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Bloodborne Pathogens: HBV, HCV and HIV

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Course Summary

This course explores acetaminophen use and overuse with a focus on the signs and symptoms of liver injury and adverse effects. It also discusses FDA recommendations for various ages and at-risk populations.

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Criteria for Successful Completion

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Course Objectives

When you finish this course, you will be able to:

1. Explain the hazards of bloodborne pathogens (HBV, HCV, HIV) in the transmission of certain chronic and life-threatening diseases and relate both OSHA and state laws designed to control them.
2. Outline the actions employers are required by OSHA to take to protect their employees from bloodborne pathogens in the workplace.
3. Explain safe handling and disposal of sharps.
4. Compare and contrast Universal and Standard Precautions and describe other work place practices to control pathogen contamination.
5. Review the selection and use of personal protective equipment.
6. Summarize the required training of healthcare personnel and identify the common symbol and color of hazardous signs.
7. Outline the OSHA requirements for housekeeping, regulated waste, soiled laundry, and vaccination against hepatitis B.
8. Discuss the procedure for promptly reporting an exposure incident.

1. The Hazards of Bloodborne Pathogens

Nurse Jennifer was struggling to keep up while working a busy shift on her med-surg unit. A colleague had called in sick and the remaining nurses had to split his assignment of patients, with the result that Jennifer's patient ratio increased by one. Then one patient in isolation took a downward trend and needed a blood transfusion; another patient needed to be started on Lovenox injections as they tapered him off his heparin drip; another was returning from surgery and put on total parenteral nutrition (TPN), requiring blood glucose monitoring every 4 hours.

In addition to these patients, she had to admit a patient in diabetic ketoacidosis (DKA) with a nonhealing foot wound that required laboratory tests. Another patient was in respiratory distress with worsening COPD and concomitant Hepatitis C, and needed lab work. Each one of these patients would require interventions with needles.

Which patient would be the greatest risk of bloodborne pathogens? Is it the obvious patient—or someone else?

In the rush to obtain a laboratory specimen from the DKA patient, Jennifer accidentally stuck herself with the needle after the withdraw from the vein of her patient. Is Jennifer at risk? What is she supposed to do now? Who would she report to, if at all?

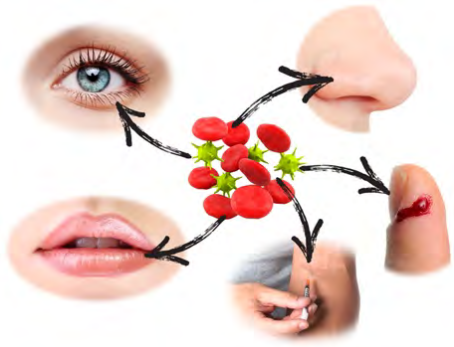
If you were Jennifer, what would you do? Do you know the risk factors, possible pathogens, process for reporting, and responsibility of her employer and herself? For healthcare workers, not becoming a "host to the pathogen party," means being prepared, knowledgeable and proactive.

You came to the right place to find out.

Defining the Danger

Bloodborne pathogens are infectious organisms in blood and other body fluids that can cause chronic and life-threatening disease in humans. The main bloodborne pathogens of concern are hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV), the organism that causes AIDS. Transmission of any of these can be through open sores, cuts, abrasions, damaged skin, or mucous membranes of the eyes, nose, mouth, vagina or anus.

Transmission Ports for Bloodborne Pathogens



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For healthcare workers, hepatitis B and C are the most common and contagious in the medical settings.

The Science

Hepatitis A and Hepatitis B

There are five main types of hepatitis, and all create inflammation and damage to the liver. Clinical symptoms can be puzzling because they may be absent, mild to severe, acute, or chronic. The types of hepatitis are:

- **Hepatitis A** (HAV): spread through the anus via feces. Think A for anus.
- **Hepatitis B** (HBV): spread through blood and body fluids. Think B for blood.
- **Hepatitis C** (HCV): spread through body fluid contact. Think C for contact fluids.
- **Hepatitis D** (HDV): a variation if you already have HBV. The HBV vaccine protects against HDV. Think “Double Trouble” from HBV.
- **Hepatitis E** (HEV): transmitted via food or water. A vaccine exists but not globally available yet. Think E for environmental.

Recent reports of viral hepatitis A (HAV) and B (HBV) outbreaks in the United States demonstrate the continued risk posed by lapses in infection-control practices, particularly in healthcare settings (Dan, 2017). Each week the Centers of Disease Control and Prevention (CDC) receive electronic reports from all 50 states about viral hepatitis cases in their states (CDC, 2019). Because many people infected with viral hepatitis are asymptomatic, many cases are not reported, which means current statistics are actually underestimated (CDC, 2016).

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HAV is a virus that is transmitted generally from fecal matter into food or water and HBV is transmitted by percutaneous or mucosal exposure to the blood or body fluids of an infected person. It is known to survive in dried blood for up to 7 days. Most often HBV is transmitted through injection-drug use, from sexual contact with an infected person, or from an infected mother to her newborn during childbirth. Transmission of HBV also can occur among people such as healthcare workers who have prolonged but nonsexual interpersonal contact with someone who is HBV-infected (CDC, 2016).

Infection may be acute—and later resolved—or it may become chronic, carried for a prolonged period, or for life. Infection may be completely free of symptoms, produce mild or moderate illness, or be rapidly fatal. Serious complications such as cirrhosis and/or liver cancer are more likely to develop in chronically infected people.

Incidence and Prevalence

In the United States, approximately 2.2 million people have chronic HBV infection and become sources for HBV transmission to others. Because of the mandatory HBV vaccine initiated in 2006, the incidence of acute hepatitis B among native-born children has declined steadily (CDC, 2016).

Unfortunately, the incidence of HBV in the adult population in the United States has been climbing, and the largest population at risk occurs in immigrant and non-nativeborn people. Three quarters of chronic HBV infections are among people born outside of the United States, 58% of whom are from Asian countries (Kowdley et al., 2012).

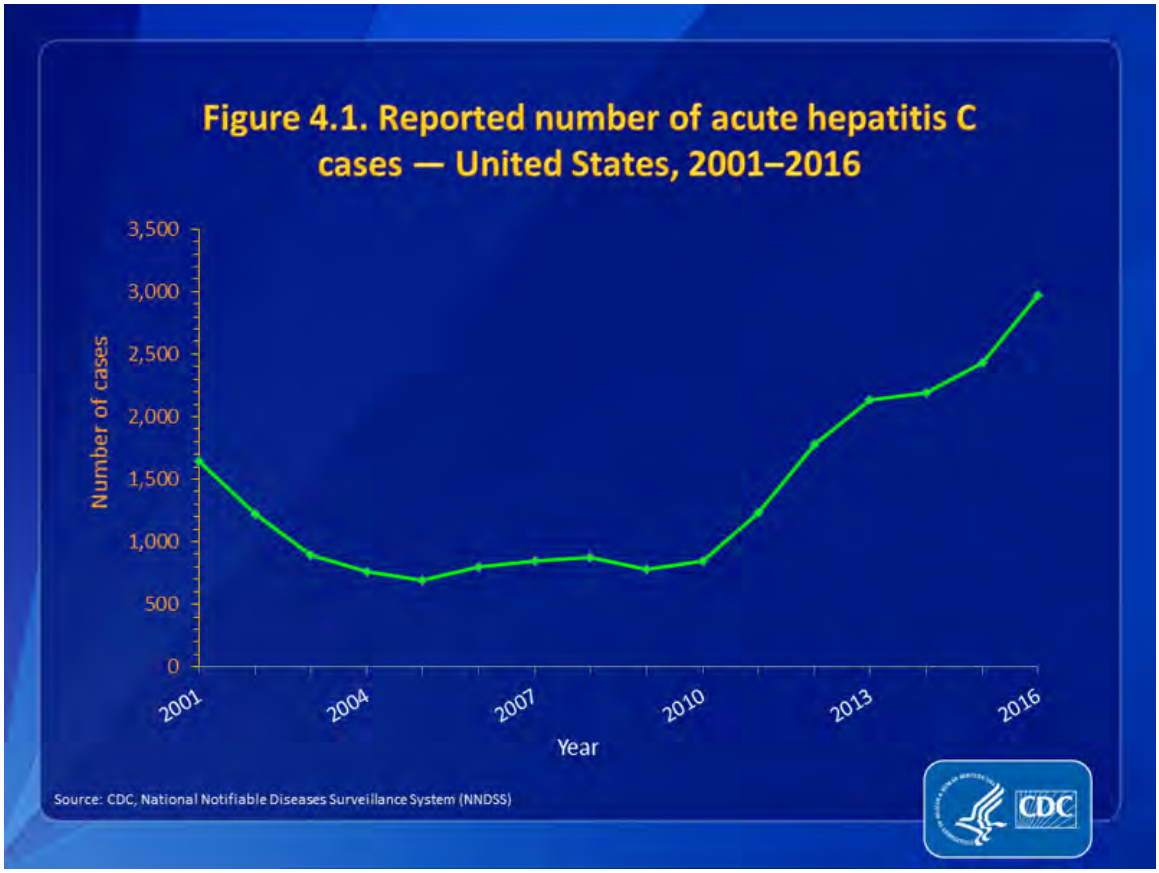


Image Source: CDC, 2016.

