Bloodborne Pathogens

In compliance with OSHA 1910.1030

Bloodborne Pathogens Standard

- 29 CFR 1910.1030, Occupational Exposure to Bloodborne Pathogens
- Published December 1991
- Effective March 1992
- Scope
  - ALL occupational exposure to blood and other potentially infectious material (OPIM)

Bloodborne Pathogens Standard

Major Provisions by Paragraph
(b) Definitions
(c) Exposure Control Plan (ECP)
(d) Engineering and Work Practice Controls
  - Personal Protective Equipment (PPE)
(e) HIV and HBV Research Labs
(f) Vaccination, Post-Exposure Follow-up
(g) Labeling and Training
(h) Recordkeeping

Methods of Compliance

- Universal Precautions
- Engineering and Work Practice Controls
- Personal protective equipment
- Housekeeping

Since 1991...

- Advancements in medical technology
- September 1998, OSHA’s Request for Information (RFI)
- Findings of RFI
- Union and Congressional involvement
- November 1999, CPL 02-02-069

Needlestick Safety and Prevention Act, P.L. 106-430
The Needlestick Safety and Prevention Act mandated...

OSHA clarify and revise 29 CFR 1910.1030, the Bloodborne Pathogens Standard

Needlestick Safety and Prevention Act Timeline

- P. L. 106-430 signed; November 6, 2000
- Revised Standard published in Federal Register; Jan. 18, 2001
- Effective date; April 18, 2001
- Enforcement of new provisions; July 17, 2001
- Adoption in OSHA state-plan states; October 18, 2001

Revisions to Standard

- Additional definitions, paragraph (b)
- New requirements in the Exposure Control Plan, paragraph (c)
- Solicitation of input from non-managerial employees, paragraph (c)
- Sharps injury log, paragraph (h)

Additional Definitions 1910.1030(b)

- Engineering Controls - includes additional definitions and examples:
  - Sharps with Engineered Sharps Injury Protections - [SESIP]
  - Needleless Systems

Engineering Controls

New Definition

“... means controls (e.g., sharps disposal containers, self-sheathing needles, safer medical devices, such as sharps with engineered sharps injury protections and needleless systems) that isolate or remove the bloodborne pathogens hazard from the workplace.”

Needleless Systems

New Definition

- Device that does not use a needle for:
  - Collection of bodily fluids
  - Administration of medication/fluids
  - Any other procedure with potential percutaneous exposure to a contaminated sharp
“SESIP” New Definition

Non-needle sharp or a needle with a built-in safety feature or mechanism that effectively reduces the risk of an exposure incident.

Hypodermic syringes with “Self-Sheathing” safety feature

Self-sheathed protected position

Hypodermic syringes with “Retractable Technology” safety feature

Retracted protected position

Phlebotomy needle with “Self-Blunting” safety feature

Blunted protected position

“Add-on” safety feature

Attached to syringe needle

Attached to blood tube holder

Retracting lancets with safety features

Before During After

Before During After

In use After use
Exposure Control Plan: 1910.1030(c)
New Provisions
The ECP must be updated to include:
- changes in technology that reduce/eliminate exposure
- annual documentation of consideration and implementation of safer medical devices
- solicitation of input from non-managerial employees

Solicitation of Non-Managerial Employees
New Provision
- Identification, evaluation, and selection of engineering controls
- Must select employees that are:
  - Responsible for direct patient care
  - Representative sample of those with potential exposure

Engineering and Work Practice Controls: 1910.1030(d)
Employers must select and implement appropriate engineering controls to reduce or eliminate employee exposure.

“Where engineering controls will reduce employee exposure either by removing, eliminating, or isolating the hazard, they must be used.”

CPL 02-02-069

Exposure Determination
- The employer must:
  - Identify worker exposures to blood or OPIM
  - Review all processes and procedures with exposure potential
  - Re-evaluate when new processes or procedures are used
Engineering and Work Practice Controls (con’t)

- The employer must:
  - Evaluate available engineering controls (safer medical devices)
  - Train employees on safe use and disposal
  - Implement appropriate engineering controls/devices

Recordkeeping: 1910.1030(h)

- **Sharps Injury Log**
  - Only mandatory for those keeping records under 29 CFR 1904
  - Confidentiality
  - Maintained independently from OSHA 300

Sharps Injury Log

At a minimum, the log must contain, for each incident:
- Type and brand of device involved
- Department or area of incident
- Description of incident

Major Pathogens

- Hepatitis
- HIV/AIDS
**Viral Hepatitis**

- Hepatitis is a disease that affects the liver. It is often caused by viruses such as the
  - hepatitis A virus (HAV)
  - hepatitis B virus (HBV)
  - hepatitis C virus (HCV)

According to government estimates, almost 4 million people in the U.S. have been infected with the hepatitis B virus.

