

Bloodborne Pathogens

Protect Yourself!



Welcome!

In this course, you will learn:

- The definition of bloodborne pathogens
- Which bloodborne pathogens are of greatest concern
- How bloodborne pathogens can enter the body
- The importance of handwashing and PPE (personal protective equipment) in protecting against infection and reducing the spread of bloodborne pathogens
- Practices that can reduce the transmission of bloodborne pathogens
- How to remove disposable gloves safely and appropriately
- What you should do if you are exposed to a bloodborne pathogen

Once you complete the course, complete the multiple-choice exam to receive your certification card.

Let's get started!

Bloodborne Pathogens- What are they, and which ones should I be concerned about?



Bloodborne pathogens are those organisms that are carried in the blood and are capable of causing disease. Common bloodborne pathogens that cause disease in humans include human immunodeficiency virus (HIV), Hepatitis B (HBV), and Hepatitis C (HCV). These viruses are usually transmitted through exposure to blood, but you may also be exposed

through other body fluids.

HIV/AIDS

Human immunodeficiency virus is one of the common bloodborne pathogens. Also called HIV, this is the virus that causes acquired immune deficiency syndrome (AIDS). Since the virus was first identified in the United States in the early 1980's, two types of HIV viruses have been identified. They are called HIV-1 and HIV-2. HIV-1 is the type most people talk about when they use the term HIV. Both types of HIV destroy T cells in the body. These T cells are critical in helping your body fight disease; when these T cells are destroyed, your body becomes 'immunocompromised' or more susceptible to other diseases.

Transmission of HIV

There are a number of different ways that HIV can be transmitted from one person to another:

- Unprotected sex with someone who has HIV will increase the risk of HIV transmission. This is particularly true if there is any contact with blood during the sexual act.
- Intravenous drug users who share needles, syringes, or other equipment used to prepare drugs are at increased risk for HIV transmission.
- Health care workers who care for an HIV patient may be at risk if they are stuck or cut with a contaminated needle, lancet or other sharp object. Although the risk is low, any worker who receives such an injury should follow the policy at their place of employment.
- Infants born to HIV infected mothers are at risk since the virus can be passed from mother to child particularly during the birth process.
- The blood supply and tissues for donation in the United States undergo many tests to ensure that they do not harbor the HIV virus; therefore, the risk of receiving contaminated blood in the U.S. is very slim. However, there is a very remote risk of infection through blood transfusions and tissue donations.
- HIV can be transmitted through medical or dental practices. The CDC and OSHA have very strict standards in place that have been established to minimize this risk. If your



doctor and dentist practice these safety standards, the risk of HIV transmission in the private office is very remote.

- Tattooing or body piercing may present a potential risk of HIV transmission; however, if equipment is properly sterilized, this risk is almost non-existent. In fact, there have been no documented cases of HIV transmission from tattooing or body piercing.

The HIV organism cannot live outside the human body. It cannot be spread by insects, saliva, tears, casual contact, sharing dishes or utensils, or breathing air around an HIV infected person.

Symptoms of HIV Infection

When a person is first infected with HIV, there may be no symptoms. Some people may have vague symptoms that mimic the flu – fever, malaise, and headache. People with HIV may appear to be healthy for months or years after infection. However, it is important that anyone who is at risk should be tested for the virus. If the test is positive, the infected person should see a doctor who specializes in treatment of HIV patients. Many treatments can be used to delay the onset of symptoms and keep an HIV patient feeling healthy for many years. The medications available today can slow the damage to the immune system. If HIV is left untreated, the infected person is at high risk for developing kidney failure, eye disorders, heart disease, and certain forms of cancer.

Despite the fact that the current medications used for HIV are effective in improving the health of the infected person, treatment must continue for the person's lifetime. A doctor who specializes in HIV treatment to prevent or delay the development of AIDS must monitor the HIV positive person.

AIDS is the stage of HIV infection when the individual's immune system can no longer fight disease. Extensive research into HIV and AIDS has led to the development of combinations of medications that allow many people with HIV to live decades before developing AIDS. However, there is currently no cure for HIV and AIDS.

