EMPLOYEE HANDOUT

BLOODBORNE PATHOGENS

Employer: _________________________

Trainer: __________________________

Employee: _________________________

Date: _____________________________
When treating patients, our first concern is naturally with them and their welfare. However, the blood and bodily fluids of any patient may contain viruses and other bloodborne pathogens. These pathogens can cause serious harm or even death to others who suffer exposure. OSHA’s Bloodborne Pathogens Standard is meant to protect employees from possible exposure to these diseases. These bloodborne pathogens training materials are designed for training employees involved in patient care or who work in a health care environment.

Some important definitions to review and keep in mind include:

- **Bloodborne Pathogens:** Disease-causing microorganisms (bacteria, viruses, and others) in human blood and other bodily fluids. Examples include hepatitis B virus (HBV), syphilis, and human immunodeficiency virus (HIV). However, microorganisms may cause a number of other diseases, including the hepatitis C virus (HCV) infection, which is the most common chronic bloodborne infection in the U.S. according to the Centers for Disease Control and Prevention.

- **Exposure Incident:** Work-related contact between blood or other potentially infectious materials (OPIM) and:
  - the eye, mouth, or other mucous membrane (mucosal contact), or
  - non-intact (cut or torn) skin, or intact skin that is cut or punctured by a needlestick or other sharps injury (parenteral or percutaneous contact)

- **Occupational Exposure:** Skin, eye, mucous membrane, or parenteral contact with blood or OPIM that may reasonably be expected while doing one’s job.

- **Other Potentially Infectious Materials (OPIM):** A catch-all category that includes semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva, and any bodily fluid that cannot be identified or that is visibly contaminated with blood. Also includes any unfixed tissue or organ (other than intact skin) from a living or dead person, any human or animal cell or tissue cultures, blood, organs, etc. that are known to contain HIV or HBV.

- **Parenteral Contact:** A piercing of mucous membranes or the skin barrier by means of a needlestick, human bite, cut, or abrasion.
2.11 Determining Occupational Exposure

The first responsibility of your employer under the Bloodborne Pathogens Standard is to determine which employees are at risk, and which tasks present a risk of occupational exposure to bloodborne pathogens. **Even in a health care environment, not all employees may face occupational exposure to bloodborne pathogens.** Employers must make that determination on a task-by-task basis.

All employees in some job classifications are at risk, but in other classifications, only some employees would be. For example, based on the tasks they perform, it is likely that all phlebotomists would be at risk—but not all aides. A nurse’s aide who was directly involved in patient care would almost certainly be at risk, while a dietary aide might not be. Nurses whose job descriptions did not include direct patient contact might not be classified as “at-risk.” However, housekeeping and maintenance personnel who had no interaction with patients would have occupational exposure if they clean and maintain potentially contaminated equipment.

To determine the employees and tasks that involve a risk of occupational exposure, the employer must perform a hazard assessment. The hazard assessment also identifies the areas of the workplace where exposure risks are present.

2.12 Illustrative List of Covered Health Care Workers

Application of the Bloodborne Pathogens Standard is not limited to workers in a health care environment. However, as a group, health care workers are the main focus of the Standard. As an employee in the medical industry, you are likely to be covered by the Bloodborne Pathogens Standard if you fall within any of the following job classifications:

- **Health Care Providers:** doctors, nurses, physicians’ assistants, and other employees in clinics, physicians’ offices, hospitals and other health care settings
- **Dental Care Providers:** dentists, dental technicians, and dental hygienists
- **Laboratory Personnel:** employees of clinics, tissue banks, blood banks, and diagnostic labs; employees at HBV and HIV research facilities
- **Custodial, Maintenance, and Housekeeping Personnel:**
  - housekeepers in health care and other facilities
  - custodial workers who clean up contaminated sharps or spills of blood or other bodily fluids
  - employees who handle regulated waste
- maintenance workers in health care facilities
- medical equipment service and repair personnel

- **Laundry Personnel:** workers in hospital laundries or commercial laundries that provide services for the health care industry
- **Emergency Personnel:** employees designated to provide emergency first aid, paramedics, and other medical emergency personnel
- **Community Health Workers:** employees of substance abuse clinics and home health care, nursing home, and hospice employees
- **Residential Care Providers:** staff of institutions for the developmentally disabled and employees of substance abuse clinics

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### 2.13 Basic Symptoms and Modes of Transmission

The best-known diseases caused by bloodborne pathogens are acquired immunodeficiency syndrome (AIDS) and hepatitis B. AIDS results from exposure to human immunodeficiency virus (HIV), and hepatitis B from exposure to hepatitis B virus (HBV). Danger may exist from a number of other bloodborne pathogens, however. Infection with the hepatitis C virus (HCV), for example, is becoming increasingly common. Approximately 170 million people worldwide are infected with HCV, according to the World Hepatitis Alliance, compared to the World Health Organization’s estimate of nearly 33 million individuals worldwide living with HIV. Fortunately, HCV appears to be less infectious than either HBV or HIV, but much remains to be learned about this debilitating disease.

The symptoms, incubation periods (time from exposure to infection), and modes of transmission for AIDS, hepatitis B, and hepatitis C are set forth below. However, many of the symptoms listed are non-specific, and a blood test is required for positive diagnosis.

**Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS)**

- **Symptoms:** Once a person is infected with HIV, symptoms of AIDS may take 10 years or longer to appear. Symptoms of AIDS include the following:
  - rapid weight loss
  - dry cough
  - recurring fever or profuse night sweats
  - profound and unexplained fatigue
  - swollen lymph glands in the armpits, groin, or neck
- diarrhea that lasts for more than a week
- white spots or unusual blemishes on the tongue, in the mouth, or in the throat
- pneumonia
- red, brown, pink, or purplish blotches on or under the skin or inside the mouth, nose, or eyelids
- memory loss, depression, and other neurological disorders

Because these symptoms can also be symptoms of many other diseases, a diagnosis of HIV infection or AIDS disease can only be made by a doctor.

