

Bloodborne Pathogens:

The University of Tennessee

Office of Environmental Health & Safety

Bloodborne pathogens are microorganisms such as viruses or bacteria that are carried in blood and can cause disease in people. There are many different bloodborne pathogens including malaria, syphilis, and brucellosis, but **Hepatitis B (HBV)** and the **Human Immunodeficiency Virus (HIV)** are the two diseases specifically addressed by the OSHA Bloodborne Pathogen Standard.

While this module will focus primarily on HBV and HIV, **it is important to know which bloodborne pathogens (from humans or animals) you may be exposed to at work, especially in laboratories.** For example, personnel in the College of Veterinary Medicine might have the potential for exposure to rabies, and it would therefore be important to know specific information about rabies.

For a **comprehensive study** of the **OSHA Bloodborne Pathogens Standard 29 CFR 1910.1030**, please [Click here](#). To **view the Bloodborne Pathogens program** as adopted by the University of Tennessee, [Click here](#).

In the United States, approximately 300,000 people are infected with HBV annually. Of these cases, a small percentage are fatal.

"Hepatitis" means "inflammation of the liver," and, as its name implies, Hepatitis B is a virus that infects the liver. While there are several different types of Hepatitis, Hepatitis B is transmitted primarily through "blood to blood" contact. Hepatitis B initially causes inflammation of the liver, but it can lead to more serious conditions such as cirrhosis and liver cancer.

There is no "cure" or specific treatment for HBV, but many people who contract the disease will develop antibodies which help them get over the infection and protect them from getting it again. It is important to note, however, that **there are different kinds of hepatitis, so infection with HBV will not stop someone from getting another type.**

The Hepatitis B virus is very durable, and it can survive in dried blood for up to seven days. For this reason, this virus is the primary concern for employees such as housekeepers, custodians, laundry personnel and other employees who may come in contact with blood or potentially infectious materials in a non first-aid or medical care situation.

The symptoms of HBV are very much like a mild "flu". Initially there is a sense of fatigue, possible stomach pain, loss of appetite, and even nausea. As the disease continues to develop, jaundice (a distinct yellowing of the skin and eyes), and a darkened urine will often occur. However, people who are infected with HBV will often show no symptoms for some time. **After exposure it can take 1-9 months before symptoms become noticeable.** Loss of appetite and stomach pain, for example, commonly appear within 1-3 months, but can occur as soon as 2 weeks or as long as 6-9 months after exposure.

AIDS, or acquired immune deficiency syndrome, is caused by a virus called the human immunodeficiency virus, or **HIV**. Once a person has been infected with HIV, it may be many years before AIDS actually develops. HIV attacks the body's immune system, weakening it so that it cannot fight other deadly diseases. AIDS is a fatal disease, and while treatment for it is improving, there is no known cure.

Estimates on the number of people infected with HIV vary, but some estimates suggest that an average of 35,000 people are infected every year. Many people who are infected with HIV may be completely unaware of it.

The HIV virus is very fragile and will not survive very long outside of the human body. It is primarily of concern to employees providing first aid or medical care in situations involving fresh blood or other potentially infectious materials. It is estimated that the chances of contracting HIV in a workplace environment are only 0.4%. However, because it is such a devastating disease, all precautions must be taken to avoid exposure.

AIDS infection essentially occurs in three broad stages. The **first stage** happens when a person is actually infected with HIV. After the initial infection, a person may show few or no signs of illness for many years. Eventually, in the **second stage**, an individual may begin to suffer swollen lymph glands or other lesser diseases which begin to take advantage of the body's weakened immune system. The second stage is believed to eventually lead to AIDS, the **third and final stage**, in all cases. In this stage, the body becomes completely unable to fight off life-threatening diseases and infections.

Symptoms of HIV infection can vary, but often include **weakness, fever, sore throat, nausea, headaches, diarrhea, a white coating on the tongue, weight loss, and swollen lymph glands.**

If you believe you have been exposed to HBV or HIV, especially if you have experienced any of the signs or symptoms of these diseases, you should consult your physician or doctor as soon as possible.

Bloodborne pathogens such as HBV and HIV can be transmitted through contact with infected human **blood** and **other potentially infectious body fluids** such as:

- Semen
- Vaginal secretions
- Cerebrospinal fluid
- Synovial fluid
- Pleural fluid
- Peritoneal fluid
- Amniotic fluid
- Saliva (in dental procedures), and
- Any body fluid that is visibly contaminated with blood.

