



Blood Pathogens Certification Class

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BLOOD PATHOGENS CERTIFICATION CLASS

Introduction

Welcome to our Bloodborne Pathogens certification class!

We've designed this class to be very user-friendly and intuitive, and to prepare you for the **BBP test** at the end of the course. If you need further explanation or information regarding this class or you are interested in deeper learning on this subject, please contact OSHA, the health and safety department where you work, or any local infection control agency or health department.

Bloodborne Pathogens and Other Potentially Infectious Materials (OPIM)

The contents of this class comply with the definitions of bloodborne pathogens, best practices for handling them as well as OPIMs, limiting risk and exposure as well as treatment as issued by the Occupational Safety and Health Administration (OSHA). OSHA is the federal agency charged with regulating safety and preparedness in the workplace. It is a legal requirement that any employee who handles blood, OPIMs and bodily fluids take a course in the safe handling of these materials. For many employees, some sort of certification or credentialing is also required.

An OSHA guide is available at www.osha.gov.



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Pathogens

Bloodborne Pathogens

- Hepatitis A virus
- Hepatitis B virus
- Hepatitis C virus
- Human Immunodeficiency virus (HIV)
- Acquired Immunodeficiency Syndrome (AIDS)
- Other disease pathogens

Transmission Routes

- Burns
- Puncture wounds
- Bites
- Cuts
- Rashes
- Mucosal membranes
- Abrasions

Fluids

- Pleural fluid
- Vaginal fluid
- Cerebrospinal fluid
- Semen
- Synovial fluid
- Blood

Fluids with No Risk for Transmission

- Tears
- Saliva
- Vomit
- Urine
- Nasal fluids
- Sweat
- Sputum

Risk Factors for Bloodborne Pathogens

- Hemodialysis patients
- Intravenous drug users
- Birth
- Sexual contact
- Direct contact with blood or other bodily fluids

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Hepatitis

Most hepatitis is caused by transmission of the virus through parenteral contact with infected blood or bodily fluids.

Hepatitis disease attacks the liver, causing inflammation and reduced hepatic function.

Hepatitis A

This variant of the hepatitis virus is transmitted orally or through infected fecal matter (often as a result of inadequate hand washing), and is an RNA virus. It is considered a less dangerous form of the virus and is less likely to develop into chronic hepatitis or to cause the patient to have the more serious symptoms and side effects of other variants of the virus. It is a self-limiting virus and does not always remain persistently in the bloodstream.

Symptoms

- Loss of appetite
- Choloria
- Fever
- Muscle and joint pain
- Nausea and vomiting
- Persistent fatigue
- Abdominal or stomach pain
- Jaundice of the skin or eyes

Treatment

There is a vaccine available for Hepatitis A.

Hepatitis B

This strain of hepatitis is transmitted through contact with infected blood or other bodily fluids. Most commonly, transmission occurs through sexual contact, use of shared needles, accidental needle sticks with contaminated needles (particularly in health care workers or custodial staff), childbirth or blood transfusion. There are also known cases of transmission through shared razor blades or toothbrushes as well as body piercing and tattooing. Hepatitis B can become chronic and does remain in the bloodstream.

Symptoms

- Loss of appetite
- Choloria
- Fever
- Muscle and joint pain
- Nausea and vomiting
- Persistent fatigue
- Abdominal or stomach pain
- Jaundice of the skin or eyes

Treatment

There is a vaccine available for Hepatitis B. Patients with chronic Hepatitis B may require a liver transplant. These patients may also be treated with antiviral medications.

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Hepatitis C

The variation of the virus known as Hepatitis C is one of the more dangerous forms of the virus, as it can develop into a chronic condition and cause serious, sometimes fatal, side effects and significantly impair the function of the liver. Patients who have contracted this virus may carry it for long periods of time without any manifestation of symptoms. This virus is transmitted through direct contact with infected blood or bodily fluids. Most commonly, Hepatitis C is contracted through sexual contact, shared needles, accidental needle sticks, particularly in healthcare workers and custodial staff, childbirth and blood transfusion. Transmission can also happen through hemodialysis and organ transplantation. There are also known cases of transmission through shared razor blades or toothbrushes as well as body piercing and tattooing. Hepatitis C can become chronic and does remain in the bloodstream.