Risk factors for HAV include behaviors such as people:

- Who work with food and do not thoroughly wash their hands after a bowel movement and then carry infected fecal material on their hands during food preparation.

Risk factors for HBV include behaviors such as people:

- Who share contaminated needles
- Who have received contaminated blood products (since new screening procedures were implemented in 1992, this is a rare occurrence in the United States)
- Who get body piercings or tattoos with instruments that have not been properly sterilized

- Who work in healthcare and may be stuck accidentally with contaminated needles
- Are living with HIV
- Are newborns whose mothers are HCV-positive

Symptoms, which mainly represent liver damage, can include:

- Yellowing skin and eyes (jaundice)
- Dark urine
- Light-colored stool
- Nausea, vomiting, abdominal pain, and discomfort
- Loss of appetite
- Extreme fatigue
- Flu-like symptoms

Diagnostic criteria include:

- Elevated serum alanine aminotransferase (ALT) > 100 IU/L
- Hepatitis B surface antigen (HBsAg) positive, or nucleic acid test for HBV DNA
- Immunoglobulin M (IgM) antibody to hepatitis B core antigen (IgM anti-HBc) positive
- HBeAg positive 2 times tested 6 months apart

Treatment of HBV includes palliative care for the resultant nausea, vomiting, and fatigue. Since publication of the 2008 recommendations, treatment options for HBV infection have expanded. Several drugs are now administered **orally**, which is a major advancement for this infection. This leads to viral suppression in 90% of patients taking one of these new oral medications. There is currently no cure but the HBV direct-acting antivirals available are interferon, peginterferon, and ribavirin (AASLD, 2019).

Effective hepatitis B vaccines have been available in the United States since 1981. In addition to hepatitis B vaccination, efforts have been made to improve care and treatment for people living with hepatitis B. In the United States, as many as 2.2 million people are estimated to be infected with HBV, most of whom are unaware of their infection status, and 3.5 million are infected with HCV (CDC, 2016).

To improve health outcomes for these people, CDC issued recommendations in 2008 to guide hepatitis B testing and public health management of people with chronic hepatitis B infection. These guidelines stress the need for testing people at high risk, conducting contact management, educating patients, and administering FDA-approved therapies for treating hepatitis B (CDC, 2008).

The risk of transmission of HBV following a positive needle stick varies from 6% to 30%, depending on the degree of infectivity of the source individual. Healthcare workers who have received hepatitis B vaccine and have developed immunity to the virus are at minimal risk for infection.

For an unvaccinated person, the risk from a single needle stick or a cut exposure to HBV-infected blood ranges from 6% to 30% and depends on the hepatitis B e-antigen (HBeAg) status of the source individual. Individuals who are both hepatitis B surface antigen (HBsAg)-positive and HBeAg-positive have more virus in their blood and are more likely to transmit HBV (CDC, 2016).

Hepatitis C

[Unless otherwise noted, most of the material on Hepatitis C in this section is from Hofmesiter et al., 2018.]

Hepatitis C virus (HCV) is transmitted primarily through percutaneous exposure, most commonly by injection-drug use. It causes damage to the liver. Currently, there is no vaccine for hepatitis C. The best way to prevent hepatitis C is by avoiding behaviors that can spread the disease, notably the use of injecting drugs. People newly infected with HCV are usually asymptomatic, so the acute phase is rarely identified or reported. With an estimated 3.5 million chronically infected people nationwide, **HCV infection is the most common bloodborne infection in the United States** (Healthline, 2019; CDC, 2016).

Incidence and Prevalence

Chronic hepatitis C is a serious disease than can result in long-term health problems, even death. For some people, hepatitis C is a short-term illness, but for 70 % to 85% of people infected, it becomes chronic. Conversely, about 15% to 25% of people clear the virus from their bodies without treatment; the reasons for this are not well known. The majority of infected individuals may not be aware of their infection because they are not clinically ill.

Chronic HCV infection is the leading indication for liver transplants in the United States. Most people with chronic HCV infection are asymptomatic; however, many have chronic liver disease, which can range from mild to severe, including cirrhosis and liver cancer. Chronic liver disease in HCV-infected people is usually insidious, progressing slowly without any signs or symptoms for several decades.

Based on limited studies, the estimated risk for infection after a needle stick or open wound exposure to HCV-infected blood is approximately 1.8%, or 1 in 50 (CDC, 2016). The risk following a blood splash to mucous membranes is unknown but is believed to be very small; however, HCV infection from such an exposure has been reported.

There is no vaccine or post exposure prophylaxis against HCV, although research is under way. Prevention of exposure is the only protection against infection. New treatments are being offered; see below.

According to the World Health Organization, HCV can improve without treatment within six months in up to 45% of cases, however 55% will develop chronic HCV infection and liver damage. Compared to the 3 million in the United States currently diagnosed with chronic HCV, an estimated 71 million people worldwide are living with chronic HCV and up to 500,000 die annually from HCV-related complications (Healthline, 2019).

Risk factors include behaviors such as those of people who:

- Share contaminated needles
- Have received contaminated blood products (since new screening procedures were implemented in 1992, this is a rare occurrence in the united states)
- Get body piercings or tattoos with instruments that have not been properly sterilized
- Work in healthcare and may be accidentally stuck with contaminated needles
- Are living with HIV
- Are newborns whose mothers are HCV-positive

Symptoms, which mainly represent liver damage, can include:

- Yellowing skin and eyes (jaundice)
- Dark urine
- Light-colored stool
- Nausea, vomiting, abdominal pain, and discomfort
- Loss of appetite
- Extreme fatigue

Diagnostic criteria include:

- Elevated serum alanine aminotransferase (ALT) > 100 IU/L
- Hepatitis C surface antigen (HCsAg) positive, or nucleic acid test for HCV DNA
- Immunoglobulin M (IgM) antibody to hepatitis C core antigen (IgM anti-HCc) positive
- HCeAg positive 2 times tested 6 months apart

Treatment for Acute Hepatitis C

New treatment guidelines recommend no treatment of acute hepatitis C. Patients with acute HCV infection should be followed and only considered for treatment if HCV RNA persists after 6 months.

Treatment for Chronic Hepatitis C

The treatment for hepatitis C virus (HCV) infection has evolved substantially since the introduction of highly effective HCV protease inhibitor therapies in 2011. Since that time, new drugs with different mechanisms of action have become, and continue to become, available.

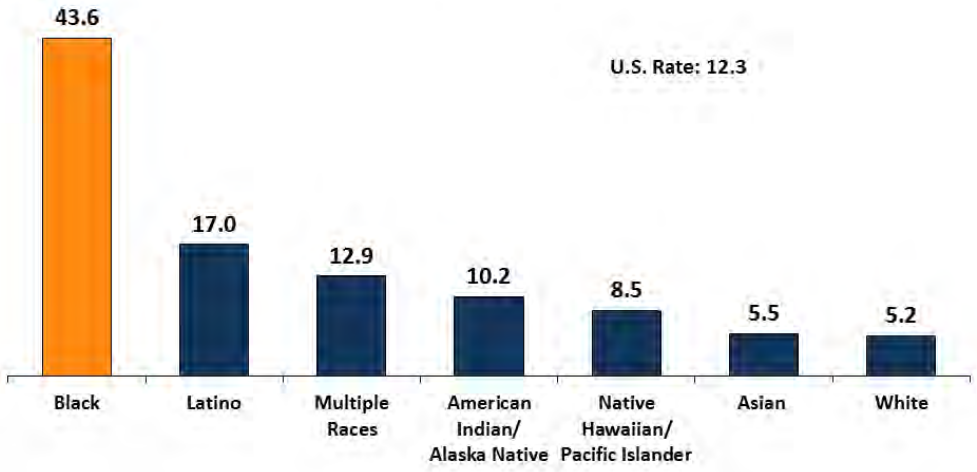
Currently available therapies can achieve sustained virologic response (SVR) defined as the absence of detectable virus 12 weeks after completion of treatment; an SVR is indicative of a cure of HCV infection. Over 90% of HCV-infected individuals can be cured of HCV infection regardless of HCV genotype, with 8 to 12 weeks of oral therapy.

HIV

Human immunodeficiency virus (HIV) is the virus that causes AIDS (acquired immune deficiency syndrome), which was first identified in 1981. For an infected individual, many years may pass between the time of infection and symptoms of illness begin or are identified. Individuals who have the virus but are not yet sick have no symptoms and many do not know they are infected. Medications can slow the course of the disease, and there are medications that can be taken after exposure to reduce the likelihood of post exposure infection (PEP).

Figure 2

Rates of New HIV Diagnoses per 100,000, by Race/Ethnicity, 2016



NOTES: HIV diagnosis data are preliminary estimates and do not include U.S. dependent areas.
SOURCE: CDC. HIV Surveillance Report, Diagnoses of HIV Infection in the United States and Dependent Areas, 2016, Vol. 28: November 2017.