HIV Prevention

HIV is primarily transmitted through unprotected sex or sharing intravenous drug devices. Therefore, HIV prevention should start with steps to eliminate those risky behaviors. First, you should know your HIV status through testing. If you are in a high-risk group, you should be tested on a regular schedule as established by your doctor. Be sure you know the HIV status of your sexual partners.

Limit your number of sexual partners and use latex condoms with all partners. Latex condoms are very effective at preventing infection with HIV and other sexually transmitted diseases. Natural condoms do NOT provide the same level of protection so be sure the condoms are latex.

If you are an IV drug user, get treatment to help you stop drug use. Many health departments have programs that can help you stop IV drug abuse. If you continue to inject drugs, always use clean needles and do not share any of the drug use equipment with anyone else. If you think you have been exposed to HIV, get medical treatment from a clinic or private physician in your area. Early treatment may prevent infection.

Hepatitis B



Hepatitis B is a bloodborne liver disease that results from infection with the Hepatitis B virus (HBV). Although it is usually spread through blood, other body fluids from a person infected with the Hepatitis B virus can also cause the disease. Hepatitis B virus infection is called “acute” when it occurs within 6 months after a person is exposed to the HBV. This short-term infection can lead to a long-term, chronic Hepatitis B infection if the disease is not treated and the virus remains in your body. Although Hepatitis B can lead to death, the good news is that there is a vaccination to prevent the disease.

Transmission of HBV

As a bloodborne pathogen, HBV is found mainly in blood, but may also be found in other body fluids. The mode of transmission for HBV is very similar to the way HIV is transmitted including:

- Unprotected sex with someone who is infected may increase the risk of HBV transmission.
- Intravenous drug users who share needles, syringes, or other equipment used to prepare drugs are at increased risk for HBV transmission.
- Health care workers may be at risk if they are stuck or cut with a contaminated needle, lancet or other sharp object.
- Infants born to infected mothers are at risk since the virus can be passed from mother to child particularly during the birth process.
- HBV can be transmitted through medical or dental practices if the doctor or dentist does not practice the safety standards recommended by the CDC and OSHA.
- Tattooing or body piercing may present a potential risk of HBV transmission; however, if equipment is properly sterilized, this risk is almost non-existent.
- Sharing personal care items such as razors, toothbrushes or other items that might harbor HBV may present a risk for infection.



As with HIV, HBV cannot be spread by insects, saliva, tears, casual contact, sharing dishes or utensils, or breathing air around an HBV infected person.

Symptoms of HBV

Once exposed to and infected by the Hepatitis B virus, symptoms will appear in six weeks to six months. Symptoms may vary by age. For example, most children under the age of 5 years may be asymptomatic with infection; as many as half of the adults over the age of 25 years will have early symptoms. Development of the chronic form of HBV infection seems to be related to the age at initial infection -- the younger the age at infection, the higher the risk for developing the chronic infection. People with chronic HBV infection may have no symptoms or may have very severe symptoms. Symptoms of HBV infection may include:

- Fever
- Fatigue and general malaise
- Loss of appetite
- Nausea and vomiting
- Abdominal pain
- Dark urine
- Jaundice (yellowing of the skin and whites of the eyes)
- Liver failure (1% of cases)
- Liver cancer (typically with chronic disease)

Prevention of HBV

Transmission of HBV can be reduced or prevented by:

- Screening of pregnant women and treatment of infants born to HBV infected mothers.
- Vaccination of all children through the age of 18 years
- Vaccination of adults who may be at increased risk for infection (healthcare workers, people with multiple sexual partners, IV drug users)

Fortunately, vaccination rates are high among infants and children. However, vaccination rates are still low in high-risk adults. Most HBV infections continue to occur in these groups.

Hepatitis C

The most common bloodborne pathogen infection in the U.S. is Hepatitis C virus (HCV). Among all of the bloodborne diseases, HCV is the one that is least likely to be transmitted through sexual contacts; however, it CAN be transmitted sexually.

Transmission of HCV

As with the other Hepatitis infections, HCV is most often transmitted through repeated exposure to infected blood. Because of this mode of transmission, the same groups are at risk for HCV infection.