• **Incubation Period:** One type of test, an RNA test, can detect the HIV virus as early as nine days after an individual is infected. More commonly, individuals are tested for antibodies to HIV, which take two to eight weeks (25 days, on average) to become detectable in infected individuals. Some people take as long as six months to develop antibodies, so anyone exposed to HIV who has a negative antibody test within three months of exposure should be re-tested.

• **Modes of Transmission:** HIV and AIDS are spread by:
  - sexual contact with an infected person,
  - sharing needles and/or syringes with an infected person when injecting drugs,
  - transfusions of infected blood or blood clotting factors, although this is rare now in countries where blood is screened for HIV antibodies,
  - transmission during birth, from infected mothers to their babies, or through breastfeeding after birth, and
  - needlesticks or contact between infected blood and a worker’s mucous membranes such as the eyes or the inside of the nose.

Note, however, that workers suffering a needlestick-type of exposure have only a 0.3% risk of developing HIV infection, which means 1 in 300 will develop the infection. The risk of developing HIV infection after mucous membrane exposure to HIV-infected blood is estimated to be about 0.1%, meaning 1 in 1,000 will develop the infection. The risk of developing HIV infection after exposure to HIV-infected blood on a worker’s intact skin is even smaller; a slight amount of blood on intact, unbroken skin probably poses no risk at all. The risk is higher for prolonged exposure and exposure on non-intact skin. There has been only one documented case of a patient who was infected by a health care worker in the United States (one infected dentist transmitted the disease to six patients). No other cases of this type of transmission have been identified in the United States, despite studies involving more than 22,000 patients of 63 HIV-infected physicians, surgeons, and dentists.
Hepatitis B Virus (HBV)

- **Symptoms:** According to the Centers for Disease Control and Prevention (CDC) and other researchers:
  - About 30% of infected individuals have no apparent symptoms of disease. Children are more likely to be asymptomatic than adults.
  - In the remaining 70% of cases, symptoms include loss of appetite, abdominal pain, nausea and vomiting, joint pain, fatigue, and jaundice (yellowing of the skin and eyes).
  - Approximately 6% of unvaccinated individuals over the age of five who are exposed to HBV will develop chronic HBV infection.
  - Between 15% and 25% of chronically infected individuals will die of liver disease caused by HBV.
- **Incubation Period:** Antibodies to HBV can be detected in an infected person’s blood anywhere from one to nine weeks following exposure to the virus. On average, most individuals test positive four weeks after exposure. If symptoms are going to occur, they occur on average about 12 weeks after exposure. Some patients show symptoms as early as nine weeks after exposure, others as late as 21 weeks after exposure. About half of all patients will clear the infection on their own by seven weeks after onset of symptoms. Generally, all patients who do not develop chronic HBV infection will be clear of the infection by 15 weeks after the onset of symptoms.
- **Modes of Transmission:** HBV is transmitted by direct contact with the blood of an infected person. You can come into contact with HBV through the following:
  - having sex with an infected person without using a condom (It is not known how effective latex condoms are at preventing HBV infection, but it is believed that using them can reduce the risk of disease transmission.)
  - sharing drugs, needles, or syringes when injecting drugs
  - infection of a newborn infant by its mother at birth
  - needlesticks or sharps exposure on the job.

Vaccinated workers who have developed immunity to the virus face almost no risk of infection. Unvaccinated workers who incur a needlestick or cut exposure to HBV-infected blood have a 6% to 30% risk of developing HBV infection. The level of risk depends on the type of HBV antigens present in the source individual’s blood.

Hepatitis C Virus (HCV)

- **Symptoms:** According to the CDC and other researchers:
- In 80% of infected individuals, acute HCV infection produces no apparent symptoms.
- In the remaining 20% of cases, symptoms include jaundice, fatigue, dark urine, abdominal pain, loss of appetite, and nausea.
- From 55% to 85% of infected individuals will develop chronic HCV infection.
- About 70% of chronically infected individuals will develop chronic liver disease.
- From 5% to 20% of infected individuals will develop tissue destruction (cirrhosis) of the liver, over a period of 20 to 30 years from their initial exposure. Alcohol may speed up tissue destruction in persons with chronic HCV infection.
- From 1% to 5% of infected individuals will die of chronic liver disease or cirrhosis. Chronic HCV infection is the number one reason for liver transplants.
- HCV was added to the National Toxicology Program's list of known human carcinogens in 2005 because HCV infection can cause liver cancer.

**Incubation Period:** The general range is from two weeks to six months; most often the incubation period is six to eight weeks. According to the CDC, antibodies indicating the presence of the disease appear in 80% of patients within 15 weeks of exposure and in 97% of patients within six months of exposure. However, because the vast majority of infected individuals have no symptoms, many people who are chronically infected with HCV do not know it.

**Modes of Transmission:** HCV is spread almost exclusively through direct contact with human blood. According to the CDC and other sources, individuals at highest risk for HCV infection include those who have:
- ever injected street drugs,
- received blood, blood products, or solid organs from a donor whose blood contained HCV,
- ever been on long-term kidney dialysis, because they may have unknowingly shared supplies or equipment that had someone else's blood on them,
- been born to HCV-infected mothers,
- ever had sex with a person infected with HCV,
- lived with someone who was infected with HCV and shared items such as razors or toothbrushes, or
- had frequent contact with blood on the job, especially accidental needlesticks.

According to the World Health Organization, studies of surgical workers show the highest rates of HCV infection among oral surgeons and dentists.
Other Diseases

HIV, HBV, and HCV are the most commonly transmitted bloodborne pathogens during patient care. However, there are recorded cases of more than twenty other diseases that have been transmitted either during patient care, laboratory activities, or autopsies. In addition to HIV, HBV, and HCV, health care workers have contracted tuberculosis through sharps injuries during both patient care and laboratory/autopsy activities, and have contracted herpes and malaria through sharps injuries that occurred during patient care. There have also been recorded cases of transmission of other diseases via sharps injury during laboratory/autopsy activities.