Source: CDC, 2017.

Incidence and Prevalence

The average risk for HIV infection after a needle stick or laceration exposure to HIV-infected blood is 0.3% (about 1 in 300). Statistically, 99.7% of needle stick/cut exposures to HIV-contaminated blood do not lead to infection. The risk after exposure of the eye, nose, or mouth to HIV-infected blood is estimated to average 1 in 1000 (CDC, 2016). These are encouraging statistics—unless you are the one. The risk is low, but it is not zero.

Risk factors for HIV include the same ones as for HAV, HBV, and HCV, and include those:

- Homosexual sexual activities of anal/oral intercourse with someone infected
- Heterosexual sexual activities of anal/oral intercourse with someone infected
- Who share contaminated needles
- Who have received contaminated blood products (since new screening procedures were implemented in 1992, this is a rare occurrence in the United States)
- Who get body piercings or tattoos with instruments that have not been properly sterilized
- Who work in healthcare and may be accidentally stuck with contaminated needles
- Newborns whose mothers are HIV-positive

Symptoms are similar to illnesses caused by other viral infections, and can include:

- Nausea, vomiting, abdominal pain, and discomfort
- Loss of appetite
- Extreme fatigue
- Weight loss
- Frequent fever and sweats
- Lymph node enlargement
- Yeast infections, skin irritations and rashes and/or flaky and itchy skin
- diarrhea

Diagnostic criteria for HIV Positive diagnosis include:

- ELISA (enzyme-linked immunosorbent assay) test, which measures antibodies against HIV)
- Western Blot test: used to confirm positive ELISA test
- Saliva tests. A cotton pad is used to obtain saliva from the inside oral cheek. Must be later confirmed with blood test.
- Viral Load test. This test measures the amount of HIV in your blood.
- VDRL (venereal disease research laboratory) and rapid plasma regain (RPR)

Diagnostic criteria for AIDS Positive diagnosis include:

- AIDS-defining condition with CD4 count less than 200 cell/mm3

Treatment of HIV/AIDS includes a cocktail of highly active anti-retroviral medications (HAART) and education and prevention strategies for opportunistic infections (Cash & Glass, 2017). There is no-known cure for HIV/AIDS and it is therefore a fatal disease.

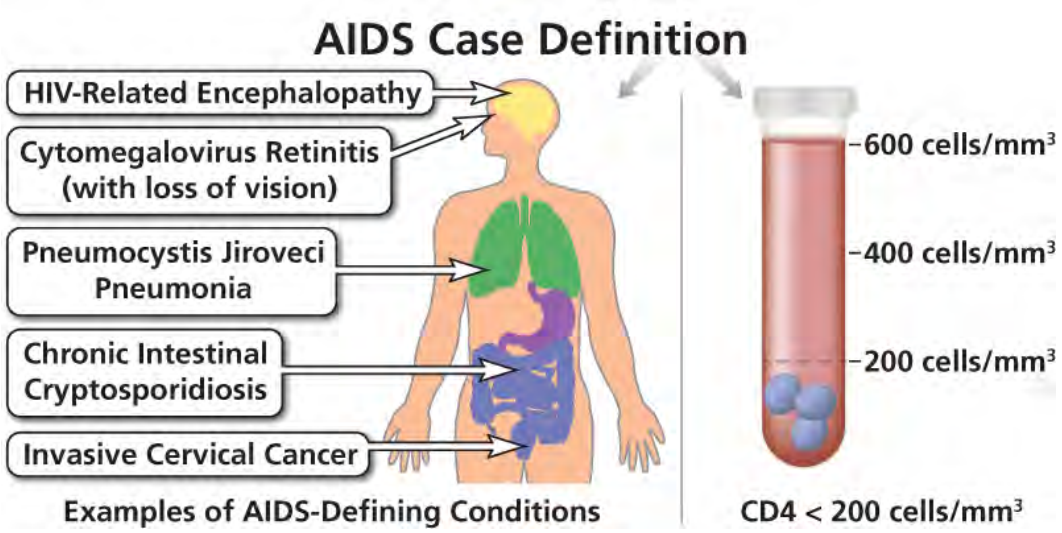


Image Source: U.S. Department of Health and Human Services, 2019.

Who Is at Risk?

It is not at all rare for people to carry more than one of the three viruses just discussed, since these pathogens are spread by similar routes: blood-to-blood contact, sexual contact, and injecting-drug use. As many as 25% of people with HIV also have HCV and up to 10% of those with HCV also have HBV (Healthline, 2019). Having one infection does not mean an individual automatically has the others, but it is prudent clinical practice to screen for the others.

In addition to hepatitis B, hepatitis C, and HIV, other less-common bloodborne pathogens include:

- Adult T-cell leukemia/lymphoma (caused by HTLV-I)
- Arboviral infections
- Babesiosis
- Brucellosis
- Creutzfeldt-Jakob disease
- Diseases associated with HTLV-II
- Hepatitis delta (HDV)
- HTLV-I–associated myelopathy
- Leptospirosis
- Malaria
- Relapsing fever
- Syphilis
- Viral hemorrhagic fever (OSHA, 2019a)

Some of the listed diseases are extremely rare in the United States; however, today's mobility of individuals and families means that rare diseases can travel globally. Healthcare workers abroad need to be aware of the possible risk of exposure to rare diseases as well as those common to their own country. In this country, rates of HCV are higher among Asians and African Americans than other ethnicities (CDC, 2016).

The most important thing to remember about all four of the main viruses is that most people infected with them are asymptomatic. This is why **it is**

critical to avoid contact with the blood and body fluids of all individuals, since there is no easy way to tell those infected from those who are not.

Those who are at risk or any of the bloodborne pathogens includes:

- People who have contact with blood or body fluids in their personal lives, whether through sexual activity, by injected drug use, or by other mechanisms
- Patients who may have exposure to the blood or body fluids of caregivers by unintended means
- People who have contact with blood or body fluids in their work-life (occupational exposure)

Chronic Infectious Diseases in the United States, 2016

Disease	People infected	Annual new infections
HIV/AIDS	1.1 million	40,000
Hepatitis A	0.02%/100,000	4,000
Hepatitis B	2.2 million	20, 900
Hepatitis C	41,200	2,967

Source: CDC, 2016.

Apply Your Knowledge

As a healthcare worker, what are the clinical symptoms you would look for in someone who has a hepatitis virus? How are the clinical symptoms different from HIV/AIDS?

The Law

OSHA Bloodborne Pathogens Standard

Law regarding bloodborne pathogens is based on the federal OSHA Bloodborne Pathogens Standard, 29 CFR 1910.1030, originally passed into law in 1992 and updated as needed. All the requirements of the Bloodborne Pathogens Standard are designed to protect workers from exposure to

bloodborne pathogens or other potentially infectious material (OPIM), (OSHA, 2019b).

The standard requires employers to do the following:

- Establish an exposure control plan.
- Update the plan annually.
- Implement the use of universal precautions.
- Identify and use engineering controls.
- Identify and ensure the use of work practice controls.
- Provide PPE for employees.
- Make available hepatitis B vaccinations to all workers with occupational exposure.
- Make available post-exposure evaluation and follow-up.
- Use labels and signs to communicate hazards.
- Provide information and training to workers.
- Maintain worker medical and training records.

State Laws

State legislation has been enacted in twenty-two states to improve healthcare worker safety related to needle sticks. These laws add provisions not included in the federal OSHA Bloodborne Pathogen standard and/or coverage of public employees not regulated by OSHA. These laws contain unique requirements such as surveillance programs, cost-benefit analyses, strict requirements for safety device use, and the use of statewide advisory boards.

Implementation of state laws differs regarding development of related regulations and the dates when they become effective. State-by-state provisions are available online (OSHA, 2019a). Resources for state laws are listed at the end of this course.

Compliance with the federal law and any applicable state law is required of all workplace settings where healthcare workers may be exposed to blood or body fluids on the job, including hospitals, clinics, surgical centers, research facilities, and anywhere they may be exposed to human tissue and blood products.

2. Workplaces Subject to the OSHA Standard

Nurse Jennifer was hesitant to complete the incident report because she didn't want to be in trouble with her charge nurse; besides, she didn't even have time to complete the report. Besides, she thought, the patient with DKA didn't have any bloodborne pathogens. The DKA was caused by the poor healing leg wounds. Her only personal concern was for the patient with COPD, who had known hepatitis C.

In reviewing the history of the DKA patient, Jennifer read that he had tested HIV-positive, which had complicated the healing of his right leg wounds and severely elevated his blood sugar levels. Suddenly the innocent needle stick looked scary. Panicked and afraid, she went to her charge nurse to disclose what had happened.

What is the protocol for an accidental needle stick? Whose responsibility is it to address the problem?