- Blood transfusions with infected blood used to be the most common method of transmission. Since screening of all blood products is so rigorous, this mode of transmission is almost unheard of in the United States.
- Intravenous drug users who share needles, syringes, or other equipment used to prepare drugs are at increased risk for HCV transmission.
- Health care workers may be at risk if they are stuck or cut with a contaminated needle, lancet or other sharp object.
- Infants born to infected mothers are at risk since the virus can be passed from mother to child particularly during the birth process.
- Unprotected sex and sharing razors and toothbrushes with an infected person CAN transmit HCV, but these modes of transmission are much more uncommon.



Symptoms of HCV

The majority of people infected with HCV usually have only mild clinical symptoms. A large majority of HCV infections results in chronic disease and many of these people will have liver disease. People with HCV infections may be at risk for chronic liver disease for the rest of their lives.

Most people with new HCV infection do not have symptoms. If symptoms do occur, they may be identical to symptoms of HBV infection including:

- Fever
- Fatigue and general malaise
- Loss of appetite
- Nausea and vomiting
- Abdominal pain
- Dark urine
- Jaundice (yellowing of the skin and whites of the eyes)
- Liver failure
- Liver cancer

Transmission of Bloodborne Pathogens

In order for infection to occur, there are four conditions that must be met. These are:

- **A pathogen must be present.** No pathogen, no problem!
- **A sufficient quantity of the pathogen must be present** in order to cause disease/infection. Some pathogens are more virulent or potent than others and require fewer numbers of virus or bacteria to cause infection.
- **A person must be susceptible to the pathogen in question.** Individuals who have been vaccinated against a pathogen can still become infected as vaccinations are not always

100% effective, and effectiveness may decrease over time. There are no vaccinations for some pathogens, such as HIV.

- **The pathogen must have access to the body** via an entry site. An entry site, or *portal of entry*, may include broken skin (abrasions or punctures), mucous membranes such as the nose and mouth, or the respiratory system.

Bloodborne pathogens are primarily spread through *direct contact* (infected blood or body fluid from an infected individual enters another person's body via the correct portal of entry).

Indirect contact occurs when an individual touches an item or surface that has been contaminated by pathogens from another person's body, and these pathogens enter the person's body via the correct portal of entry. Bloodborne pathogens cannot be spread by casual contact (shaking hands or hugging), water or food, although other pathogens that are not bloodborne can. *Droplet transmission* occurs when a person coughs or sneezes and pathogens are inhaled by another person, or are deposited on items or surfaces touched by another person. Insects and animals can also spread pathogens when they bite or sting us- this is known as *vector-borne transmission*.

Hand Hygiene

Handwashing is one of the most effective ways to prevent the spread of pathogens. Hands should be washed before and after providing care, even when gloves are worn. Although handwashing might seem like a fairly straight-forward procedure, many people do not wash their hands correctly. Hands should be washed in the following fashion:

- Wet your hands with warm running water.
- Apply soap and lather your hands by rubbing them together briskly. Don't forget under your nails, between your fingers and the backs of your hands.
- Scrub vigorously for at least 20 seconds. To time yourself, sing the "Happy Birthday" song twice.
- Rinse your hands thoroughly under warm running water.
- Dry your hands with a clean paper towel (or air dry them).

When there is no ready access to water, alcohol hand rubs may be used. Alcohol hand rubs should contain at least 60% alcohol. You should know that, although hand sanitizers containing alcohol can greatly reduce the number of pathogens on your skin, they cannot remove all pathogens.

Personal Protective Equipment (PPE)

Personal protective equipment is used to minimize exposure to bloodborne pathogens and may include gloves, gowns, masks or goggles and others. Let's look at the different types of PPE used to protect against the transmission of bloodborne pathogens:

- Goggles- protect the eyes; should fit snugly around and over eyes; eyeglasses are not a substitute for goggles
- Gloves- protect the hands
- Face shields- protect the eyes, mouth, nose and face; should cover the forehead and should wrap around the sides of the face; should also extend below the chin
- Gowns/aprons- protect clothing and skin; may be reusable or disposable; should be resistant to fluid penetration
- Masks- protect the mouth and nose; should fully cover nose and mouth; should be resistant to fluid penetration
- Respirators- protect the respiratory tract from airborne agents, such as influenza (the flu); may be half or full face; particulate respirators protect against tiny particles; full respirators have an air source; some respirators must be fit tested

Not all of these must be worn at the same time. Selection of PPE is based on the type of possible exposure. For example, when changing a patient's dressing you might wear only gloves. When dealing with a victim of a motor vehicle collision with multiple trauma, you might be required to wear gloves, a gown and a mask.