Some of the other diseases that can be transmitted through bloodborne pathogens include:

- **Babesiosis**: A parasitic infection generally transmitted by the bite of an infected deer tick. It most severely affects the elderly and those with weak immune systems. The disease can cause fever, fatigue, anemia, and (in severe cases) acute respiratory distress. It may take from four weeks to one year for symptoms to appear.

- **Blastomycosis**: A fungal disease that is picked up in areas where decaying organic matter is present, typically forests. Except for accidental transmission via sharps, it is not known to pass from person to person. After an incubation period of three weeks to four months, it causes a flu-like illness. It can be treated with antifungal drugs. Untreated infections can lead to serious, sometimes fatal, complications.

- **Brucellosis**: A bacterial infection most commonly found in people who work with livestock. Symptoms may include headaches, weakness, generalized aching, and extensive sweating. Symptoms usually appear within five to 30 days from exposure. The bacterium is most frequently seen in unpasteurized milk from diseased cows and infected cattle, goats, and sheep.

- **Cryptococcosis**: A fungal disease that is transmitted through contact with infected bird droppings. It is most likely to infect immunocompromised individuals. The disease may incubate for as long as 11 months. Symptoms include a pneumonia-like illness and skin lesions. In immunocompromised individuals, it may cause meningoencephalitis.

- **Diphtheria**: A bacterial infection that was once a childhood disease, but now occurs mostly in adults, as childhood immunizations are now common in the United States. Immunity to the disease fades over time, so boosters are recommended for adults who are at risk. The bacterium itself does not produce illness. Instead, it produces a toxin that makes people sick. Symptoms include sore throat, fever, and swelling of the throat. The disease may also cause skin lesions. Diphtheria antitoxin, used to treat the disease, is available through the CDC.
• **Ebola**: A virus that causes ebola hemorrhagic fever, which is native to Africa. There has never been a human case in the United States, although the disease has appeared in monkeys here. However, laboratory workers in England and Russia have been infected with Ebola through accidental needlesticks. The disease incubates for 2 to 21 days. After that, fever, headache, joint and muscle aches, sore throat, and weakness appear. Diarrhea, vomiting, and stomach pain follow. In late stages, patients suffer severe bleeding and shock. As many as 90% of cases may be fatal.

• **Gonorrhea**: A bacterial disease, typically transmitted through sexual contact. Symptoms may appear from 2 to 30 days after infection, but most infected individuals have no symptoms. Symptoms, if present, may include burning during urination; rectal, vaginal, or penile discharge; swollen testicles; and skin lesions. The disease can be treated with antibiotics. Left untreated, it can cause serious, long-term health effects, including blindness, arthritis, and infertility.

• **Herpes**: The non-specific name for many different herpes viruses, including the virus that causes genital herpes (herpes simplex virus, which is also called type 2 or HSV-2), the Epstein-Barr virus, and the chickenpox virus. Herpes simplex virus type 1 (HSV-1) is the herpes virus that is commonly responsible for “cold sores” or “fever blisters” around the mouth. Dental workers may be familiar with herpetic whitlow, an HSV-1 infection transmitted from the saliva of an infected patient to the hands of a dental care professional, usually through non-intact skin, where it causes itchy, painful blisters at the infection site. The HSV-1 virus has also been transmitted through contaminated sharps. It has an incubation period of 2 to 12 days, after which sores or blisters appear at the infection site. There is no vaccine for HSV-1, although antiviral treatment can reduce the duration of outbreaks.

• **Leptospirosis**: A disease that most often affects farmers, sewer workers, and others who have contact with animals, especially rats. It is generally spread through the urine of infected animals. Symptoms of the disease may include headache, fever, nausea, vomiting, jaundice, and anemia and usually result in the hospitalization of the victim. Symptoms generally appear within 4 to 10 days from exposure.

• **Malaria**: A disease caused by blood parasites carried by mosquitoes. It is very common in tropical and sub-tropical areas and rare in the United States. It may also be transmitted by transfusion of blood from infected people or by the use of contaminated needles or syringes. Symptoms may include chills, fever, and sweating, and generally appear in 12 to 30 days, although one strain of the disease may take from 8 to 10 months to produce symptoms. Malaria may result in kidney or liver failure.

• **Rocky Mountain Spotted Fever**: A bacterial disease that is generally transmitted to humans by tick bites. Despite its name, it occurs throughout North America, with as many as 1,200 cases reported each year within the United States. Many more unreported cases are believed to occur. The disease has an incubation period of 5 to 10 days. Its first symptom is fever, sometimes accompanied by nausea, vomiting,
headache, muscle pain, and lack of appetite. Two to five days after the onset of fever, a rash may appear on the wrists and ankles. Although the disease can be treated with antibiotics, it can be difficult to diagnose. In genetically susceptible individuals (i.e., people with glucose-6-phosphate-dehydrogenase deficiency; the highest rates of this condition occur in men of African ancestry), the disease progresses extremely quickly and is often fatal within five days. Victims who survive the more severe forms of the disease may suffer chronic severe nerve damage.

- **Scrub Typhus**: A bacterial disease that is native to the regions of east Asia and the southwest Pacific, where it is transmitted to humans through flea bites. People who have traveled abroad in eastern Russia, Japan, India, Pakistan, Afghanistan, or other countries in the region (extending as far south as northern Australia) may bring the disease back with them. The disease incubates for 5 to 20 days, after which victims will complain of high fever, severe headache, and muscle pain. Severe cases may affect the heart, lungs, circulatory system, or central nervous system. It can be treated with antibiotics, although resistant strains have been reported.

- **Strep Pyogenes**: A Group A *Streptococcus* bacterium that is most commonly transmitted by direct contact with mucus or sores of an infected person. It causes strep throat and impetigo, but can also cause necrotizing fasciitis or “flesh-eating bacteria” and streptococcal toxic shock syndrome. (Note: This is not the same toxic shock syndrome that is associated with tampon use.) As many as 10,000 cases of invasive disease are caused by this bacterium each year in the U.S. There is no vaccine for this bacterium, but it can be effectively treated with antibiotics.