The federal OSHA Bloodborne Pathogens Standard specifies that "each employer having an employee(s) with occupational exposure shall establish a written Exposure Control Plan designed to eliminate or minimize employee exposure." Paragraph (b) says:

> *Occupational exposure* means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties. (OSHA, 2019a)

In other words, if any workers may reasonably expect to have contact with blood or body fluids on the job, this law applies to their workplace. All healthcare workers—both licensed and non-licensed—risk exposure to bloodborne pathogens, whether they work in hospitals, nursing homes, home care, or correctional institutions.

Work Areas of Special Concern

Research has identified home care and correctional institutions as work areas with increased risk of bloodborne pathogen transmission. Work practices such as extended work schedules and understaffing also increase the risk of percutaneous injuries (Phillips, et al., 2012). The good news is that after OSHA enacted the needle stick safety and prevention training known as the Needle stick Safety and Prevention Act of 2000, the incidence of worker injuries from needle sticks as declined, however it is also estimated that 50% of all sharps injuries go unreported.

Home Care

Earlier discharge from hospitals means that patients are going home “sicker and quicker,” and may have health needs that demand complex nursing skills. Studies show that both RNs and aides/personal care assistants (PCAs) are still experiencing sharps injuries at significant levels. One study found that 14% of RNs reported one or more sharps injuries in the previous three years. These injuries were associated with lack of compliance with Standard Precautions, recapping of needles, exposure to household stressors, exposure to violence, and mandatory overtime (CDC, 2013).

Another study found that PCAs are at increased risk when performing nursing-related activities for which they are inexperienced and/or lack training (Lipscomb et al., 2009). A third study showed that 35% of nurses and 6.4% of aides experienced at least one sharps injury during their home healthcare career. It is estimated approximately 800,000 needle sticks occur each year by healthcare professionals (CCOH, 2018).

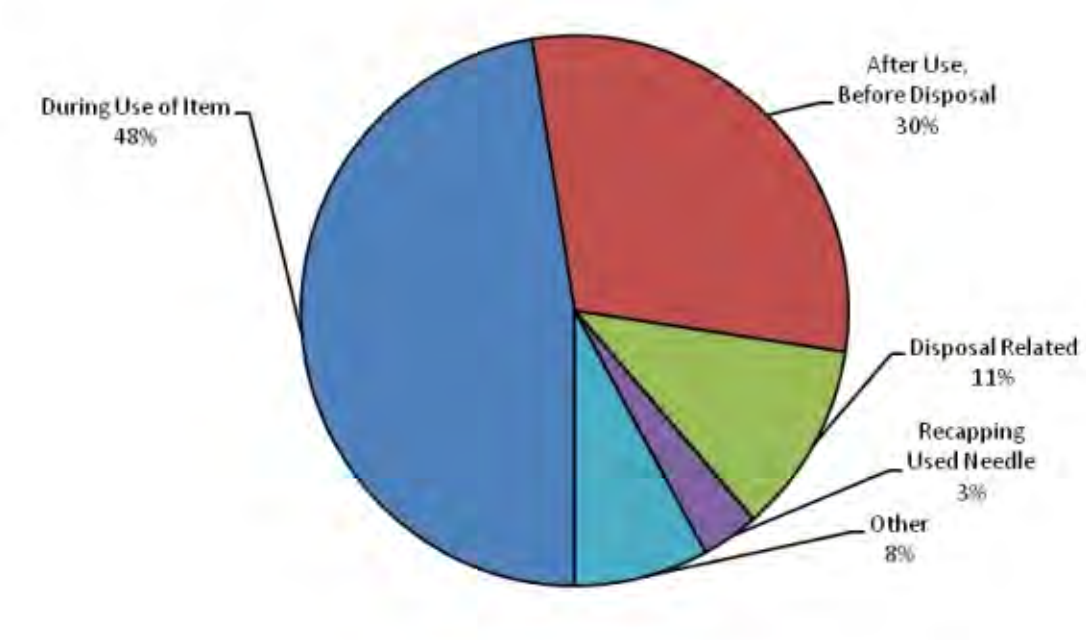
Procedures contributing to sharps injuries obviously include injecting medications with needles, administering finger sticks and heel sticks, and drawing blood. Sharps disposal, contact with waste, and patient handling also contributed to sharps injuries. Newer devices are available and being developed to help healthcare staff avoid needle sticks; they include needle-shielding devices, auto-disabling systems to prevent the reuse of needles, and retraction of needles by pushing a clicker button built within the syringe.

Yet another study evaluated the experiences of 355 home healthcare nurses and 30 Medicare Certified Home Healthcare Agency and hospice employers in one state and found that some employer policies and nurse practices were out of compliance with OSHA, and they were experiencing needle sticks from nonadherence to established safety standards.

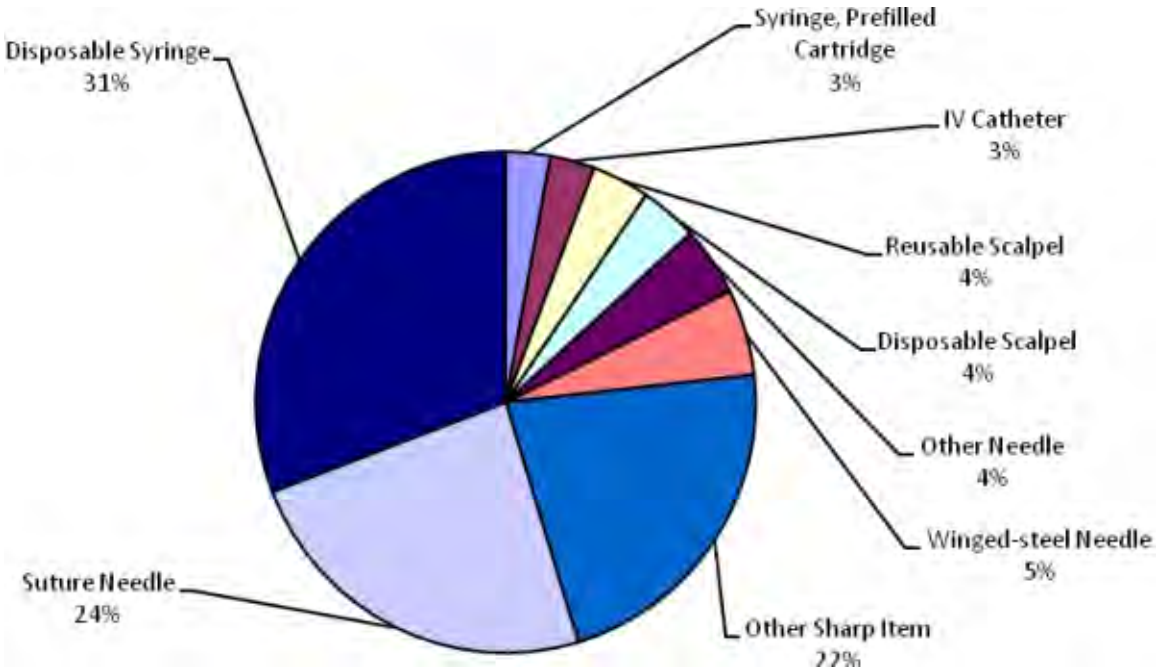
There is also a discrepancy between needle sticks being reported and those actually occurring. Thirty-eight home healthcare nurses from 12 of the 30 employers reported sharps injuries within the past year but the employers reported only 18 such injuries in that same year (Scharf et al., 2009). More effective education, training, and enforcement of OSHA standards are needed to reduce the incidence of sharps injuries in these areas of practice.

An Exposure Control Plan that includes safety sharps and training on how to use them correctly is required by the Bloodborne Pathogens Standard (OSHA, 2019c). Talk with your employer if you are concerned about exposure risk on the job or would like the newer products being developed to become available in your facility.

When Needle Sticks Occur



Sharps Devices



Activities associated with percutaneous injuries in EPINet hospitals, by % total percutaneous injuries, 2007. Source: EPINet, 2009.

Online Resources

(5:10) YouTube: Needle Stick Injury

https://www.youtube.com/watch?v=Wq3ktC75pvM

(3:42) A Message About Sharps Safety: Protecting Against

Needle Sticks and Other Sharps Injuries

https://www.youtube.com/watch?v=nv_2S0p9Wj0

Correctional Institutions

All healthcare workers risk occupational exposure to bloodborne pathogens but those who work in correctional facilities face additional challenges:

- Jails and prisons are unpredictable work settings.
- Security issues are often a higher priority than infection control.
- Inmates may have a higher rate of bloodborne diseases. The rate of AIDS in prison is 5 to 7 times the rate in the U.S. general population.
- Almost 25% of all those living with HIV are in a correctional facility. (AIDS Infonet, 2014)

Correctional healthcare workers may be bitten or stabbed during an inmate assault, punctured with a used needle, or splashed in the face with blood. Any of these situations can expose workers to bloodborne diseases (Hood, 2011). Despite security measures, illicit drugs still enter correctional facilities for inmate recreational drug use. It is estimated that a single needle will be re-used 200 times among 100 inmates, causing a serious infectious risk for anyone with a needle stick. Education and training of correctional healthcare workers is essential to prevent exposure in these high-risk work settings.