Symptoms

- Loss of appetite
- Choloria
- Fever
- Muscle and joint pain
- Nausea and vomiting
- Persistent fatigue
- Abdominal or stomach pain
- Jaundice of the skin or eyes
- Unusual or excessive bruising and bleeding
- Edema in the lower extremities
- Confusion or disorientation
- Spider angiomas

Treatment

There is no vaccine available for the treatment of Hepatitis C. The standard treatment for this disease is the use of antiviral medications over a prescribed period of time to remove the virus from the bloodstream and cure the patient. In the event that liver damage is too great, the best treatment may be a liver transplant.

Difference between Acute and Chronic Hepatitis

Acute Hepatitis manifests in three stages. The initial stage may have no symptoms other than the patient exhibits fatigue or other non-specific symptoms. In the second phase, the patient may develop jaundice, liver and abdominal pain, and perhaps a worsening of general symptoms. The final stage is recovery. Acute hepatitis will resolve within six months. Acute Hepatitis is usually tied to Hepatitis A.

Chronic Hepatitis follows much the same pattern as Acute Hepatitis but is linked more closely to Hepatitis B and C. More importantly, the disease does not resolve within a six month period. The virus continues to persist in the blood. Patients may continue to experience symptoms and more importantly, the danger of significant damage to the liver is much greater. As many as 5% of all patients with Chronic Hepatitis will die as a result of complications from the condition.



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Human Immunodeficiency Virus (HIV)

Human Immunodeficiency Virus, also known as HIV, is a virus that attacks the body's immune system, reducing its ability to fight infection. Once this virus is introduced into the bloodstream, it remains and must be treated as a chronic condition. This virus is transmitted through sexual contact, from mother to infant during childbirth, breastfeeding, shared needles, blood transfusion, organ transplant, or accidental needle stick. Infected blood must come into contact with mucosal membranes, wounds or damaged tissue or inserted into the bloodstream directly. The virus lives in semen, blood, breast milk, pre-ejaculate, and vaginal fluid.

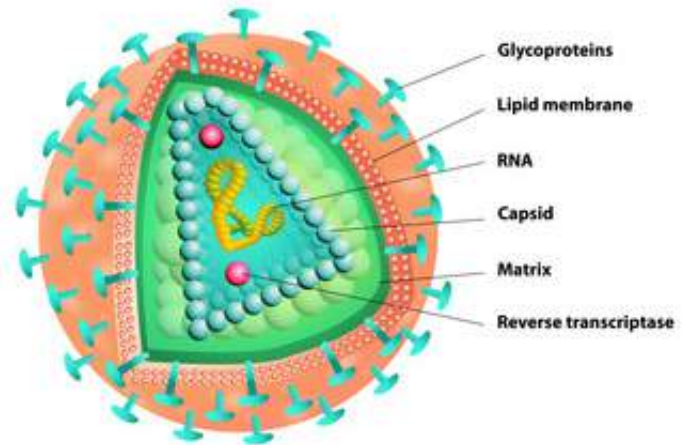
Symptoms

- Sore throat
- Fever
- Rash
- Achy muscles and joints
- Severe headache
- Swollen lymph nodes and glands

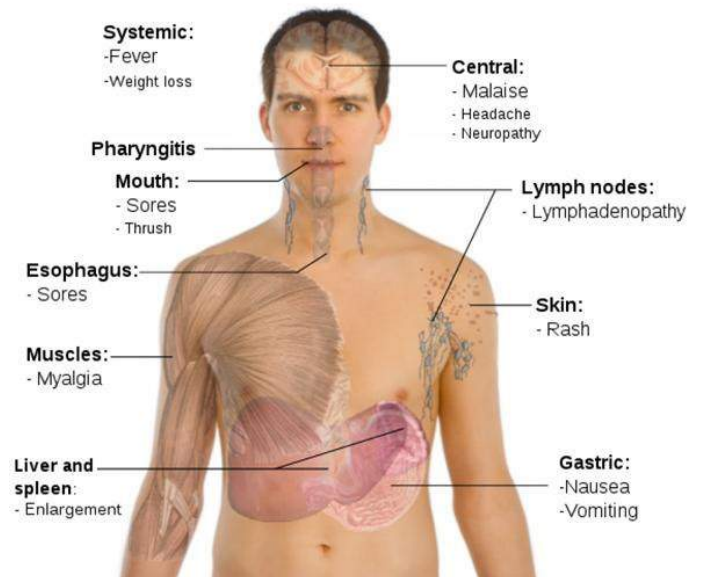
Treatment

There is no vaccine for the prevention of HIV. It can be treated and managed with the use of antiviral medications, antiretroviral medicines, some drugs used in treating Hepatitis C and supplemental hormones when treating women.