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**Types of Viral Hepatitis**

<table>
<thead>
<tr>
<th>Source of virus</th>
<th>Face</th>
<th>Blood/blood-derived body fluids</th>
<th>Blood/blood-derived body fluids</th>
<th>Blood/blood-derived body fluids</th>
<th>Blood/blood-derived body fluids</th>
<th>Face</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route of transmission</td>
<td>Fecal-oral</td>
<td>Peritoneal</td>
<td>Peritoneal</td>
<td>Peritoneal</td>
<td>Peritoneal</td>
<td>Fecal-oral</td>
</tr>
<tr>
<td>Chronic infection</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

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**How Is the hepatitis B Virus Spread?**

The hepatitis B virus is spread through contact with the blood of an infected person. Some of the ways that people have been infected include having:

- had a blood transfusion or organ transplant before 1992
- a clotting factor problem, and being given a blood product before 1987
- used a contaminated needle to inject drugs like heroin or cocaine, even if it was only once, many years ago
- been on long-term kidney dialysis

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**How Is the hepatitis B Virus Spread?**

Some other ways that people have been infected include having:

- been a health care worker and having had contact with blood in the workplace, especially through needle stick injuries
- been born to a woman who had hepatitis B when she gave birth to you.

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**What Are the Symptoms of hepatitis B?**

Symptoms of hepatitis B are usually very mild. You may not have any symptoms at all. Even though hepatitis B might not make you feel sick, it is still a serious illness. In most cases, hepatitis B never goes away. Over time, it can cause other problems, including cirrhosis and liver cancer.

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**Can I Get a Vaccine Against hepatitis B?**

There is an immunization that will keep you from getting hepatitis B. It is a series of shots over a 7 month period. Every EMT or Paramedic at Patriot Ambulance should have had the series or signed a declination of the vaccine.

There are vaccines that can keep you from getting other kinds of hepatitis, such as A, but there is no vaccine for hepatitis C.

Employees who signed a declination may change their mind at any time.
Possible Outcomes after Infection with hepatitis B Virus

- Anti-HBs. Development of antibody against the surface antigen. Usually protects against further disease.
- Acute hepatitis. Usually a self-limited disease with complete recovery
  i) Some may result in fulminant hepatitis that has a high mortality rate.
  ii) Some cases proceed to chronic HBV infection with increased risk of chronic liver disease and primary cancer of the liver
- The carrier state. Chronic infection with HBV that is asymptomatic for decades. An increased risk for chronic liver disease and primary cancer of the liver.
- Chronic liver disease
- Primary cancer of the liver
- Other serological reactions, i.e., anti-HBc, anti-HBe, anti-HBx, HBeAg, HBV DNA, etc. that denote different stages of disease and infection

HIV

- “Human Immunodeficiency Syndrome”
- A specific type of virus (a retrovirus)
- HIV invades the helper T cells to replicate itself.
- There is no cure

HIV-Infected T-Cell

Four Stages of HIV

Stage 1 – Primary
- Short, flu-like illness - occurs one to six weeks after infection
- no symptoms at all
- Infected person can infect other people

Stage 2 – Asymptomatic
- Lasts for an average of ten years
- This stage is free from symptoms
- There may be swollen glands
- The level of HIV in the blood drops to very low levels
- HIV antibodies are detectable in the blood
**Stage 3 - Symptomatic**

- The symptoms are mild
- The immune system deteriorates
- Emergence of opportunistic infections and cancers

**Stage 4 - HIV ⇒ AIDS**

- The immune system weakens
- The illnesses become more severe leading to an AIDS diagnosis

**HIV Infection and Antibody Response**

- AIDS
  - Acquired Immunodeficiency Syndrome
  - HIV is the virus that causes AIDS
  - Disease limits the body’s ability to fight infection
  - A person with AIDS has a very weak immune system
  - There is no cure

**Opportunistic Infections associated with AIDS**

- Bacterial
  - Tuberculosis (TB)
  - Strep pneumonia

- Viral
  - Kaposi Sarcoma
  - Herpes
  - Influenza (flu)