In the past decade, the U.S. Food and Drug Administration (FDA) approved a needle-free injection system that pushes medicine directly through the skin without a needle. One product, among many being developed, has been used in correctional facilities and for mainstream medications such as insulin, epinephrine and even flu vaccines, which demonstrates a hopeful solution

(Hood, 2011). According to the OSHA Bloodborne Pathogen Standard, the use of safer medical devices must be implemented, and employees must be trained for their proper use (OSHA, 2019d). OSHA does not dictate which products a facility must use, but the standard does state that if safety devices and better products are available that promote safety, the facility has the obligation to evaluate and use them.

Research and Production Facilities

The OSHA Bloodborne Pathogens Standard includes a section on protection of workers in specialized types of worksites such as research and production facilities and pharmaceutical facilities where risk of exposure to HBV and HIV is significantly higher. Protective measures for these worksites are much more stringent. If your workplace is not this type of facility, these more stringent requirements do not apply to it (OSHA, 2019d).

Exposure Control Plans

Employers are required to create and implement a written exposure control plan (ECP) specific to each workplace to eliminate or minimize employee exposures. The plan must be updated annually to reflect technological changes (eg, newer needless syringes) that help eliminate or reduce exposure to bloodborne pathogens. In the plan, employers must include information about the ECP used in the workplace.

The ECP should contain annual documentation of consideration and implementation of commercially available safer medical devices designed to eliminate or minimize occupational exposure. Employers must also document that they have solicited input from non-managerial workers in identifying, evaluating, and selecting engineering controls. The ECP must be available to workers. You have the legal right to ask your employer how you can review it.

The ECP for your facility must:

- Be written specifically for each facility
- Be reviewed and updated yearly
- Be readily available to all workers
- Include regular education for workers

The exposure control plan should also include a written exposure process that includes those job classifications and positions in which employees have the potential for occupational exposures. The exposure determination should be made without consideration of the use of PPE or equipment. Employees who are required or expected to administer first aid must also be included.

In addition to the possible presence in blood, bloodborne pathogens may be present in other potentially infectious material (OPIM). OPIM includes:

- Human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids
- Any unfixed tissue or organ (other than intact skin) from a human (living or dead)
- HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV

OSHA's Bloodborne Pathogens Law requires Universal Precautions for the OPIM listed above. Note that the list does not specify precautions with urine or feces, which may be heavily loaded with bacteria other than the bloodborne pathogens. Universal Precautions should absolutely be implemented for all body fluids and waste products and considered potentially infectious.

Standard Precautions, as described by the CDC, are broader than Universal Precautions, covering more bacteria and viruses than the three main bloodborne pathogens—HBV, HCV, and HIV. Standard Precautions specify that contact with all body fluids from all patients should be avoided and considered potentially infectious. Often these names are used synonymously in clinical practice although they are technically different, however both focus on protection by the healthcare worker from all body fluids from another person.

OSHA requires the use of Engineering Controls, Work Practice Controls, and Personal Protective Equipment—in that order, because the most effective protections for workers take priority.

Apply Your Knowledge

Have you seen a copy of your facility's ECP? Is your facility educating you about bloodborne pathogen prevention? Is your facility providing a needless

entry system for medications? Who is in charge of evaluating new products for your facility? Have you seen some of the new needless injection products?

3. Engineering Controls

Nurse Jennifer completed the incident report with her Charge Nurse and immediately was sent to the lab for a blood draw and rapid HIV test. She received her HBV series five years ago when she began nursing school. Was she still covered against HBV? What is the blood test for HIV? How soon does HIV testing show results? Jennifer suffered emotionally throughout the rest of her shift until the answers came. Was she wearing gloves when she took the blood specimen? Didn't she always? Now she couldn't remember because she wasn't consistent about PPE use.

Engineering controls are devices that isolate or remove the bloodborne pathogen hazard from the workplace (OSHA, 2019a). Controlling the environmental hazards are part of the directive to decrease the potential for the spread of bloodborne pathogens and other potentially infectious agents. The various environmental controls include:

- Hand washing, that sends pathogens on the worker's hands down the drain and out of the workplace
- Elimination of hazardous materials from the workplace, such as the replacement of a hazardous chemical with a safer one, or needleless systems for injection
- Devices that contain the hazard, such as specimen containers, safety sharps, sharps disposal containers, and red bags

Engineering controls, including facilities for hand washing, must be maintained or replaced on a regular schedule to ensure their effectiveness. When handwashing facilities are not available, an antiseptic hand cleanser should be provided. Hands must be washed after gloves are removed or any time there is skin contact with blood or other body fluids.

Specimen containers should not leak. If there is a possibility of leakage a secondary container must be used. All containers with dirty particles such as laundry and garbage must be placed in a soiled utility room away from clean supplies and laundry.

Safety When Handling Sharps

The federal OSHA Bloodborne Pathogens Standard was amended in 2001 to add the provisions of the Needlestick Safety and Prevention Act of 2001 (public law 106-430). Since then, safety syringes are required for use whenever possible in healthcare facilities. This legislation mandates that institutions conduct annual product reviews of sharps safety devices and that non-managerial employees be involved in the decision-making process.

An estimated 800,000 needle sticks and other sharps injuries are reported each year, but the CDC believes that even more such injuries go unreported. Researchers at Johns Hopkins University reported that nearly 60% of medical

school graduates surveyed had been stuck by a needle during medical school but half of them did not report the injury to hospital officials. The primary reason for not reporting was the amount of time and paperwork involved in making a report. Those surveyed had trained to become surgeons at seventeen medical centers in the United States (Sharma et al., 2009, Quinn et al., 2009).

Other reasons for not reporting sharps injuries include the lack of a clear policy and process for reporting the injury, lack of available PPEs and disposal containers, insufficiently trained staff, shortage of staff, and perceived retribution, or complication of completing and filing an incident report (Braun, n.d.). Recognizing the barriers to reporting needle sticks is important before facility administrators can strategize how to improve the process. Competing an incident report has often triggered reprimand, yet the report should be used as a tool for improvement rather than punishment.

Two-thirds of nurses report being accidentally stuck by a needle while working, and three-fourths of them were contaminated needle sticks. Although the overwhelming majority of nurses knew the workplace protocol concerning needle stick injuries, only 7 out of 10 reported the incident (Firas et al., 2014).

Care must be used whenever handling sharps, especially contaminated sharps. Needle sticks and other sharps injuries carry extra risk of exposure since they penetrate the protection of intact skin.

The best way to prevent cuts and sticks is to minimize contact with sharps. That means:

- Not using a sharp when an alternative method is available
- Activating safety sharps immediately following completion of use
- Disposing of used sharps immediately

A needle stick or a cut from a contaminated scalpel can lead to infection by one of the bloodborne viruses. Risk of infection varies by which pathogen is involved.

Puncture-resistant containers must be available nearby to hold contaminated sharps. When reusable sharps must be used, puncture-resistant transport containers must not require employees to reach into the holding container. Newer sharps containers allow the nurse or healthcare professional using the sharp to simply drop it into the top of the container rather than forcing it into a side flap where other needles may be sticking out and potentially cutting the intruding hand.

Recapping, bending, or removing needles should not be done unless there is no feasible alternative or if required for a specific medical procedure. If recapping, bending, or removal is necessary, workers must use either a mechanical device or a one-handed technique. If recapping is required, a one-handed "scoop" technique may be used, using the needle itself to pick up the cap, pushing cap and sharp together against a hard surface to ensure a tight fit.

There has been considerable media attention about disease outbreaks caused by unsafe injection practices. The CDC has reported nearly 50 outbreaks linked to unsafe injection practices, with more than 150,000 patients affected since 2001. These outbreaks have included transmission of hepatitis B and C as well as bacterial infections (CDC, 2016).

Syringes and needles must be used for only one patient in every circumstance. This is a matter of protecting patients from diseases spread by injection.

Sharps Containers

Containers of used sharps are regulated waste and must be handled as specified in the Standard. They must be puncture-resistant, closable, and the sides and the bottom must be leakproof. They must be labeled or color-coded **red** to ensure that everyone knows the contents are hazardous. Containers for disposable sharps must be easily accessible and they must be maintained upright to keep liquids and sharps inside.

Containers need to be located as near as feasible to the area of use. In some cases, they may be placed on carts to prevent access by mentally disturbed or pediatric patients. Containers should also be available wherever sharps may be found, such as in public bathrooms for insulin pens and facility laundries. The containers must be replaced routinely and not be overfilled. Many facilities have added a specific policy to replace the container when it is three-quarters full rather than waiting until it is completely full.

Employees must never reach into containers of contaminated sharps. Containers for reusable sharps could be equipped with wire basket liners for easy removal during reprocessing, or employees could use tongs or forceps to withdraw the contents. Reusable sharps disposal containers may not be opened, emptied, or cleaned manually.

Employees should use caution when handling full containers of used sharps, looking carefully for needles that may have punctured the container. Lids should be closed before discard and transportation. If there is a chance of leakage from the primary container, a secondary container that is closable, labeled, or color coded and leak resistant should be used.

