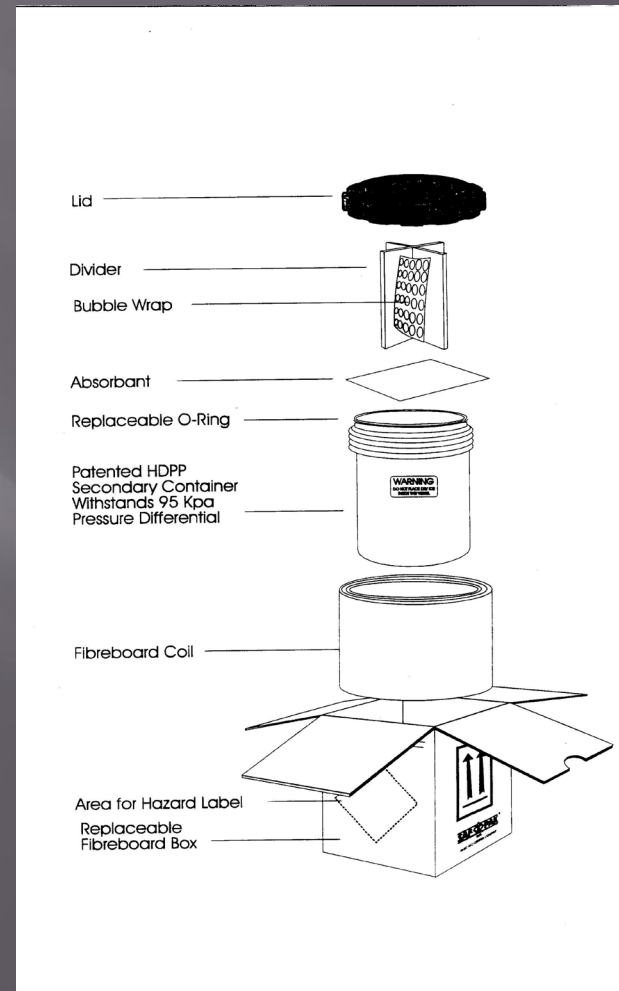
Steam Sterilization (Autoclave)

- Used for treatment of solid and liquid wastes
- Wastes should be packaged in heat resistant bags with the opening loosely closed to allow steam to enter bags
- Once waste is autoclaved, place it in a white trash can with a black liner for housekeeping
- Perform quality control on a routine basis and record activities in the log book



Shipping Infectious and Diagnostic Substances

- Training required for all persons wanting to ship infectious or diagnostic substances
- Refresher training required every two years or as regulations change
- For additional help or training information please contact EHS at 936-468-6034



Training Elements

- ▣ Copy of the standard
- ▣ Modes of transmission
- ▣ Site-specific exposure control plan
- ▣ Hazard recognition
- ▣ Use of engineering controls, work practices and PPE
- ▣ Live question and answer sessions

Medical Record Keeping Requirements

- ▣ Employee's name and social security number
- ▣ Employee's hepatitis B vaccination status
- ▣ Results of examinations, medical testing, and post-exposure evaluation and follow-up procedures
- ▣ Health care professional's written opinion
- ▣ Information provided to the health care professional
- ▣ Employee medical records must be kept confidential and not disclosed or reported without the employee's written consent (unless required by law)
- ▣ Medical records must be maintained for duration of employment plus 30 years according to OSHA's rule governing access to employee exposure and medical records

Sharps Injury Log

- Employers must maintain a sharps injury log for the recording of injuries from contaminated sharps
- The log must be maintained in a way that ensures employee privacy and must contain, at a minimum:
 - Type and brand of device involved in the incident
 - Location of the incident
 - Description of the incident

Summary

- ▣ OSHA's Bloodborne Pathogens standard prescribes safeguards to protect workers against the health hazards from exposure to blood and other potentially infectious materials, and to reduce their risk from this exposure
- ▣ Implementation of this standard not only will prevent hepatitis B cases, but also will significantly reduce the risk of workers contracting AIDS, Hepatitis C, or other bloodborne diseases

Information Resources

- Resources available at SFA that provide information about bloodborne pathogens
 - Biological Safety Program (936-468-6034)
 - www.sfasu.edu/safety
 - Biological Safety Manual
 - OSHA Bloodborne Pathogen Standard
 - Centers for Disease Control and Prevention
 - Texas Department of State Health Services
 - Infectious Disease Control Unit - Bloodborne Pathogen Control

Questions??

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