STRUCTURE OF THE HUMAN IMMUNODEFICIENCY VIRUS (HIV)



Main symptoms of Acute HIV infection



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Acquired Immunodeficiency Syndrome (AIDS)

Acquired Immunodeficiency Syndrome (AIDS) is the final stage of HIV infection. Patients do not die from the HIV infection itself or from AIDS. The significant depression of the patient's immune system caused by the virus allows for other infections to attack the patient. AIDS actually results from untreated HIV which continues to damage and weaken the immune system. When T-cell levels dip below 200 cells per cubic millimeter of blood and/or the patient has developed an opportunistic infection, that patient has moved from HIV to AIDS. It is the severity of the opportunistic infection and the patient's inability to fight that infection that lead to death. When the HIV is effectively treated with antiviral and antiretroviral medications, AIDS generally will not develop in the patient.

Symptoms

Symptoms vary depending on the nature of the infection that the patient has contracted, but common symptoms include:

- Weight loss
- Excessive sweating
- Dry cough
- Persistent diarrhea
- White sores in the mouth or tongue
- Difficulty breathing
- Chronic fatigue

Treatment

There is no AIDS vaccine. AIDS is treated with antiviral medications, antiretroviral medications, and supplemental hormones for women and Hepatitis C drugs.

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Prevention

OSHA Required Prevention

The guidelines laid out by OSHA for the safe handling of bloodborne pathogens and prevention of transmission of viruses and pathogens fall into five major categories. They are:

- Engineering controls
- Work practices
- Personal protective equipment
- Universal precautions
- Body substance isolation

Engineering Controls

This term refers to methods, procedures or equipment that isolate or remove the bloodborne pathogens from the environment

- Protocols for containment of infectious materials, such as freezer bags, refrigerators, etc
- Cleaning stations/lavage for the eyes, hands, body
- Protocols for control of waste disposal, including transportation
- Appropriate labeling and storage of medical tools
- Protocols for infectious material labeling and biohazard labeling



Sharp with Engineered Sharps Injury Protections (SESIP)

- Procedures for handling with retractable needles. Retractable needles should be disposed of in a puncture-resistant, leak-proof container
- Procedures for handling finger prick lancets.
- Procedures for handling needless systems including needle guards, blunted needles, retractable scalpels including disposal in a puncture-resistant, leak-proof container.

Proper recapping of needles

Generally, needles should not be recapped, but if that is required for some reason, workers should use a one-handed scoop motion or a mechanical device. Two hands should not be used.



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Injury

In the event of suspected exposure or injury from a sharp or a needle, the following procedures should be followed:

- The employer should document the injury describing exactly what happened and why exposure is suspected
- The employee should be tested for the bloodborne pathogen (this may require a succession of testing over time). Results of the blood test conducted should be shared with the patient and the medical provider should also include a written opinion.
- The patient should be counseled on safe sexual contact
- The patient should receive therapy or counseling as needed
- If the patient is a currently breastfeeding, she should stop breastfeeding until such time as exposure or infection has been ruled out or the patient has been treated.
- There must be an immediate evaluation to determine the presence of presumed illnesses.
- The health care professional who is responsible for the testing and continued monitoring of the patient must be provided information regarding how and when the exposure occurred, the nature of the work the employee was doing and their normal duties, and all relevant and up to date medical information for the employee.

Work Practices

According to the Occupational Safety and Health Association, "Work Practice Controls means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique)."

Work practice controls include standards around:

- Handwashing – soap and hot water are first choice and best practice to prevent transmission of bloodborne pathogens and other infectious viruses. In the event that soap and running water are unavailable, workers may use antiseptic towelettes, or antiseptic hand cleansers followed by a thorough handwashing with soap as soon as possible.
- All medical facilities should have an exposure control plan that includes documenting exposure, a regimen of testing for infection and developing illness and counseling for safe behaviors to prevent further transmission of the pathogens.
- Workers should be trained in proper methods to decontaminate equipment and work areas.
- Workers should be trained in proper methods of labeling specimens and use of containers and secondary containers.