4. Work Practice Controls

Nurse Jennifer had a hepatitis titer drawn with HBV surface antigen, HBsAG, and anti-HCV antibodies. She was also drawn for an ELISA rapid blood test for HIV. She was asked to bring the needle as a specimen but had already thrown it away in the sharps container. She had to complete a full history of previous exposures including sexual relations, which may have impacted her risk.

The infection control nurse correctly cleansed the wound on her finger and then gave information for a potential Recombivax hepatitis vaccine and hepatitis immune globulin, if appropriate pending the lab results. The patient had known HIV-positive status but was asked permission to draw for HBV and HCV. The patient agreed, and now both the patient and Jennifer had to wait 1 hour for the HIV results. Jennifer would also now have to be tested at 6 and 12 weeks, and 6 months after exposure.

She would be started immediately on PEP, and plan to continue with the multi-pill regimen for 4 weeks. The PEP would include Truvada (tenofovir/emtricitabine, 300/200 mg daily) plus Isentress (raltegravir, 400 mg twice daily). Alternative regimens are also available.

Source: Google Images.

Work practice controls are intended to reduce the likelihood of exposure by changing the way a task is performed. They include appropriate procedures for handwashing, sharps disposal, lab specimen handling, laundry handling, and contaminated material cleaning (OSHA, 2019b). Work practice controls are commonly described in written procedures in the workplace.

Universal vs. Standard Precautions

The OSHA Bloodborne Pathogens Standard specifies “Universal Precautions shall be observed to prevent contact with blood or other potentially infectious materials.” When you can’t tell the difference, “all body fluids should be considered potentially infectious.”

Comparison of Universal and Standard Precautions

	Universal precautions	**Standard precautions**
First proposed year	1992	1996
Proposed by	Federal OSHA	CDC
Authority is based on	Federal law	science
Protects	Workers only (not patients)	Workers and patients
Use precautions with	ALL patients	ALL patients
Protects from	Bloodborne pathogens only	Viruses, bacteria and protozoa
Stay out of	Blood and listed OPIM (see module 3)	All body fluids, mucous membranes and non-intact skin
Broadness of requirements	Limited to OSHA requirements	Broader than Universal Precautions

Source: OSHA, 2019b.

Is it preferred to use Standard Precautions? Standard Precautions includes all the requirements of Universal Precautions and more. When you use Standard Precautions, you are in full compliance with OSHA's requirement to use Universal Precautions.

The key provision of both types of precautions is that workers must avoid contact with blood and body fluids of all patients, regardless of diagnosis, because most people who do carry a bloodborne pathogen have no symptoms and often do not know they are a carrier. Avoid contact with blood and body fluids of all patients to protect yourself, your other patients, your co-workers, and your family.

Other Work Practice Controls

The Bloodborne Pathogens Standard specifies other work practice controls:

- Eating, drinking smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in work areas where there is reasonable likelihood of occupational exposure to body fluids. Some work places post signs where body fluids, used gloves, and specimens are not allowed, and permit eating and/or drinking in those areas.

- Procedures involving blood or OPIM shall be performed in a manner to minimize splashing or generation of droplets. Mouth pipetting is specifically prohibited.

Apply Your Knowledge

Explain the difference between standard and universal precautions. How does your physical uniform, hair, nails, and equipment contribute or decrease your risk of pathogen contamination?

5. Personal Protective Equipment (PPE)

Jennifer's needle stick protocol checklist included the incident report, exposed employee date of birth and contact info, her own risk status and information about her date, time and route of exposure. The required HIV testing included the following on the infection control nurse's checklist:

HIV testing:

☐ Patient had rapid HIV test*

☐ Result negative > no further HIV testing needed

☐ Result positive > sent for Western blot confirmation

☐ Result positive > staffer tested for HIV > staffer to doctor for management

Hepatitis testing:

☐ Patient documented recent negative for HBV (date ____/____/_____), copy in chart

☐ Patient documented recent negative for HCV (date ____/____/_____), copy in chart

☐ Patient tested for HBV/HCV*

☐ HBV-vaccinated staffer tested for immunity, found immune (positive anti-HBs Abs)

☐ HBV-vaccinated staffer tested for immunity, found not immune (negative anti-HBs Abs)

☐ Patient HBV-positive (HBsAg positive) > staffer to doctor for testing and HBV-PEP

☐ Patient HCV-positive (anti-HCV Abs positive) > staffer to doctor for testing and management

PEP: Staffer given rx for

☐ Truvada + Isentress ☐ Truvada + Kaletra ☐ Atripla

☐ Financial assistance provided for rx

☐ Staffer started PEP within 2 hrs of exposure

☐ PEP discontinued when patient documented HIV-negative

Source: Needle stick protocol, occupy-medical.org. (n.d.).

When to Wear PPE

Personalized Protection Equipment (PPE) is specialized clothing or equipment worn by an employee for protection against hazards that remain after engineering controls and work practice controls are in place. PPE is not the first line of defense! Legally, the employer must provide PPE, ensure that the employee uses and must clean, repair, and replace this equipment as needed. You as the employee have the right to have PPE available to complete your job duties.

PPE includes gloves, gowns, laboratory coats, face shields or masks, eye protection, resuscitation masks, and other protective gear such as hats and booties. It may also include full protection suits, as were used for the Ebola patients. It must be readily accessible to employees and available in appropriate sizes. The hospital infection control process often determines the isolation requirements for patents including contact, droplet, and airborne and will require nurses and visitors to follow the protocol for each type of isolation.

The worker often must decide on their own when to wear PPE because exposure is likely. If exposure seems reasonably likely, you have the right to protect yourself with PPE.

An easy guideline to use is

If it is wet and not yours, stay out of it!

Gloves shall be worn when:

- It can reasonably be anticipated that the employee may have hand contact with blood, OPIM, mucous membranes and non-intact skin
- Performing all vascular access procedures or procedures involving uncontained blood, such as finger or heel sticks
- Gloves must be changed between patients (CDC, 2013)

Single use gloves cannot be washed or decontaminated for reuse. Utility gloves worn by engineering or housekeeping may be decontaminated if they are not compromised. They should be replaced when they show signs of cracking, peeling, tearing, puncturing, or deteriorating.

Traditionally, latex gloves are used to avoid contact with blood or OPIM. However, some workers are allergic to latex or vinyl. In most circumstances, nitrile or other glove alternatives may be used in place of latex gloves. Employers are required to provide non-latex alternatives to employees with sensitivities to latex and other materials. Sterile or nonsterile gloves are also available as PPE and dictated by the procedure.

Do's of glove use	**Don'ts of glove use**
Work from clean to dirty	Touch your face
Limit opportunities for touch contamination	Adjust the PPE with a contaminated glove
Double glove if changing a very soiled bed/bowel movement	Touch environmental surfaces except as necessary during patient care
Change gloves if torn, heavily soiled and between patients	Wash or reuse gloves

Employees should wear **eye and mouth protection** such as goggles and masks, glasses with solid side shields, and masks or face shields when

splashes, sprays, splatters, or droplets of blood or OPIM pose a hazard to eyes, nose, or mouth.

Gowns, aprons, surgical caps and hoods, shoe covers, or boots are needed when splash, spray, or gross contamination is expected. This may occur, for example, during labor and delivery, surgery and procedures with anticipated blood splash may occur.

Employers must provide the PPE and ensure that their workers wear it. This means that if a lab coat is considered PPE, it must be supplied by the employer rather than the employee. The employer also must clean or launder clothing and equipment and repair or replace it as necessary. This includes, but is not limited to dentistry, phlebotomy or processing of any body fluid specimen, and postmortem procedures.

Personal protective clothing and equipment must be appropriate for the level of protection needed for the expected exposure. For example, gloves would be sufficient for a laboratory technician who is drawing blood, whereas a pathologist conducting an autopsy would need considerably more protective clothing. Personal protective equipment may be required during the care of any patient, so it must be routinely available in patient-care areas, not just on isolation carts. You may need to wear a mask and eye protection during the care of a patient on Standard or Universal Precautions. Availability of PPE is required by the OSHA Standard. If you are not sure where to obtain it, ask your employer.

What PPE to Wear

Knowing what to wear for each different type of isolation is important for your protection

Factors influencing PPE selection include the fit, the type of exposure anticipated, durability, and appropriateness for the task.

Airborne	**Contact**	**Droplet**
Gloves	Gloves	Gloves
Gown	Gown	Gown
N95 Respirator	Goggle/Face shield if splash anticipated, but not needed for standard contact isolation	Goggles/Face shield

What PPE would you wear for these patient encounters?