- **Syphilis**: A bacterial infection that is primarily transmitted through sexual contact. The first sign of syphilis is a painless sore that appears at the site of initial contact. If the disease is not quickly treated with antibiotics, it may cause fever, tiredness, sore throat, headaches, and destruction of bones and the nervous system. Symptoms generally appear within three to four weeks after a person becomes infected, although the full range is anytime from 10 to 90 days.

- **Toxoplasmosis**: A disease typically caused by a parasite found in both undercooked pork and the feces of infected cats. More than 60 million Americans may be infected with the parasite that causes this disease, according to the CDC, but most have no symptoms. A healthy immune system prevents illness; however, individuals who are pregnant or who have weakened immune systems can suffer serious health effects. The disease can cause flu-like symptoms, which can last for a month or longer. Serious cases can cause severe damage to the eyes or brain. The disease is treatable, but mild cases usually resolve without medication.

- **Tuberculosis (TB)**: A bacterial infection that can attack any part of the body, but usually attacks the lungs. The infection is most commonly spread through droplet or airborne transmission, but the CDC has documented rare cases of bloodborne trans-
mission through exposure to contaminated sharps. More than 11,500 cases of TB were reported in the United States in 2009. The disease is treated with antibiotics, but some strains are resistant to multiple drugs. A vaccine is available, but it is only rarely used because it is not always effective and can cause vaccinated individuals to have a false-positive reaction to TB skin tests, making it more difficult to monitor health care workers for the disease.

Basic Safety Approach: Universal Precautions, a Subset of Standard Precautions

2.14

Employees who are covered under the Bloodborne Pathogens Standard must use special engineering controls, work practices, and personal protective equipment (PPE) to avoid being infected with bloodborne pathogens. OSHA’s required precautions for the prevention of employee exposures are called “universal precautions” because workers are expected to use these precautions “universally,” that is, with every patient, all the time.

Bloodborne pathogens are invisible to the naked eye, and infected persons may not know their status. Sometimes a person can be infected for years before becoming symptomatic and being diagnosed.

Legal rights of confidentiality and limited scientific information further prevent us from knowing exactly who is and is not infected with a disease. The use of universal precautions enables us to nevertheless minimize the risk of infection by treating everyone as if we know that they are indeed infected. Since anyone may be infected, precautions against exposure apply in all cases—universally.

Universal Precautions and Standard Precautions

Many health care facilities these days incorporate OSHA’s universal precautions into a set of infection control practices and procedures called “standard precautions.” Bear in mind that standard precautions (which are defined by the Centers for Disease Control and Prevention and detailed in Chapter 4, Infection Control) differ from universal precautions in that they are designed to:

- protect both health care workers and patients from infectious diseases; and
- protect all parties against diseases that are transmitted in many different ways, not just through exposure to blood or other potentially infectious materials.

So, if you are observing your facility’s “standard precautions,” you and your patients should be protected against bloodborne pathogens, as well as other types of diseases.
Example of Using Universal Precautions

Suppose an elderly patient tears her arm on a sharp corner and bleeds on the furniture, walls, floor, bed linens, and her clothing. All workers who come into contact with her blood must treat it as if they knew the blood is infected with bloodborne pathogens. Whether or not the patient is infected, everyone who might come into contact with her blood would still be protected.

The staff members who come to her aid must wear impermeable gloves; and, depending on the type and amount of bleeding, they may also wear protective clothing (lab coats or scrubs) and face or eye protection. This personal protective equipment (PPE) would prevent blood from contacting their skin, mucous membranes, and street clothes. The housekeeper or janitor who comes to clean the spilled blood also must wear appropriate PPE (gloves, etc.). Any blood that might splash would be covered with clean toweling; and a disinfectant solution would be used to clean up any furnishings, the walls, and the floor. These work practice controls would kill any pathogens that might be present. Contaminated laundry would be placed in leakproof bags; this engineering control would prevent unprotected personnel from contacting potentially infectious blood. Similarly, contaminated disposable items (e.g., paper toweling to clean up, paper sheeting to cover examination beds) would be placed in a leakproof and properly labeled garbage container for disposal.

Required Elements of the Bloodborne Pathogens Standard

2.15

OSHA’s Bloodborne Pathogens Standard requires that employers develop an Exposure Control Plan (ECP) and provide a copy to employees on request. In addition, employers must provide training to employees on all of the following subjects:

- bloodborne diseases and how they are spread
- the ECP and how to obtain a copy
- specific engineering controls and work practices to limit exposure to bloodborne pathogens
- personal protective equipment
- hepatitis B vaccine, exposure evaluation, and follow-up
- responding to emergencies involving blood and other bodily fluids
- signs and labels to warn of potential hazards
The best way for employers to protect employees from bloodborne pathogens is through the use of engineering controls. Engineering controls eliminate hazards at their source. Examples of engineering controls include the use of needleless systems and special containers for used sharps. Engineering controls must be checked and maintained on a regular schedule to keep them in good working order.

New Technologies

Since the advent of the Bloodborne Pathogens Standard, there have been a number of technological advances in protecting employees against infections caused by needlestick and other sharps injuries. Examples of such advances include needleless systems and needles with sharps injury protection. OSHA regulations require your employer to update its Exposure Control Plan to include advanced technologies as needed for your protection.

Blunt-Tip Suture Needles

According to OSHA, sharp-tip suture needles are the leading source of percutaneous injuries to surgical personnel, causing as many as 77% of all such injuries. There is also a risk to patients who are then exposed to the blood of injured staff members. Suture needle injuries can occur when:

- needles are loaded or repositioned within the needle holder;
- needles are passed from one team member to another;
- one surgeon or assistant sews an opening, while another surgeon or assistant holds back other tissue;
- tissue is tied with the needle still attached or with the needle left on the operating field;
- needles are placed in overfilled sharps containers; or
- needles are placed in poorly located sharps containers.