It is important to know the ways exposure and transmission are most likely to occur in your particular situation, be it providing first aid to a student in the classroom, handling blood samples in the laboratory, or cleaning up blood from a hallway.

HBV and HIV are most commonly transmitted through:

Sexual Contact

Sharing of hypodermic needles

From mothers to their babies at/before birth

Accidental puncture from contaminated needles, broken glass, or other sharps

Contact between broken or damaged skin and infected body fluids

Contact between mucous membranes and infected body fluids



Accidental puncture from contaminated needles and other sharps can result in transmission of bloodborne pathogens.

In most work or laboratory situations, transmission is most likely to occur because of accidental puncture from contaminated needles, broken glass, or other sharps; contact between broken or damaged skin and infected body fluids; or contact between mucous membranes and infected body fluids. For example, if someone infected with HBV cut their finger on a piece of glass, and then you cut yourself on the now infected piece of glass, it is possible that you could contract the disease. Anytime there is **blood-to-blood contact** with infected blood or body fluids, there is a slight potential for transmission.

Unbroken skin forms an impervious barrier against bloodborne pathogens. However, **infected blood can enter your system through:**

Open sores

Cuts

Abrasions

Acne

Any sort of damaged or broken skin such as sunburn or blisters

Bloodborne pathogens may also be transmitted through the **mucous membranes** of the

Eyes

Nose

Mouth

For example, a splash of contaminated blood to your eye, nose, or mouth could result in transmission.

WORK PRACTICES AND ENGINEERING CONTROLS

"Universal Precautions" is the name used to describe a prevention strategy in which all blood and potentially infectious materials are treated as if they are, in fact, infectious, regardless of the perceived status of the source individual. In other words, whether or not you think the blood/body fluid is infected with bloodborne pathogens, **you treat it as if it is**. This approach is used in all situations where exposure to blood or potentially infectious materials is possible. This also means that certain engineering and work practice controls shall always be utilized in situations where exposure may occur.

HYGIENE PRACTICES

Handwashing is one of the most important (and easiest) practices used to prevent transmission of bloodborne pathogens. Hands or other exposed skin should be thoroughly washed as soon as possible following an exposure incident. Use soft, antibacterial soap, if possible. Avoid harsh, abrasive soaps, as these may open fragile scabs or other sores. Hands should also be washed immediately (or as soon as feasible) after removal of gloves or other personal protective equipment.



Because handwashing is so important, you should familiarize yourself with the location of the handwashing facilities nearest to you. Laboratory sinks, public restrooms, janitor closets, and so forth may be used for handwashing if they are normally supplied with soap. If you are working in an area without access to such facilities, you may use an antiseptic cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes. If these alternative methods are used, hands should be washed with soap and running water as soon as feasible.

If you are working in an area where there is reasonable likelihood of exposure, **you should never:**

Eat

Drink

Smoke

Apply cosmetics or lip balm

Handle contact lenses

No food or drink should be kept in refrigerators, freezers, shelves, cabinets, or on counter tops where blood or potentially infectious materials are present.



If you have contaminated fluids on your hands, you may accidentally ingest them if you smoke or eat before washing your hands. You should never eat, smoke, drink, apply cosmetics, or handle contact lenses in areas where exposure to bloodborne pathogens is possible.

You should also try to minimize the amount of splashing, spraying, splattering, and generation of droplets when performing any procedures involving blood or potentially infectious materials, and you should **NEVER pipette or suction these materials by mouth.**

Decontamination and Sterilization

All **surfaces, tools, equipment and other objects** that come in contact with blood or potentially infectious materials must be decontaminated and sterilized as soon as possible.

Equipment and tools must be cleaned and decontaminated before servicing or being put back to use.

Decontamination should be accomplished by using

- A solution of 5.25% sodium hypochlorite (household bleach / Clorox) diluted between 1:9 and 1:100 with water. The standard recommendation is to use at least a quarter cup of bleach per one gallon of water.
- Lysol or some other EPA-registered tuberculocidal disinfectant. Check the label of all disinfectants to make sure they meet this requirement.

If you are cleaning up a spill of blood, you can carefully cover the spill with paper towels or rags, then gently pour your 10% solution of bleach over the towels or rags, and leave it for **at least 10 minutes**. This will help ensure that the bloodborne pathogens are killed before you actually begin cleaning or wiping the material up. By covering the spill with paper towels or rags, you decrease the chances of causing a splash when you pour the bleach on it.

