

# **Bloodborne Pathogens**

**OSHA 10-hour Outreach Training**  
**General Industry**

# Introduction

Lesson objectives:

1. Define bloodborne pathogens.
2. Identify workers who are at risk of exposure to bloodborne pathogens.
3. Identify key aspects of a Bloodborne Pathogen Exposure Control Plan;
4. Describe methods for controlling exposure to bloodborne pathogens.
5. Describe steps to take when exposed to a bloodborne pathogen.

# Introduction

# 1981

**1 in 8**  
people with  
**HIV**  
don't know  
**THEY**  
have it.



**Get the facts. Get tested. Get involved.**  
Find out more about HIV, including where to get tested, at [gettested.cdc.gov](http://gettested.cdc.gov)





# 2014

**Facts *about***  
**Ebola**  
in the U.S.

**You CAN'T get Ebola through AIR**



**You CAN'T get Ebola through WATER**




**You CAN'T get Ebola through FOOD grown or legally purchased in the U.S.**



**You can only get Ebola from**

- The body fluids of a person who is sick with or has died from Ebola.
- Objects contaminated with body fluids of a person sick with Ebola or who has died of Ebola.
- Infected fruit bats and primates (apes and monkeys).
- And, possibly from contact with semen from a man who has recovered from Ebola (for example, by having oral, vaginal, or anal sex).



# 2016

**TOP 5 THINGS EVERYONE NEEDS TO KNOW ABOUT ZIKA**

**1**  **Zika primarily spreads through infected mosquitoes. You can also get Zika through sex.**  
Many areas in the United States have the type of mosquitoes that can spread Zika virus. These mosquitoes are aggressive daytime biters and can also bite at night. Also, Zika can be passed through sex from a person who has Zika to his or her sex partners.

**2**  **The best way to prevent Zika is to prevent mosquito bites.**

- Use insect repellent. It works!
- Wear long-sleeved shirts and long pants.
- Stay in places with air conditioning or window and door screens.
- Remove standing water around your home.

**3**  **Zika is linked to birth defects.**  
Zika infection during pregnancy can cause a serious birth defect called microcephaly that is a sign of incomplete brain development. If you have a partner who lives in or has traveled to an area with Zika, do not have sex, or use condoms every time you have sex during your pregnancy.

**4**  **Pregnant women should not travel to areas with Zika.**  
If you must travel to one of these areas, talk to your healthcare provider first and strictly follow steps to prevent mosquito bites during your trip.

**5**  **Returning travelers infected with Zika can spread the virus through mosquito bites.**  
If you get infected with Zika and a mosquito bites you, you can pass the virus to the mosquito. The infected mosquito bites other people, who get infected. Returning travelers should also use condoms or not have sex if they are concerned about passing it to their partners through sex.

[WWW.CDC.GOV/ZIKA](http://WWW.CDC.GOV/ZIKA)





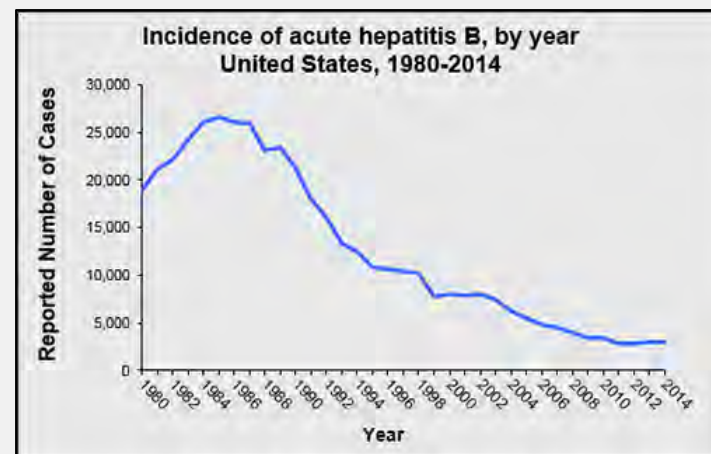
# Bloodborne Pathogens

What are **bloodborne pathogens**?