BIOHAZARD



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Personal Protective Equipment (PPE)

- OSHA standards state that for Personal Protective Equipment to meet guidelines, it must not permit blood, or other bodily fluid to touch, soak through or reach in any way the employee's garments, mouth, skin, eyes, or other body part when in use. PPE should be chosen appropriately based on the environment, procedure or task and the kind of exposure risk that might generate for the patient.
- Personal Protective Equipment must be provided to employees at no cost by the employer. This includes the cleaning, repair and replacement of this equipment as necessary. This includes uniforms or laboratory jackets that protect the employee's personal clothing.
- Personal Protective Equipment must be removed in the work area as defined by the context of where the exposure might occur.
- Eye protection should be used when facial exposure may occur. This would include goggles, face shields, masks and other eye protection devices.
- Gloves should be worn any time it is reasonable to anticipate contamination or exposure, including any vascular procedure.
- Gloves should be replaced any time they are contaminated or there is any sort of tear or break to the surface of the glove.



Universal Precautions

OSHA guidelines for universal precautions operate on the premise that all body fluids should be considered infected and handled accordingly. These include:

- Nasal fluid, mucus
- Sweat
- Vomit
- Blood
- Sputum
- Saliva
- Tears
- Urine

Decontamination of surfaces and equipment should include bleach solutions to kill bloodborne pathogens and other infectious viruses. For medical equipment, the solution should be 1:10. For work stations and contaminated surfaces, the solution should be 1:100.

Laundry that has been contaminated should be handled as little as possible. Workers should handle with gloves, and may need other protective equipment. It should be placed in clearly labeled bags. If the laundry is wet or there is a danger that the laundry may soak through the bag, it should be transported in leak proof containers.

When disposing of regulated waste, it must be placed in containers that are closable, labeled or color-coded, built to prevent leaking in storage or in transit, and sealed to prevent spills, leaks or other means of exposure. The actual disposal of this waste must meet all regulations that apply according to the United States.

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Body Substance Isolation (BSI)

BSI refers to a body of practices that isolate bodily fluids to reduce the possibility of transmission of infection or disease. OSHA guidelines are designed to protect workers, and any others who may be at risk of exposure to bloodborne pathogens and other infectious materials. These practices are particularly important in emergency medical settings outside of hospital services and facilities where the medical conditions of the patient may or may not be known. BSI precautions are critical where workers and others may be exposed to blood, pericardial fluid, nasal secretions, pleural fluid, urine, saliva, phlegm, marrow, vaginal secretions, semen, cerebrospinal fluid, amniotic fluid, mucus, vomit or any other bodily fluid or secretion.



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Review

Bloodborne Pathogens

These include viruses, bacteria and parasites

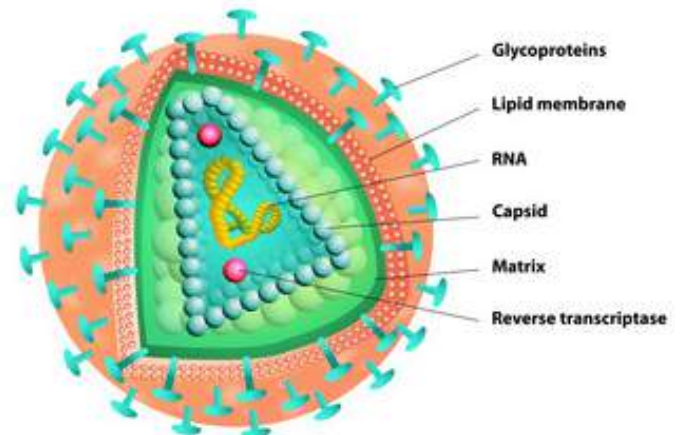
- **Hepatitis A** – causes acute condition, but typically does not become chronic. May resolve on its own. Vaccine available.
- **Hepatitis B** – may become chronic. Can cause long-term liver damage. Vaccine available
- **Hepatitis C** – typically becomes chronic. Can cause long-term liver damage and death. No vaccine available
- **Human Immunodeficiency Virus (HIV)** – persistent infection that will require treatment over the course of the patient's lifetime. No vaccine available
- **Acquired Immunodeficiency Syndrome (AIDS)** – final stage of HIV infection, caused by suppressed immune system and lowered T-cell count, opportunistic infections

Difference between Acute and Chronic infection

- **Acute:** Linked to Hepatitis A. Has 3 stages, but will resolve within six months, often without treatment and does not persist in the bloodstream.
- **Chronic:** Linked to Hepatitis B and C. Has 3 stages but does not resolve within six months, will require treatment and will persist in the bloodstream.