Blunt-tip suture needles are an example of an engineering control device that can reduce percutaneous injuries. Although conventional needles may still be required to suture skin, bowel, and blood vessels when suture-less techniques should not be used, blunt-tip needles could be used in the suturing of muscle and fascia, which is when nearly 60% of suture needle injuries occur. OSHA encourages the use of blunt-tip suture needles whenever feasible and appropriate.
Catheter Securement Devices

Medical catheters are vital to modern health care. These flexible tubes can be inserted into a blood vessel to allow medication and fluids to be delivered or blood to be drawn; they can also be placed within the body to allow fluids to be drawn off. The placement of a catheter is typically accomplished using sharps. Hollow-bore needles are used for insertion of some types of catheters; solid needles are used to suture some types of catheters in place.

Once catheters are inserted, they have historically been sutured or taped in place. Both of these methods, but especially tape, can become insecure, causing the catheter to migrate or become dislodged. This can be dangerous to the patient, and it also increases the risk to the health care workers who have to place the new catheter.

To reduce the risk of bloodborne pathogens exposures during the placement and securing of catheters, OSHA recommends that employers switch from tape and sutures to the use of catheter securement devices. These devices use plastic retainers to hold the catheter and large adhesive pads to secure the catheter in place. Multiple studies have shown that catheter securement devices eliminate injuries due to suturing and greatly reduce injuries that occur when catheters must be restarted.

2.17 Sharps Risk Factors

According to the 2008 Study of Nurses’ Views on Workplace Safety and Needlestick Injuries conducted by the American Nurses’ Association, 64% of nurses report having been accidentally stuck with a needle while working. That survey, however, accounts only for nurses, leaving out emergency medical workers, phlebotomists, dental workers, and other health care personnel who use sharps for direct patient care. Of the nurses who reported needlesticks, nearly three-quarters reported that they had been stuck by a contaminated needle.

According to the Centers for Disease Control and Prevention (CDC), needlesticks often occur because of one of the following reasons:

- The health care worker was withdrawing a needle from a patient. Health care workers who attend to the bleeding patient while disposing of the needle expose themselves to an even higher risk.
- The patient moved unexpectedly.
• The health care worker withdrew the needle from the rubber stopper of a vacuum tube and was jabbed when the needle rebounded.
• The worker was recapping a needle. Thanks to safer needle design, this is less common than it once was.
• The worker was trying to dispose of a sharp in an overfilled sharps disposal container.
• Workers were passing contaminated sharps from hand to hand or carrying them between locations.
• Workers collided while one was holding a contaminated sharp.
• Workers were decontaminating or processing used equipment.
• Sharps were improperly disposed of (for example, left in laundry, pockets, or trash cans).

Some types of sharps are more likely to cause injury or transmit disease because of the way they are designed. These include the following:

• hollow-bore needles
• devices that must be taken apart or manipulated by the health care worker
• syringes that retain an exposed needle after use
• needles attached to tubing

Workers using these types of needles or performing the types of operations described above should be aware that they are at high risk of sharps injuries, and should be sure to observe the safe injection practices discussed in Section 2.18.

2.18 Specific Controls: Sharps and Sharps Containers

All sharps must be disposed of in special containers that are:

• **labeled** with the universal biohazard symbol and the word “Biohazard”;
• **readily accessible** to employees (located as close as possible to the area where sharps are used);
• **puncture resistant**;
• **leakproof** on their sides and bottom;
• **kept upright** throughout use;
• **replaced routinely**; and
• **NOT** allowed to be **overfilled**.
Transporting Sharps Disposal Containers

If the sharps containers will be transported from one place to another—for example, sharps containers mounted on crash carts that are not in use while the cart is in transit—then you must protect yourself against contaminated sharps spilling out of the containers. Because the Bloodborne Pathogens Standard does not permit containers that hold contaminated sharps to be reopened once they are closed, any container that you must transport must be equipped with a temporary barrier, such as counterbalanced doors or closable flaps, that will protect you while the container is in transit. Containers with these features are commercially available.

Proper Handling of Contaminated Sharps

Follow these rules:

• Do not bend, shear, break, remove, or recap any used needle or sharp.
• Dispose of used sharps in the proper containers.
• Do not open, empty, or clean reusable containers in a way that would expose employees to the risk of being cut or injured.

Additional Precautions

Be especially careful not to overfill sharps containers. Hundreds of workers throughout the country have been injured while attempting to put sharps into overstuffed containers. To help you avoid overfilling containers, your employer should:

• purchase containers with transparent windows that allow you to see if they are filled; or
• place containers at a height where you can visually check them before attempting to insert any additional sharps.

Employee Input on Controls for Contaminated Sharps

In addition, employers must solicit the input of non-managerial employees—people who are involved in direct patient care—when evaluating and selecting new protective devices and work practice controls for contaminated sharps. In a smaller workplace, this may mean that all employees are invited to comment; in a larger workplace with many employees, it may mean that some are consulted on behalf of all, usually as part of a committee or workgroup.
CDC Safe Injection Practices

Injecting a patient is a critical hazard-control point for health care workers and patients alike, so bloodborne pathogens precautions include safe injection practices when necessary. These recommendations, which are based on recommendations published by the Centers for Disease Control and Prevention (CDC) in its *Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007*, are not explicitly part of OSHA’s Bloodborne Pathogens Standard, although they are a standard part of infection control procedures in many health care facilities. These recommendations are designed to prevent the transmission of infectious diseases between patients as well as between patients and health care workers. They apply to the use of needles, cannulas that replace needles, and intravenous delivery systems, where applicable.