- Pathogenic microorganisms present in human blood that can lead to diseases
- Examples of primary concern
  - Hepatitis B (HBV)
  - Hepatitis C (HCV)
  - Human Immunodeficiency Virus (HIV)

# Bloodborne Pathogens

- Hepatitis B (HBV)
  - Over 12 million Americans are infected (1 in 20)\*
  - Silent infection; symptoms include jaundice, fatigue, abdominal pain, loss of appetite, intermittent nausea, vomiting; may lead to chronic liver disease, liver cancer, and death
  - HBV can survive for at least one week in dried blood
  - Up to 40,000 people in US will become newly infected each year\*



Reported cases of hepatitis B in the U.S. have generally declined from 1980 to 2014.  
Source: CDC

\*Source: Hepatitis B Foundation

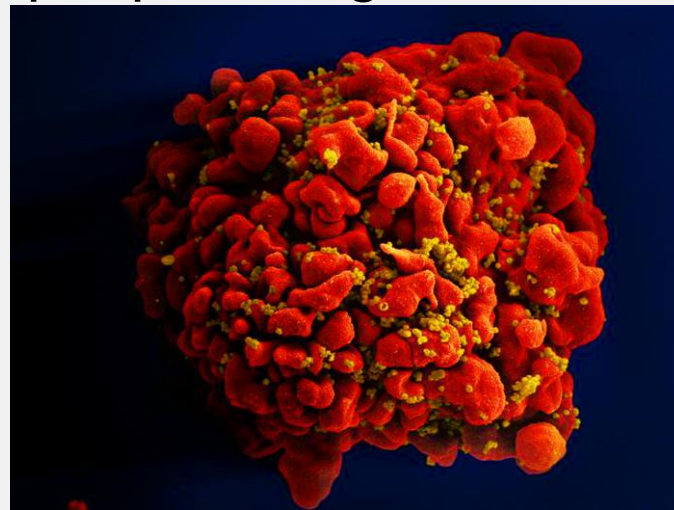


# Bloodborne Pathogens

- Hepatitis C (HCV)
  - Hepatitis C is the most common chronic bloodborne infection in the U.S.
  - Symptoms include: jaundice, fatigue, abdominal pain, loss of appetite, intermittent nausea, vomiting
  - May lead to chronic liver disease and death

# Bloodborne Pathogens

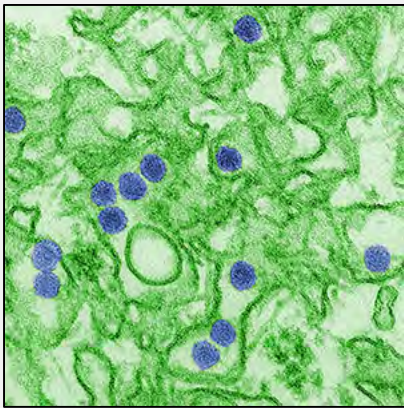
- Human Immunodeficiency Virus (HIV)
  - HIV is the virus that leads to AIDS
  - HIV affects the body's immune system
  - HIV does not survive well outside the body
  - Estimated >1.1 million people living with HIV
  - Infected for life



Single, red-colored H9-T cell infected by numerous mustard-colored HIV particles which are attached to the cell's surface membrane. Source: NIAID.

# Bloodborne Pathogens

- Other bloodborne diseases
  - Caused by viruses or bacteria
  - Circulate in blood at some phase; capable of being transmitted
  - Most are rare in the U.S.



Source: CDC / C.Goldsmith

Zika Virus (left) and Ebola Virus (right) can be spread to workers through contaminated blood or infectious body fluids.



Source: CDC / F. Murphy





# Bloodborne Pathogens

- Examples
  - Hepatitis D (HDV)
  - Syphilis
  - Malaria
  - Babesiosis
  - Brucellosis
  - Leptospirosis
  - Arboviral Infections
  - Relapsing fever
  - Creutzfeldt-Jakob Disease
  - Human T-Lymphotropic Virus Type I
  - Viral Hemorrhagic Fever

# Risk of Exposure

## Contamination sources:

- Blood
- Other potentially infectious materials (OPIM)
  - Human body fluids
  - Any unfixed tissue or organ from human
  - Cultures, culture mediums, or other solutions
  - Experimental animal blood, tissues, or organs infected with HIV or HBV



Source: OSHA

# Risk of Exposure

Spread of bloodborne pathogens occurs through:

- Direct contact
- Indirect contact
- Respiratory transmission
- Vector-borne transmission



Source: NIOSH

# Risk of Exposure

How exposure occurs:

- Needlesticks
- Cuts from other contaminated sharps
- Contact of mucous membrane or broken skin with contaminated blood or OPIM