STRUCTURE OF THE HUMAN IMMUNODEFICIENCY VIRUS (HIV)



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Review

OSHA Guidelines for Prevention

These guidelines fall into five categories. They are:

- Engineering controls
- Work Practices
- Personal Protective Equipment (PPE)
- Universal Precautions
- Body Substance Isolation (BSI)

Engineering Controls

Engineering controls include appropriate labeling of containers that hold infectious materials, proper handwashing, an exposure control plan, proper documentation of any accidental exposure or transmission, and proper handling of medical equipment including sharps, needles, saws, scalpels, etc.

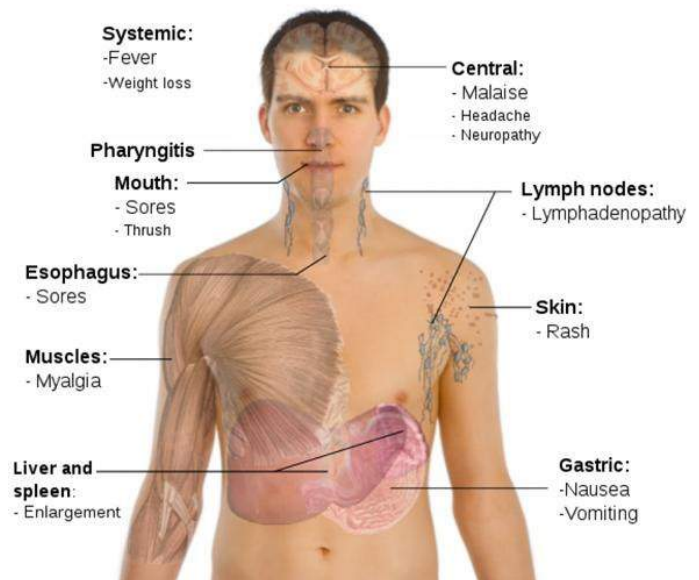
Sharp with Engineered Sharps Injury Protections (SESIP)

This subset of engineering controls focuses on the safe handling and disposal of retractable needles and finger-prick equipment as well as needleless systems.

Proper recapping of needles

Generally not advised, but if recapping is necessary, workers should be trained in a one-handed technique or use a mechanical device to accomplish the task. Workers should not use two hands to recap a needle as it could lead to accidental injury.

Main symptoms of
Acute HIV infection



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Review

Injury

In the event a worker is exposed to Bloodborne Pathogens or other infectious material, an exposure control plan should be followed that includes:

- Documentation of injury or exposure
- Testing regimen for virus
- Safe sexual contact to prevent further spread
- Cessation of breastfeeding
- Evaluation for presumed illness

Work Practices

- Proper handwashing
- Proper use of tools and equipment
- Proper decontamination practices for tools, equipment and workstations
- Proper methods of labeling

Personal Protective Equipment (PPE)

- Must protect eyes, mouth, skin, nose, all other body parts from reasonably anticipated exposure to body fluids
- PPE must be provided to employees at no cost
- PPE must be discarded in the work area

Universal Precautions


- Treat all bodily fluids as if they are infected and handled accordingly
- Bleach solutions used to decontaminate equipment and surfaces
- Proper procedures for handling laundry
- Proper procedures for handling, storing, transporting and disposing of medical waste

Body Substance Isolation

The cluster of best practices that combine to isolate bodily fluids in medical treatment to prevent the transmission of bloodborne pathogens and other infectious materials to medical workers, emergency responders, custodians and other workers who may be exposed to these pathogens in their daily work.

For more information regarding specific regulations or guidelines, please consult the complete list of OSHA guidelines and rules at www.osha.gov.

Congratulations on finishing our Bloodborne Pathogens certification class. Next, let's test your knowledge.



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