The CDC’s recommended safe injection practices are as follows:

- **The aseptic technique** should be used to prevent contamination of sterile injection equipment.
- **Single-use items** include needles, cannulae, syringes, and fluid infusion and administration sets. Medications should not be administered to multiple patients from a single syringe, even if the needle or cannula on the syringe is changed. Needles, cannulae, and syringes should not be reused for another patient, nor to access a medication or solution that might be used for a subsequent patient. A syringe, needle, or cannula should be considered contaminated once it has been used to enter or connect to a patient’s intravenous infusion bag or administration set. Fluid infusion and administration sets (i.e., intravenous bags, tubing, and connectors) should be used for one patient only and disposed of after use.
- **Parenteral medications** should be administered from single-dose vials whenever possible.
- **Single-dose vials and ampules** should not be used to administer medications to multiple patients, nor should leftover contents be combined for later use.
- **Multi-dose vials** should be accessed only with sterile needles, cannulae, and syringes.
- **Multi-dose vials** should be stored in accordance with manufacturer’s directions. Multi-dose vials should not be kept in the immediate patient treatment area. Any vials whose sterility is compromised or questionable should be discarded.
- **Bags or bottles of intravenous solution** should not be used as a common source of supply for multiple patients.
- Personnel should wear **surgical masks** when performing special lumbar puncture procedures that involve placing a catheter or injecting material into the spinal canal or subdural space (i.e., during myelograms, lumbar puncture, and spinal or epidural anesthesia).
Work Practice Controls

Work practice controls include handwashing, minimizing spraying or splashing of blood, preventing needlesticks, and wearing personal protective equipment. Work practice controls must be strictly followed.

**Handwashing**

After any hand contact with blood or other potentially infectious materials (OPIM), immediately remove your gloves or other protective equipment and wash your hands. If soap and running water are unavailable, antiseptic cleansers must be provided. When antiseptic cleansers are used, you must still wash with soap and water as soon as possible.

**Other Work Practice Controls**

Ensure that you do the following:

- **Food and Cosmetics**: Do not eat, drink, apply cosmetics or lip balm, or handle contact lenses in areas where there is a potential for exposure. An exception applies for hand lotion.
- **Food Storage**: Do not store food or drink in refrigerators, freezers, shelves, or cabinets or on countertops where blood is stored or where blood or OPIM may be present.
- **Contaminated Work Clothes**: Remove any contaminated clothing before leaving a work area. This is to minimize any possible spread of contamination.
- **Spraying and Splashing Fluids**: Always handle blood and OPIM in a way that minimizes spraying or splashing.
- **Leakproof Containers**: Place blood or fluid specimens in containers that do not leak during handling, storage, or shipping.
- **Clean-Up Procedures**: Always wear appropriate personal protective equipment (gloves, etc.) when cleaning up spilled blood or OPIM. Cover the blood or OPIM with clean toweling, and use a disinfectant solution to clean up any contaminated furnishings, walls, floors, other surfaces, and equipment.
2.20 Personal Protective Equipment (PPE)

Employers must provide, and employees must use, personal protective equipment (PPE) whenever there is the possibility of exposure to blood or other bodily fluids. The required level of PPE is whatever it takes to stop exposure to blood or other potentially infectious materials (OPIM), whether that is gloves, goggles, a half-face mask, a full-body gown, or something else, from contacting skin, mucous membranes, or street clothes.

PPE must be:

- accessible;
- available in appropriate sizes;
- kept clean and in good repair; and
- capable of preventing blood and OPIM from passing through to the employee’s clothes, skin, eyes, or mouth.

Gloves

Gloves are probably the most common type of PPE to prevent exposure to blood and OPIM. Single-use gloves must be replaced as soon as possible after they are contaminated or if they become torn or punctured. These gloves should never be washed for reuse.

Gloves protect workers against bloodborne pathogens both by keeping a workers’ skin from coming into contact with a patient’s blood or OPIM and by reducing the amount of contamination in the event of a needlestick. When a contaminated needle or other sharp passes through the glove, some of the contamination is rubbed off onto the glove material, so that less penetrates the skin. So even if you do suffer a needlestick, your gloves may help to protect you against infection.

Many gloves are made from natural rubber latex, which comes from the rubber tree. While frequent hand washing, drying, and glove usage can cause inflamed, itchy, or cracked skin, a minority of the workforce has a true allergy to latex products. The allergic reaction usually involves a rash that causes skin irritation and discomfort, as well as hives, headaches, sneezing, and itchy eyes. Repeated exposure to latex products can cause the allergy to worsen. In extreme cases, a potentially life-threatening condition can occur. If you have a reaction to latex gloves, however mild, notify your employer and seek guidance from a physician or other health care professional. Alternative materials, such as vinyl or nitrile, generally may be substituted for latex.
Double-Gloving

Gloves are essential in the prevention of bloodborne pathogens exposures, but they are not 100% reliable. Often, a worker may not realize the glove has failed until he or she removes the glove and sees blood on his or her skin. This is especially common in surgical environments, where large amounts of blood mingle freely with sharps in the presence of health care workers’ hands. As many as half of all surgeries result in health care worker exposure to blood through sharps injury, barrier failure, or parenteral exposure.

One way of reducing these exposures that has been shown to be reliable is the practice of double-gloving. With some surgeons reporting glove perforation rates as high as 61%, and 83% of these incidents going unnoticed until after surgery, the risk to surgeons, first assistants, and others in the surgical environment can be significant. Double-gloving, which is the practice of wearing two pairs of surgical gloves, reduces these exposure incidents by as much as 87% in cases where the outer glove fails or is punctured. In addition, when a solid suture needle passes through two layers of gloving, the amount of blood on the needle is reduced by up to 95%, so that even if a needlestick occurs, the risk of disease transmission is drastically reduced.

One problem reported with double-gloving is a lack of worker acceptance. Studies of the practice have found that physicians initially report reduced dexterity and sensation while wearing two pairs of gloves, which increases resistance to the practice. However, the same studies found that over a period of four months, physicians who wore two pairs of gloves were able to adapt to them.

In any environment where prolonged contact with blood and other potentially infectious materials is common, especially in the presence of sharps, double-gloving can effectively reduce exposures.