Source: OSHA DTE

# Risk of Exposure

## Occupational exposures:

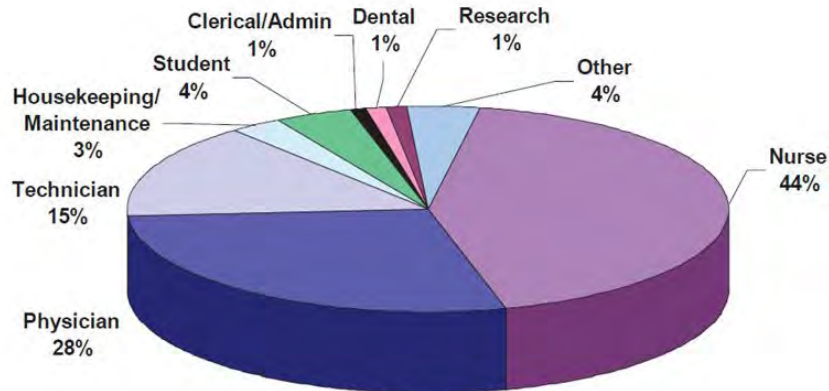
- Occupations at risk
  - First responders
  - Housekeeping personnel in some industries
  - Nurses and other healthcare personnel
- CDC estimates 5.6 million workers in healthcare and related occupations are at risk
- All occupational exposure to blood or OPIM places workers at risk



Source: OSHA

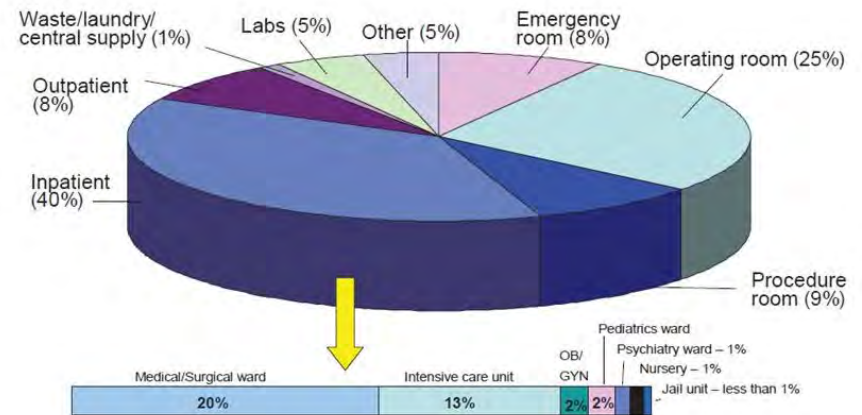
# Risk of Exposure

**Figure 1.** Occupational Groups of Healthcare Personnel Exposed to Blood/Body Fluids; NaSH, 6/95 to 12/03 (N=23,197)\*



\* Missing values not included in the total n.

**Figure 2.** Work Locations Where Blood/Body Fluid Exposures Occurred; NaSH, 6/95 to 12/03 (N=23,140)\*



\* Missing values not included in the total n.

The figure on left shows percent of occupational groups of healthcare workers exposed to blood or body fluids, with nurses (44%), physicians (28%), and technicians (15%) accounting for most of the incidents. The figure on the right shows healthcare work locations where exposures occurred, with inpatient facilities, such as the medical or surgical ward (20%) and intensive care unit (13%), and operating rooms (25%) accounting for the majority of exposure sites. Source: CDC (2008)

# Exposure Control Plan (ECP)

Establish an Exposure Control Plan

- Written plan
- Review and update plan



# Exposure Control Plan (ECP)

Required elements of Exposure Control plan include:

- Exposure determination
- Schedule and method of implementation
- Procedure for evaluation of exposure incidents





# Exposure Control Plan (ECP)

- Accessible to employees
- Review and update
  - Annually
  - When new or modified tasks/procedures are implemented



# Controlling Exposures

Observe standard precautions, such as:

- Treating all blood and bodily fluids as if they are contaminated
- Proper cleanup and decontamination



Source: OSHA DTE

# Controlling Exposures

Engineering and work practice controls:

- Safer medical devices
- Sharps disposal containers
- Hand hygiene



Source: OSHA DTE



Source: NIOSH



Source: NIOSH

# Controlling Exposures

PPE examples:

- Gloves
- Masks
- Aprons/Smocks/Gowns
- Face shields
- Mouthpieces
- Safety glasses
- CPR pocket masks



Source: OSHA DTE



Source: OSHA DTE



Source: NIOSH



# Controlling Exposures

## Employer's responsibilities:

- Perform hazard assessment
- Identify and provide appropriate PPE to employee at no cost
- Train employees on use and care
- Maintain/replace PPE
- Review, update, evaluate PPE program

# Controlling Exposures

- PPE selection
  - Safe design and construction
  - Fit comfortably
- Required PPE training
  - When it is necessary
  - What kind is necessary
  - Proper donning, adjusting, wearing, doffing
  - Limitations
  - Proper care, maintenance, useful life, disposal



Source: CDC



# Controlling Exposures

Employee's responsibilities:

- Properly wear PPE
- Attend training
- Care for, clean, and maintain
- Notify when repairs/replacement needed

# Controlling Exposures

## Housekeeping:

- Written schedule for cleaning and decontamination
- Picking up broken glass
  - Not picked up by hands
  - Mechanical means only



Source: OSHA DTE



# Controlling Exposures

## Clean-up and decontamination:

- Wear protective gloves
- Use appropriate disinfectant
- Clean and disinfect contaminated equipment and work surfaces
- Thoroughly wash up immediately after exposure
- Properly dispose of contaminated PPE, towels, rags, etc.