If you are decontaminating equipment or other objects (be it scalpels, microscope slides, broken glass, saw blades, tweezers, mechanical equipment upon which someone has been cut, first aid boxes, or whatever) you should leave your disinfectant in place for **at least 10 minutes** before continuing the cleaning process.

Of course, any materials you use to clean up a spill of blood or potentially infectious materials must be decontaminated immediately, as well. This would include mops, sponges, re-usable

12 gloves, buckets, pails, etc.

Sharps

Far too frequently, housekeepers, custodians and others are punctured or cut by improperly disposed needles and broken glass. This, of course, exposes them to whatever infectious material may have been on the glass or needle. For this reason, it is especially important to handle and dispose of all sharps carefully in order to protect yourself as well as others.



Needles must be disposed of properly in sharps containers such as this one. Improperly disposed needles can injure housekeepers, custodians and other people

Needles

Needles or other sharps should not be bent, recapped, or moved except as noted below:

- Needles may be recapped only by using a mechanical device.
- Needles should be moved only by using a mechanical device or tool such as forceps, pliers, or broom and dust pan.
- Never break or shear needles.
- Needles shall be disposed of in labeled sharps containers only.
- Sharps containers shall be closable, puncture-resistant, leak-proof on sides and bottom, and must be labeled or color-coded.
- When sharps containers are being moved from the area of use, the containers should be closed immediately before removal or replacement to prevent spillage or protrusion of contents during handling or transport.

Broken Glassware

- Broken glassware that has been visibly contaminated with blood must be sterilized with an approved disinfectant solution before it is disturbed or cleaned up.
- Glassware that has been decontaminated may be disposed of in an appropriate sharps container: ie. closable, puncture-resistant, leak-proof on sides and bottom, with appropriate labels. (Labels may be obtained from EHS.)
- Broken glassware will not be picked up directly with the hands. Sweep or brush the material into a dustpan.
- Uncontaminated broken glassware may be disposed of in a closable, puncture resistant container such as a cardboard box or coffee can.

By using Universal Precautions and following these simple engineering and work practice controls, you can protect yourself and prevent transmission of bloodborne pathogens.

SIGNS AND LABELS



Warning labels need to be affixed to containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious material; and other containers used to store, transport, or ship blood or other potentially infectious materials. These labels are fluorescent orange, red, or orange-red, and they are available from EHS. Bags used to dispose of regulated waste must be red or orange red, and they, too, must have the biohazard symbol readily visible upon them. Regulated waste should be double-bagged to guard against the possibility of leakage if the first bag is punctured.

Regulated waste refers to:

Any liquid or semi-liquid blood or other potentially infectious materials

Contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed

Items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling

Contaminated sharps

Pathological and microbiological wastes containing blood or other potentially infectious materials

All regulated waste must be disposed in properly labeled containers or red biohazard bags. These must be disposed at an approved facility. Most departments or facilities that generate regulated waste will have some sort of contract with an outside disposal company that will come pick up their waste and take it to an approved incineration/disposal facility.

Non-regulated waste (i.e., does not fit the definition of regulated waste provided above) that is not generated by a medical facility such as the Student Health Center, or human health-related research laboratory may be disposed in regular plastic trash bags *if it has been decontaminated or autoclaved prior to disposal.*

EMERGENCY PROCEDURES

In an emergency situation involving blood or potentially infectious materials, you should always **use Universal Precautions** and **try to minimize your exposure** by wearing gloves, splash goggles, pocket mouth-to-mouth resuscitation masks, and other barrier devices.

If you are exposed, however, you should:

- Wash the exposed area thoroughly with soap and running water. Use non-abrasive, antibacterial soap if possible.

If blood is splashed in the eye or mucous membrane, flush the affected area with running water **for at least 15 minutes**.

- Report the exposure to your supervisor as soon as possible.
- Fill out an exposure report form, if you desire. This form will be kept in your personnel file for 40 years so that you can document workplace exposure to hazardous substances. This report is available from your supervisor or from EHS.
- You may also contact the Occupational Health Clinic located behind the University Medical Center to request blood testing or the Hepatitis B vaccination if you have not already received it.

Quiz Time

To complete the Blood borne Pathogens Training Module, please [click here](#) for the quiz