Eye Protection

Eye protection is required whenever the mucous membranes of the eye may be splashed or sprayed by blood or OPIM. Examples of eye protection include glasses with solid side shields, goggles, or chin-length face shields.
Labels are required on the following:

- regulated waste
- laundry bags (unless universal precautions are observed)
- refrigerators or freezers that are used to store blood or other potentially infectious materials (OPIM)
- bags or containers used to store, dispose of, transport, or ship blood or OPIM
- contaminated equipment that is to be serviced or shipped

All warning labels must bear the biohazard legend, be printed in fluorescent orange or orange-red, and have lettering of a contrasting color. Labels must be placed as close to the container as possible. Red bags or containers may be substituted for labels.

### 2.22 Housekeeping Techniques

To avoid occupational exposure to bloodborne pathogens, the following housekeeping rules must be followed:

- **Adhere to the cleaning schedule** that provides for decontamination and proper disposal of used sharps.
- **Clean and decontaminate** equipment and work areas as soon as possible after contact with any blood or other potentially infectious materials.
- **Apply a solution that contains at least 10% bleach** to any contaminated site. This concentration should destroy HBV and HIV.
- **Wait at least 15 minutes** before wiping the bleach solution up after pouring it on the contaminated site. A shorter period may not accomplish the decontamination.
- **Remove and replace protective coverings:**
  - when visibly contaminated, and
  - at the end of each shift (if there is a possibility of contamination during the shift).
- **Handle contaminated laundry** as little as possible. Contaminated laundry must be bagged.
- **Place** any wet laundry in leakproof bags.
- **Wear gloves** when handling contaminated laundry.
• **Place regulated waste in containers** that are:
  - closable,
  - constructed to contain all contents and to prevent leakage during handling or shipping,
  - properly labeled and color-coded, and
  - closed before removal to prevent spillage or protrusion during handling, storage, transport, or shipping.
• **Use a secondary container** that is leakproof, color-coded, and closable if the primary container leaks.

### 2.23 Hepatitis B Vaccine

A vaccine is available for one of the most common bloodborne pathogens, the hepatitis B virus (HBV). The employer must provide HBV vaccine at no cost to all employees who might reasonably be at risk of exposure while on the job. “At no cost” means that you may use your health care insurance to pay for the vaccination series only if your employer pays all of the cost of the health insurance and you do not have to pay any deductible, co-payment, or other expenses.

**When and How Do I Get It?**

Generally speaking, the vaccination must be offered within 10 working days of an employee’s initial job assignment, after completion of appropriate training. Employees who perform first aid only as part of their secondary job duties do not need to be offered the vaccination in advance, but must instead be offered the vaccination within 24 hours after an exposure incident. Vaccination after exposure can help to prevent infection, but is not nearly as effective as vaccination in advance.

**Can I Change My Mind?**

Eligible employees who do not wish to be vaccinated must sign a declination form. Employees who later change their minds still have the right to receive the vaccination, at no cost, and at a time and place that is convenient to the employee.
2.24 Exposure Incident

An “exposure incident” has occurred when blood or other potentially infectious materials (OPIM) come into contact with mucous membranes (e.g., the eye or the inside of the nose or mouth), broken skin, or any internal tissues (as with a needlestick).

If you suffer an exposure incident, immediately do the following:

- **Via Needlestick or Open Skin**: Wash the area with soap and water. Do not use bleach or other surface disinfectants. There is no evidence that using antiseptics or squeezing the wound will reduce your risk of disease.
- **Via the Nose, Mouth, or Skin**: Flush the area with water.
- **Via the Eyes**: Irrigate the eyes with clean water, saline, or sterile irrigants.

It is critical that any exposure incident be reported to your employer immediately! Post-exposure treatment that can often prevent HIV and HBV infection is available. Treatment for HCV infection is now also available, but employees must be referred to a doctor as soon as possible after an exposure incident.

2.25 Medical Evaluation

When an exposure incident is reported, the employer will arrange for an immediate and confidential medical evaluation. The medical evaluation must:

- document how the exposure occurred;
- identify and test the source individual, if feasible;
- test the exposed employee’s blood, if consent is obtained;
- provide counseling; and
- evaluate any reported illness.

The medical professional doing the exposure assessment must be provided with all data needed to complete the evaluation.

2.26 Post-Exposure Follow-Up

After being exposed to bloodborne pathogens or other potentially infectious materials (OPIM), an employee generally has the right to have the source documented and to receive medical counseling and evaluation.
Source Documentation

For every exposure incident, the employer must identify and document the source individual (the person whose blood or other potentially infectious materials were involved) unless:

- identification is not feasible; or
- identification is prohibited under state or local law.

In addition, the employer must test the source individual’s blood to determine the presence of human immunodeficiency virus (HIV) or hepatitis B virus (HBV) if:

- the source individual is available; and
- consent either is given (if required under state law) or is not legally necessary.

Employee Rights and Evaluation

After an exposure incident, the employee who suffered the occupational exposure has the right to receive all of the following:

- testing of his or her blood for HIV or HBV infection, provided that the employee consents to such collection and testing
- post-exposure counseling, regardless of the employee’s decision to accept blood testing
- post-exposure medical evaluation by a health care professional

The health care professional’s written opinion for HBV must be limited to whether the HBV vaccination is needed and whether the employee received the vaccination. All other findings or diagnoses must be kept confidential and not included in the written report. Within 15 days of completion of the evaluation, the employer must obtain and provide a copy of the health care professional’s written report to the employee.