**Opportunistic Infections associated with AIDS**

- Parasitic
  - Pneumocystis carinii

- Fungal
  - Candida
  - Cryptococcus
**Modes of HIV/AIDS Transmission**

Through Bodily Fluids

Through IV Drug Use

Through Sex

Mother-to-Baby

**Through Bodily Fluids**

- Blood products
- Semen
- Vaginal fluids
- Breast Milk

**Through IV Drug Use**

- Sharing Needles
  - Without sterilization
- Increases the chances of contracting HIV
- EMT’s or Paramedics being stuck accidentally in the course of their duties. A needlestick is the most common source of exposure to pathogens for any health care worker.

**Through Sex**

- Intercourse (penile penetration into the vagina)
- Oral
- Anal
- Digital Sex

**Testing Options for HIV**

**Blood Detection Tests**

- Enzyme-Linked Immunosorbent Assay/Enzyme Immunoassay (ELISA/EIA)
- Radio Immunoprecipitation Assay/Indirect Fluorescent Antibody Assay (RIP/IFA)
- Polymerase Chain Reaction (PCR)
- Western Blot Confirmatory test
Urine Testing

- **Urine Western Blot**
  - As sensitive as testing blood
  - Safe way to screen for HIV
  - Can cause false positives in certain people at high risk for HIV

Oral Testing

- **Orasure**
  - The only FDA approved HIV antibody.
  - As accurate as blood testing
  - Draws blood-derived fluids from the gum tissue.
  - NOT A SALIVA TEST!

HIV Testing after exposure

- **EIA/ELISA Test**
  - Positive
  - Negative
  - Repeat ELISA
  - Positive
  - Negative
  - Repeat at 2-4 months
  - Repeated
  - Negative
  - Positive
  - Repeat at 3 weeks
  - Negative
  - Positive
  - Repeat every 6 months for continued high risk behavior

HIV Occupational Exposure

- Report the incident by notifying a supervisor
- Medical follow-up is required to determine the exposure risk and course of treatment
- Baseline and follow-up HIV testing
- Four week course of medication initiated one to two hours after exposure
- Liver function tests to monitor medication tolerance
- Exposure precautions practiced

HIV Post Exposure Prophylaxis

- **On-HIV Exposure: Low Risk**
  - Report the incident by notifying a supervisor
  - Medical follow-up is required to determine the exposure risk and course of treatment
  - Baseline and follow-up HIV testing
  - Four week course of medication initiated one to two hours after exposure
  - Liver function tests to monitor medication tolerance
  - Exposure precautions practiced

HIV \rightarrow AIDS

- Once a person is infected they are always infected
- Medications are available to prolong life but they do not cure the disease
- Those who are infected are capable of infecting others without having symptoms or knowing of the infection
Important Issues

The post exposure treatment is only done on advice of a physician and there are serious implications to consider.

- You may not be able to work, the medication(s) may make you very ill.
- The medications are potentially dangerous
- The decision will be yours to make to start treatment or not based on the advise of the physician.

The best thing you can do is avoid the exposure in the first place

Utilize your PPE

- Gloves
- Mask
- Eye protection

PPE is not for decoration it is there for your protection

Other Pathogens

Not necessarily Blood borne.

MRSA

*Staphylococcus aureus*, often referred to as "staph", are bacteria commonly carried on the skin or in the nose of healthy people

MRSA

- Occasionally, staph can cause an infection
- Staph bacteria are one of the most common causes of skin infections in the US
- Most of these infections are minor
  - pimples, boils
- Most can be treated without antibiotics
- However, staph infections can cause serious infections
  - surgical wound infections, pneumonia

Methicillin-Resistant Staphylococcus Aureus

AKA MRSA

In past, most serious staph bacterial infections were treated with a certain type of antibiotic related to penicillin

In recent years, treatment of these infections more difficult because staph bacteria have become resistant to various antibiotics, including the commonly used penicillin related antibiotics

These resistant bacteria are called methicillin-resistant staphylococcus aureus, or MRSA
Where are staph and MRSA found?

Staph bacteria and MRSA can be found on the skin and in the nose of some people without causing illness.

What is the difference between colonization and infection?

- **Colonization** occurs when the staph bacteria are present on or in the body without causing illness
- ~25-30% of the population is colonized in the nose with staph bacteria at a given time

What is the difference between colonization and infection?