Giving a bed bath?	(generally none)
Suctioning oral secretions?	(gloves and mask/goggles or a face shield)
Transporting a patient in a wheelchair?	(generally none)
An emergency where blood is spurting?	(gloves, fluid-resistant gown, mask/goggles or a face shield)
Drawing blood from a vein?	(gloves)
Cleaning an incontinent patient with diarrhea?	(gloves and generally a gown)
Irrigating a wound?	(gloves, gown, and mask/goggles or a face shield)
Taking vital signs?	(generally none)

Exception

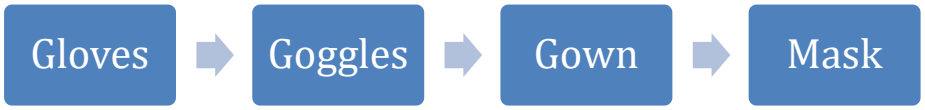
The employer shall ensure that the employee uses appropriate PPE unless the employer shows that the employee temporarily and briefly declined to use PPE when, under rare and extraordinary circumstances, it was the employee's professional judgment that in the specific instance its use would have prevented the delivery of healthcare or public safety services or would have posed an increased hazard to the safety of the worker or co-worker.

When the employee makes this judgment, the circumstances shall be investigated and documented in order to determine whether changes can be instituted to prevent such occurrences in the future. In other words, if using PPE would increase danger to the person receiving care or to the worker, then the worker may decline to use the PPE, but situations like this must be reported and investigated, and are rare.

Decontaminating and Disposing of PPE

Employees must remove personal protective clothing and equipment before leaving the work area or when the PPE becomes contaminated. If a garment is penetrated, workers must remove it immediately or as soon as feasible. Used protective clothing and equipment must be placed in designated containers for storage, decontamination, or disposal.

While use of PPE cannot prevent all exposures, wearing it properly and when needed can greatly reduce potential exposure to all bloodborne pathogens. The sequence for removing PPE is:



Apply Your Knowledge

How diligent are you in using PPE's in your facility? How meticulous are you in removing them correctly? Do you know the correct process to remove a gown, glove, and mask and do you follow it? What would you do if you saw a colleague using PPEs incorrectly with an isolation patient? How do you instruct and reinforce a visitor to wear PPEs in an isolation room when visiting?

6. Protecting Employees

Scenario

The test results came back and were negative for both HBV, HCV and HIV, but she would need to continue with her PEP and repeat testing. Never, before was Jennifer so grateful that her hospital followed the OSHA Standard so carefully and that they knew exactly what to do to help her after a needle stick. They would even pay for her treatment and follow-up.

Information and Training

All new employees or employees being transferred into jobs involving tasks or activities with potential exposure to blood or OPIM are required to receive training prior to an assignment to tasks where occupational exposure may occur. Training typically includes information on the hazards associated with blood and OPIM, the protective measures to be taken to minimize the risk of occupational exposure, and information on the appropriate actions to take if an exposure occurs.

Retraining is required annually, or when changes in procedures or tasks affecting occupational exposure occur. Employees must be provided access to a qualified trainer during the training session to ask and have answered questions as they arise.

OSHA's Bloodborne Pathogens Standard specifies the content which must be addressed in annual re-training, appropriate in content and vocabulary to educational level, literacy, and language of employees. Employees should request work-place-specific information from their employers if it has not already been provided.

Annual training must address (and is included in this CE course):

- An accessible copy of the regulatory text of this standard and an explanation of its contents
- A general explanation of the epidemiology and symptoms of bloodborne diseases
- An explanation of the modes of transmission of bloodborne pathogens
- An explanation of the employer's ECP and the means by which the employee can obtain a copy of the written plan
- An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and OPIM

- An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and PPE
- Information on the types, proper use, location, removal, handling, decontamination and disposal of PPE
- An explanation of the basis for selection of PPE
- Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge
- Information on the appropriate actions to take and people to contact in an emergency involving blood or OPIM
- An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical followup that will be made available
- Information on the post exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident
- An explanation of the signs and labels and/or color coding required
- An opportunity for interactive questions and answers with the person conducting the training session, who must be knowledgeable in the subject matter covered

Hazard Signs and Labels

The OSHA Standard requires warning labels be affixed to containers of regulated waste, refrigerators and freezers, and other containers used to store or transport blood or OPIM. The labels must use the word BIOHAZARD and be fluorescent orange or orange-red, and affixed in a manner that prevents their loss. Red bags or red containers may be substituted for labels.

Note that the biohazard sign is a good reminder that bloodborne pathogens may be present. However, bloodborne pathogens may also be present in many areas that do not have biohazard signs, both within healthcare facilities and in the general public. For this reason, it makes sense to minimize contact with body fluids and to protect any breaks in the skin, including mouth and eyes, at all times.

Apply Your Knowledge

How has your attitude changed about receiving and completing your employer's annual required OSHA training? Did you realize it was their legal responsibility? How will your attitude improve the next time you have to complete the training?

7. Other OSHA Requirements

Six months after the needle stick, and after completing her PEP, Jennifer's HIV tests remained negative. In those six months, she became extra vigilant with sharps and needles and purposely slowed down during procedures with needles. She became a strong voice on her unit for encouraging other nurses and healthcare workers to be purposeful and cautious when dealing with needles.

She also became proactive with her central supply department and administration in investigating a new needleless product that her hospital later adopted. She pondered many times how she could have avoided the original needle stick. What do you think she could have done differently? What would you do? What will you do to avoid the same mistake Jennifer experienced?

Housekeeping

The Standard requires employers to maintain the workplace in a clean and sanitary condition, using schedules and procedures for cleaning and decontamination. Equipment and work surfaces must be cleaned and decontaminated after contact with blood or OPIM, immediately, or as soon as feasible. If protective coverings are used they should be replaced as soon as contaminated or at the end of the work shift. Waste containers should be cleaned and decontaminated on a schedule and as needed. Contaminated broken glass must not be picked up by hand.

The methods of decontaminating different surfaces must be specified, determined by the type of surface to be cleaned, the soil present, and the tasks or procedures that occur in that area. For example, different cleaning and decontamination measures would be used for a surgical operating room and a patient room. Similarly, hard-surface flooring and carpeting require separate cleaning methods. More extensive efforts will be necessary for gross contamination than for minor spattering. Likewise, such varied tasks as laboratory analyses and normal patient care require different techniques for cleanup.

Employees must clean (1) when surfaces become obviously contaminated; (2) after any spill of blood or OPIM; and (3) at the end of the work shift if contamination might have occurred. Thus, employees need not decontaminate the work area after each patient-care procedure, but only after those that actually result in contamination.

Before any equipment is serviced or shipped for repairing or cleaning, it must be decontaminated to the extent possible. If some areas remain contaminated, the equipment must be labeled, indicating which portions are still contaminated. This enables employees and those who service the equipment to take appropriate precautions to prevent exposure.

Regulated Waste

Proper handling of regulated waste is essential to prevent unnecessary exposure to blood and OPIM. All regulated waste must be placed in closeable, leakproof containers or bags that are color-coded (red-bagged) or labeled to prevent leakage during handling, storage, and transport. Disposal of waste shall be in accordance with federal, state and local regulations.

Regulated waste includes:

- Liquid or semi-liquid blood or OPIM that cannot feasibly be flushed
- 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

Safety sharps and containers for disposal of used sharps are both engineering controls and regulated waste, once used. Used syringes or sharps must never be discarded into a red bag, only into the puncture-resistant containers required by the Bloodborne Pathogens Standard.

Containers used to store regulated waste must be closable and suitable to contain the contents and prevent leakage of fluids. They must be labeled or color-coded to ensure that employees are aware of the potential hazards. Such containers must be closed before removal to prevent the contents from spilling. If the outside of a container becomes contaminated, it must be placed within a second suitable container. Regulated waste must be disposed of in accordance with applicable federal, state and local laws.

Soiled Laundry

Contaminated laundry shall be handled as little as possible with a minimum of agitation. It must be bagged or contained at the location where it was used and shall not be sorted or rinsed at the location of use. Containers of soiled laundry should be color-coded or labeled to permit all employees to recognize the containers as holding soiled linen and therefore requiring the use of Universal Precautions. If the bag may leak, a secondary leak-proof container must be used.

Laundry workers must wear PPE and have sharps containers available in the event that a sharp may be within the soiled laundry.

Guidance regarding laundry handling and washing procedures in the healthcare setting can be found in *CDC Guidelines for Environmental Infection Control in the Healthcare Facilities, 2003.*

Hepatitis B Vaccination

The employer must make hepatitis B vaccination available to all employees with occupational exposure to bloodborne pathogens within 10 days of assignment, at no charge to the employee. This includes healthcare workers, emergency responders, morticians, first-aid personnel, law enforcement officers, correctional facilities staff, laundry workers, and others.

The vaccine is given as a series of three injections, the second and third injections given 1 month and 6 months after the first one. All three must be received for full protection. The vaccine has an excellent record of safety and effectiveness, protecting workers against a disease that may cause no symptoms, mild symptoms, or serious even fatal disease, and that can be spread to others. You may decline the vaccine and will be asked to sign a declination form, as required by the Standard, to verify that you were offered the vaccine. You may change your mind and receive the vaccine later even if you declined at first.

To ensure immunity, it is important for individuals to receive all three injections. As of 2013, the CDC says that for people with normal immune status who have been vaccinated, booster doses are not recommended. The vaccine causes no harm to those who are already immune or to those who may be HBV carriers. Testing to verify immunity following completion of the vaccine series is recommended by the CDC, but is not required.