A word about gloves

It is easy to become complacent when wearing gloves, so it is important to remember that gloves are not 100% effective. You should also be mindful of protecting yourself and others. When wearing gloves, try not to touch your face (for example, to readjust goggles or a mask. Do not touch others or environmental surfaces excepting those that must be touched to provide care. Change gloves when they are heavily soiled when working with a patient, and NEVER use the same gloves to care for two different patients. Lastly, be sure to dispose of your gloves in the appropriate receptacle. Disposable gloves are meant to be discarded after a single use.

Donning and removing PPE

- PPE should be donned before coming in contact with the patient
- PPE should be removed carefully at the doorway or just outside the patient's room- respirators should be removed once you are outside the room
- Hands should be washed immediately after removing PPE

- When donning PPE, don in the following order: gown, mask, goggle/face shield, gloves (use common sense!)
- Gloves are always donned last and should extend over the cuffs of an isolation gown
- When removing PPE, remove in the following order: gloves, goggles/face shield, gown, mask/respirator

Removing gloves:

- Grasp the outside edge of one glove near the wrist
- Pull the glove down the hand and turn the glove inside out
- Hold the glove in the opposite gloved hand
- Slide an ungloved finger under the wrist edge of the remaining glove
- Pull off from the inside, creating a bag for both gloves
- Discard both gloves in the appropriate receptacle

Work Practice and Engineering Controls

Work practice controls are measures used to change the way work practices are carried out to ensure safety, whereas engineering controls are those measures used to isolate or remove hazards from the work environment.

Examples of work practice controls are:

- Removing and disposing of PPE as soon as possible after use
- Isolating areas of contamination to prevent others from being exposed
- Disposing of sharps in puncture-proof biohazard containers
- Avoiding unnecessary spraying, splashing or spattering of blood or other potentially hazardous materials
- Avoiding eating, drinking or applying cosmetics in areas where contamination might occur
- Disinfecting/cleaning soiled work areas or surfaces
- Washing hands properly and frequently

Examples of engineering controls are:

- Safe needles (self-sheathing needles)
- Biohazard containers
- Labeling of all biohazards
- Safer medical devices
- PPE

Cleanup of Spills and Equipment

It is everyone's responsibility to maintain a clean and safe environment. When equipment is soiled or there has been a spill of a potentially hazardous substance, it is important to clean and remove the biohazardous substance immediately. Know where spill kits, disinfectants and other cleanup agents are located in your workplace. When attending to spill or cleaning equipment, keep the following in mind:

- Always wear gloves and other PPE as necessary depending on the risk
- Protect others by blocking off the area with cones or ropes to prevent others from inadvertently walking through the contaminated area
- Clean up spills immediately, or as soon as is feasible under the circumstances, using the appropriate cleansers/disinfectants
- Do not pick up needles or broken glass with your gloved hands- use a broom and dustpan or other items to prevent punctures or cuts
- When using absorbent material to clean up a biohazardous material, dispose of the absorbent material in a biohazard container
- Flood the contaminated area with disinfectant (i.e. bleach and water) and allow it to stand for at least 10 minutes to kill any pathogens
- Wash uniforms between wearings and wash according to the manufacturer's instructions

What to Do if You Are Exposed

No matter how careful we are, accidents can occur. It is a serious matter to be exposed to a bloodborne pathogen, and it's important that you take the proper steps if exposure occurs.

Following an exposure, you should:

- Wash the contaminated area thoroughly with soap and water; if your mouth and nose have been exposed, flush the areas with water
- For eye exposure, irrigate the eyes with clean water or normal saline for 20 minutes- many workplaces have eye wash stations for this purpose
- Report the incident immediately to your supervisor
- See a medical professional (EMS or a physician) according to your workplace protocol
- Make a written report of the incident, including the date, time of event and the circumstances surrounding the event. Make sure to include what you did immediately after the event.