- **Infection** occurs when the staph bacteria cause disease in the person
  
  People also may be colonized or infected with MRSA, the staph bacteria that are resistant to many antibiotics

Who gets MRSA?

- Staph bacteria can cause different types of illness
- skin infections, bone infections, pneumonia, severe life threatening bloodstream infections, and other illnesses
- Since MRSA is a staph bacterium, it can cause the same types of infections as staph in general; however, MRSA occurs more commonly among persons in hospitals and healthcare facilities

Factors that Facilitate Transmission

Epidemiology of MRSA

Reservoirs

1. Humans are the natural reservoirs for *S. aureus*. 20-50% of healthy adults are colonized with *S. aureus*, and 10-20% are persistent carriers. Colonization rates are highest among patients with type 1 diabetes, IV drug users, hemodialysis, dermatologic conditions, and AIDS.

2. Colonized and infected patients are the major reservoir of MRSA.
Are staph and MRSA infections treatable?

- Yes. Most staph bacteria and MRSA are susceptible to several antibiotics.
- Furthermore, most staph skin infections can be treated without antibiotics by draining the sore.
- However, if antibiotics are prescribed, patients should complete the full course and consult their physicians if the infection does not get better.

How can I prevent staph or MRSA infections?

- Practice Good Hygiene!!!
- Keep your hands clean by washing thoroughly with soap and water.
- Keep cuts and abrasions clean and covered with a proper dressing until healed.
- Avoid contact with other people’s wounds or material contaminated from wounds.

Treatment of MRSA Infection

- Incision and drainage
- Culture wound
- Pharmacologic/supportive treatment
  - Minocycline 100 mg po bid x 14 days (Septra DS as alternative)
  - Rifampin 600 mg po qday x 14 days
  - Bactroban: apply to nares bid x 14 days
  - Hibiclens: head to toe bath
  - Wash all bedding/clothes in dilute bleach solution
- Unresponsive patients
  - Vancomycin IV; Zyvox (linezolid), Cubicin (Daptomycin) IV

Meningitis

Neisseria meningitidis, also simply known as meningococcus, is a heterotrophic gram-negative diplococcal bacterium best known for its role in meningitis and other forms of meningococcal disease.

- It only infects humans; there is no animal reservoir. It is the only form of bacterial meningitis known to cause epidemics.

Meningococcal Disease

Clinical Features

- Incubation period 3-4 days (range 2-10 days)
- Abrupt onset of fever, meningeal symptoms, hypotension, and rash
- Fatality rate 9%-12%; up to 40% in meningococcemia

Meningococcal Meningitis

- Most common pathologic presentation
- Result of hematogenous dissemination
- Clinical findings (not a complete list)
  - fever
  - headache
  - stiff neck
  - Photosensitivity
  - nausea
Meningococcemia

- Bloodstream infection
- May occur with or without meningitis
- Clinical findings
  - fever
  - petechial/purpuric rash
  - hypotension
  - multiorgan failure

If you suspect meningitis

You should already have gloves on
Put a mask on yourself and the patient, in the event the patient is dyspneic a NRM works well.
Notify the receiving facility
Notify your supervisor

General ECP Policies

Wash the affected area immediately
Notify a supervisor as soon as possible
If appropriate seek medical attention

General ECP Policies

Our exposure control plan (ECP) requires the following on every exposure or suspected exposure to any pathogen.
- An incident report
- An OEMS exposure form
  - Turn one into the facility the patient went to and one a copy to your supervisor
  
  Both must be done immediately, don’t wait and don’t go home.

Medical Evaluation

It is for your protection
Please comply and be evaluated if you are requested to

Housekeeping

Spill or leakage cleanup
Using appropriate PPE, use commercial products, paper towels, or the like to absorb spill
Do NOT use hands to pick up glass, needles, or other sharp objects
Dispose of contaminated material in labeled container or bag
Flood area with disinfectant (can be ¼ cup bleach per gallon of water) for at least 10 minutes
Use appropriate material to clean up disinfectant and dispose of like other contaminated material
General Principles to protect you

Wash your hands frequently

Avoid behaviors which can be risky to you

General Principles to protect you

Remove your gloves properly to avoid a spray or splash injury

Remove the second glove. Note that the person touches only the "inside" surface of the glove with his bare hand. Always remove away from others.

How do you obtain a copy of the Exposure Control Plan?

It is on the website (policy and procedures)

It is available in hard copy

It can be emailed to you

Please ask a supervisor