Source: OSHA DTE

# Controlling Exposures

- Regulated waste disposal:
  - Dispose of regulated waste in closable, leak-proof red or biohazard labeled bags or containers
  - Dispose of contaminated sharps in closable, puncture-resistant, leak-proof, red or



Source: OSHA DTE

# Controlling Exposures

- Laundry
  - Contaminated laundry must be bagged or containerized at the location where it was used.



Source: OSHA DTE

# Controlling Exposures

## Training:

- Who
  - All employees with occupational exposure to blood or other potentially infectious material (OPIM)
  - Employees who are trained in first aid and CPR
- No cost; during working hours
- When
  - Initial assignment
  - Annually; or with new/modified tasks



Source: OSHA DTE

# Controlling Exposures

## Hepatitis B vaccination:

- Offered to all potentially exposed employees
- Provided at no cost to employees (within 10 days to employees with occupational exposure)
- Declination form



Source: OSHA DTE



# Controlling Exposures

No vaccinations for:

- Hepatitis C
- HIV

# When Exposure Occurs

## Exposure incident:

- Specific eye, mouth, or other mucous membrane, non-intact skin, parenteral contact with blood or OPIM that results from the performance of an employee's duties.



Source: CDC

# When Exposure Occurs

- Immediate actions
  - Wash exposed area with soap and water
  - Flush splashes to nose, mouth, or skin with water
  - Irrigate eyes with water and saline



Source: OSHA





# When Exposure Occurs

- Report exposure immediately
- Direct employee to healthcare professional for treatment



# When Exposure Occurs

- Confidential medical evaluation and follow-up
  - Route(s) of exposure and circumstances
  - Source individual
  - Collect/test blood for HBV and HIV serological status
  - Post exposure prophylaxis (when medically indicated)
  - Counseling
  - Evaluation

# What Questions Do You Have?





# Knowledge Check

1. Bloodborne pathogens can be transmitted by \_\_\_\_.
  - a. sexual intercourse or intravenous drug use
  - b. rubbing an eye after coming in contact with potentially infectious material
  - c. potentially infectious material coming in contact with inflamed acne or sunburn blisters
  - d. all of the above



# Knowledge Check

2. Employees should use PPE when \_\_\_\_\_.
- a. there is a reasonable anticipation of contact with blood or OPIM
  - b. cleaning up spills
  - c. responding to an emergency
  - d. all of the above

# Knowledge Check

3. Which of the following is an example of a work practice control?
- a. Spill kits
  - b. Accessible handwashing stations
  - c. Proper decontamination of spill areas
  - d. Red hazardous waste bags

**Answer: c. Proper decontamination of spill areas**

# Knowledge Check

4. Which of the following is a standard precaution for workers exposed to bloodborne pathogens?
- a. Treat all liquids as hazardous for HIV
  - b. Treat all blood and bodily fluids of patients as potentially infectious materials
  - c. Test all blood and unknown bodily fluids for HIV after spills
  - d. Label unknown liquids with hazard signs

**Answer: b. Treat all blood and bodily fluids of patients as potentially infectious materials**

# Knowledge Check

5. Hepatitis B is an inflammation of which body organ?
- a. Kidney
  - b. Lungs
  - c. Larynx
  - d. Liver

**Answer: d. Liver**



# Knowledge Check

6. In the event of an exposure incident, which following action should be taken first?
- a. Notify appropriate personnel
  - b. Wash the area thoroughly
  - c. Seek medical treatment
  - d. Complete an incident or accident report

**Answer: b. Wash the area thoroughly**

# Knowledge Check

7. Which of the following actions can help prevent exposure to bloodborne pathogens?
- a. Wearing latex gloves
  - b. Wearing goggles
  - c. Washing hands
  - d. All of the above

**Answer: d. All of the above**

# Knowledge Check

8. A vaccine is only available for which of the following major bloodborne pathogen viruses?
- a. HIV
  - b. Hepatitis B
  - c. Hepatitis C
  - d. No vaccines are available for any of the three major BBP viruses

**Answer: b. Hepatitis B**

# Knowledge Check

9. Which of the following are potential routes of entry for bloodborne pathogens?
- a. Mucous membranes of the eyes, nose, and mouth
  - b. Non-intact skin
  - c. Penetration by a contaminated sharp object
  - d. All of the above

**Answer: d. All of the above**