2.27 Recordkeeping

For all employees with occupational exposure, records must be maintained for the period of their employment plus 30 years. These records are confidential and can be released only if the employee consents or if required by law. Each record must include the following:

- name and Social Security number of the exposed employee
- hepatitis B vaccination status
results of all exams, testing, and follow-up procedures
• a copy of the health care professional’s opinion
• a copy of information provided to the health care professional

Sharps Injury Log

Your employer, unless it has 10 or fewer employees or is otherwise exempt from OSHA’s
general recordkeeping requirements, must keep a Sharps Injury Log. Every “percutaneous
injury” (i.e., piercing, tearing, or breaking the skin) involving a contaminated sharp must
be recorded in the Log. At a minimum, the Log must contain the following information:

• the type and brand of device involved in the incident
• the department or work area where the exposure incident took place
• an explanation of how the incident occurred

HIV and HBV Research Laboratories
and Production Facilities

2.28

Note: This section only applies to research laboratories and production facilities engaged
in the culture, production, concentration, experimentation, and manipulation of human
immunodeficiency virus (HIV) and hepatitis B virus (HBV). It does not apply to clinical
or diagnostic laboratories engaged solely in the analysis of blood, tissues, or organs.

Laboratories where bloodborne virus research is conducted are subject to additional
requirements under the Bloodborne Pathogens Standard (see Section 2.03).

Facility Requirements

Facilities in which HIV or HBV research is conducted must meet certain requirements.
An employee who recognizes a problem, or believes there might be a problem, with any
of the safety requirements listed below should immediately bring it to the attention of
the employer, so that it can be promptly addressed and corrected.

Each facility must have the following:

• Handwashing Areas: A handwashing sink must be located near the exit from each
  work area. The sink must be foot, elbow, or automatically operated.
• Eyewash: An eyewash must be located within each work area.
• **Autoclaves**: An autoclave must be located within or as near as possible to the work area, so that regulated waste can be decontaminated.

• **Separated Work Areas**: Areas where research is conducted must be physically separate from any area that is open to unrestricted access and traffic flow. The minimum allowable separation requires passage through two sets of doors to enter the work area.

• **Self-Closing Access Doors**: Access doors to all work areas must be self-closing.

• **Water-Resistant Surfaces**: All doors, floors, walls, and ceilings must be water-resistant, and openings must be sealed, so that the work area can be easily cleaned.

• **Negative-Pressure Ventilation**: The ventilation system must be designed to pull air **into** the work area through the entry area. And, it must exhaust workplace air, without recirculating it, to the outside of the building **away from** occupied areas and building air intakes.

• **Containment Equipment**: Any activities that might expose employees to droplets, splashes, spills, or aerosols containing infectious material must be conducted within biological safety cabinets or other physical containment equipment. This kind of work may not be performed on an open bench. In addition to biological safety cabinets, containment equipment includes centrifuge safety cups, sealed centrifuge rotors, and containment caging for animals.

• **Vacuum Lines**: Vacuum lines in the work area must have liquid disinfectant traps and high-efficiency particulate air (HEPA) filters. These traps and filters must be checked routinely and maintained or replaced as needed.

• **Warning Signs**: Biohazard warning signs must be posted on all access doors to work areas where potentially infectious materials or infected animals are present. The sign must have the biohazard symbol, and a caption:

```
BIOHAZARD
(name of the infectious agent)
(name and telephone number of the laboratory
director or other responsible person)
```

![Biohazard Symbol](image)
Work Practices

Employees who work in HIV/HBV research facilities must use protective work practices to prevent exposure to the viruses with which they work. Work practices specified by OSHA include the following:

- **Closed Doors:** Laboratory doors must be kept closed when biohazardous work is being performed.
- **Waste Disposal:** All regulated waste must either be incinerated or decontaminated in such a way that all bloodborne pathogens are destroyed (e.g., by autoclaving). Regulated wastes include the following:
  - liquid or semi-liquid blood or other potentially infectious materials (OPIM)
  - contaminated items that would release blood or OPIM in a liquid or semi-liquid state if compressed
  - items that are caked with dried blood or OPIM and are capable of releasing these materials during handling
  - contaminated sharps
  - pathological and microbiological wastes containing blood or OPIM
- **Waste Packaging:** Waste materials that will be decontaminated at a site away from the work area must be protectively packaged in durable, leakproof, labeled or color-coded containers that are closed before being removed from the work area.
- **Limited Access to Work Areas:** Only individuals who have been advised of the potential biohazard, who meet specific entry requirements, and who comply with all entry and exit procedures are allowed to enter work areas and animal rooms.
- **Spill Cleanup:** All spills must be contained and cleaned up **immediately** by trained personnel. If a spill results in an exposure incident, the incident must be immediately reported to the laboratory director or other responsible person.
- **Biosafety Manual:** All HIV and HBV research laboratories must prepare a biosafety manual, which must be reviewed and updated annually. Laboratory personnel are required to read the instructions in the manual and follow them.
- **Hypodermic Needles and Syringes:** In a research laboratory, hypodermic needles and syringes may be used only for parenteral injection and aspiration of fluids from laboratory animals and diaphragm bottles. Needle-locking syringes or disposable syringe-needle units **must** be used for the injection or aspiration of other potentially infectious materials.

Personal Protective Equipment

Protective equipment and clothing are required for employees in HIV and HBV research laboratories, as follows:
• **Protective Clothing:** While in the work area and animal rooms, employees must wear laboratory coats, gowns, smocks, uniforms, or other appropriate protective clothing. This clothing must not be worn outside of the work area, and must be decontaminated before being laundered.

• **Gloves:** Employees must be especially careful to avoid skin contact with blood or OPIMs. Gloves must be worn when handling infected animals, and when making unavoidable hand contact with blood or OPIMs.

### 2.29 Working Safely

Remember the key elements of a bloodborne pathogens program. If you are a health care or first aid provider, maintenance or janitorial person responsible for cleaning up potentially infectious materials, or any other employee who might be exposed to blood or other potentially infectious materials, then you need to know about the following:

- the written Exposure Control Plan
- the training that must be provided to you
- engineering controls and work practices to minimize chances of exposure
- personal protective equipment to provide barriers to exposure
- housekeeping techniques
- the hepatitis B vaccine
- the use of labeling for contaminated waste
- steps to be taken in the event of an exposure incident