Online Resource

(4:29) YouTube: Infection Control: Break the Chain

https://www.youtube.com/watch?v=_o9SxDFPUiA

Apply Your Knowledge

Did you realize that the cleaning protocols done by housekeeping, and environmental service personnel are actually mandated by law per OSHA Standards? When is the last time you thanked your facility housekeeper? Do you wipe down your workstation at the beginning and end of your shift with a bacteriostatic solution? Will you do so now that you have a better understanding of pathogen transmission?

8. Reporting Exposure Incidents

An occupational exposure is defined as a percutaneous (through the skin) injury such as a needle stick or cut with a sharp object or contact of mucous membrane or non-intact skin with blood, tissue, or OPIM. Non-intact skin may be chapped, abraded, or afflicted with dermatitis. Intact skin is a good barrier against these viruses. For exposure to occur there must be some sort of break in the skin, a “portal of entry,” such as a needle stick, cut, dermatitis, or exposure of a mucous membrane. The skin is the primary “suit of armour” against pathogens and to avoid a “pathogen party” the host must protect skin by using a barrier, such as gloves when coming in contact with potential pathogens, and then wash off after exposure.

Factors influencing the risk of infection include:

- Whether exposure was from a hollow-bore needle or other sharp instrument
- Whether the exposure was to non-intact skin or mucous membranes
- The amount of blood involved
- The amount of virus present in the source's blood
- Which virus is involved—hep B can be more infectious than hep C or HIV.

The OSHA Bloodborne Pathogens Standard requires medical follow-up for workers who have an exposure incident. Exposures should be reported within 1 hour if possible to allow for prompt intervention to reduce the risk of infection. Follow the protocol of your employer. Wash the exposed area with soap and water, or use an eye-wash station in the event of an eye-splash. Then report the exposure to the department or individual at your workplace who is responsible for managing exposure, which is often the occupational health nurse or infection control department/worker. Your employer should let you know how to do this as part of your orientation. If you do not know or are not sure, ask.

If you know the name of the individual who was the source of the exposure, take it and any information of the device involved when you report the exposure. For example, the brand of the safety sharp in use should be brought to the attention of the person receiving the report as a supply success or failure can be evaluated and lead to improvements in supplies carried by the facility. You will be asked about the situation that led to the exposure. These facts are needed for follow-up and prevention of similar exposures to others.

Reporting is important because part of the follow-up includes testing the blood of the individual source to determine HBV and HIV infectivity, if this is unknown and if permission for testing can be obtained. There are now at least four FDA-approved tests available for rapid HIV antibody testing that can confirm negative HIV status within an hour after blood is drawn from a source individual.

An employer's failure to use rapid HIV antibody testing of the individual source could be considered a violation of paragraph 1910.1030(f)(3)(ii)(A) in the OSHA standard (OSHA, 2019a). The exposed employee must be informed of the results of these tests. Employers must tell the employee what to do if an exposure incident occurs.

Medical Evaluation and Follow-up

The Bloodborne Pathogens Standard requires employers whose employees may have exposure to body fluids on the job have a system in place for managing occupational exposures. This system must be available without delay, 24 hours per day, 7 days per week. This requirement may be challenging for employers who are not health-care providers, such as correctional facilities, firefighters, and first-aid providers. It is often managed by contractual arrangement.

Knowledge of the way to access this system is required as part of your orientation to the job and as part of your annual update education. If you do not know how to do it on your job, ask. Employers must provide free medical evaluation and treatment to employees who experience an exposure incident. A licensed healthcare provider will evaluate the exposure and advise on how to prevent further spread of any potential infection. If known, the source patient's blood will be tested for HBV, HCV and HIV, with appropriate consent.

The blood of the exposed employee will be tested with their consent, or the employee may choose to have blood drawn but may not delay testing later than 24 hours or be tested until later. The employer must hold this specimen for at least 90 days. This baseline specimen is needed to determine if any later disease is related to the exposure or may have been present before the exposure.

The healthcare provider will share information from testing with the employee and will prescribe appropriate treatment in line with current U.S. Public Health Service recommendations. If the source individual was HBV- or HIV-positive or in a high-risk category, the exposed employee may be offered **post exposure prophylaxis (PEP)**, medication that can be taken following exposure to reduce risk of infection. There is no available PEP against hepatitis C. Hepatitis B vaccine should always be offered following any exposure incident unless the employee is already immune as confirmed with a blood titer.

Because of the complexity of selecting an HIV/PEP regimen, consultation with people having expertise in antiretroviral therapy and HIV transmission is strongly recommended. The National PEP Hotline is available 24/7 at no cost to treating professionals at 888-448- 4911 (Clinical Consultation Center, 2019).

Written Opinion

In addition to counseling the employee, the healthcare provider will provide a written report to the employer. This report simply identifies whether hepatitis B vaccination was recommended for the exposed employee and whether the employee received vaccination. The employer must provide a copy of the report to the employee within 15 days of the completion of the evaluation. The healthcare provider also must note that the employee has been informed of the results of the evaluation and told of any medical conditions resulting from exposure to blood which require further evaluation or treatment. Any added findings must be kept confidential.

Confidentiality

Medical records must remain confidential. Employee health and medical records are not available to the employer, without the written consent of the employee. The employee must give specific written consent for anyone to see the records. Records must be maintained for the duration of employment plus 30 years in accordance with OSHA's standard on access to employee exposure and medical records.

Recordkeeping

The OSHA Bloodborne Pathogens Standard specifies recordkeeping requirements for employers that include confidential medical records for employees with occupational exposures, records of training provided, and a sharps injury log that documents every sharps injury in detail.

Online Resource

(1:32) YouTube: What is Post Exposure Prophylaxis?

https://www.youtube.com/watch?v=Yu82TFo6j94

Apply Your Knowledge

If you were to be stuck with a needle at your facility, do you know who to go to for reporting, testing, and treatment? How can you find out who that is?

9. Conclusion

Transmission of bloodborne pathogens in the work setting is a risk wherever workers may have contact with blood or body fluids as a result of their duties. The science is clear that there have been cases of hepatitis B, hepatitis C, and HIV resulting from occupational exposures. Risk of transmission has been greatly reduced by implementation of the requirements of the OSHA Bloodborne Pathogens Standard established in 1992.

The lawful requirements for facilities follow the recommendations of the CDC, based on current scientific understanding of these diseases. All the requirements of the OSHA Bloodborne Pathogens Standard must be followed in any workplace where workers may be exposed to bloodborne pathogens as part of their duties.

Employees have a right to PPE, training, and treatment in the event of a needle stick or exposure to bloodborne pathogens. Ignorance of the law is no excuse especially because this is a protection against job-related risk.

10. Resources and References

Resources

OSHA Bloodborne Pathogens Standard

800 321-OSHA (6742)

http://osha.bloodbornepathogens.us/

To report unsafe working conditions or

safety/health violations to OSHA, contact

800-321-OSHA (6742)

TTY 877 889 5627

For questions about appropriate medical treatment for occupational exposures, assistance is available from the Clinicians Post Exposure Prophylaxis (PEP) Line at
1-888-448-4911
http://www.nccc.ucsf.edu/External

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11. Post Test: BBP (246)

1. Bloodborne pathogens:

    a. Include lice and fleas that can be transmitted to another person by contact with contaminated bedding or clothes.

    b. May be spread through contact with the intact skin of an infected person.

    c. Are infectious materials in blood or body fluids that can cause disease in humans.

    d. Cannot be spread through cerebral spinal fluid because the blood-brain barrier prevents passage of organisms into the spinal fluid.

2. The most common bloodborne infection in the United States is:

    a. Malaria.

    b. Creutzfeldt-Jakob disease.

    c. HCV infection.

    d. Syphilis.

3. About the three main bloodborne viruses—HBV, HCV, and HIV—the most important thing to remember is that:

    a. Most people infected with them are asymptomatic.

    b. People who have one will not be co-infected with one of the others.

    c. Laboratory tests can always return accurate results within 24 hours.

    d. Healthcare personnel develop a natural immunity that protects them from becoming infected with one of the bloodborne viruses.

4. OSHA's Bloodborne Pathogens Standard:

    a. Was originally passed into law in 1980.

    b. Has not been amended since 2001.

    c. Is amended biannually by OSHA.

    d. Has been amended every five years.

5. Research on bloodborne pathogens has identified the following areas of special concern:

    a. Daycare and playgrounds.

    b. Classrooms and sports facilities.

    c. Obstetrical units.

d. Correctional facilities and research facilities.

6. Employers are required to:

a. Create a written exposure control plan that must be updated every 2 years to minimize employee bloodborne pathogen exposures.

b. Make an exposure report that evaluates the effectiveness of personal protective equipment used by nurses.

c. Consider and implement appropriate, commercially available safer medical devices to eliminate or minimize occupational exposure.

d. Make an exposure determination on all patients who may be considered at risk for a bloodborne pathogen exposure.

7. Employees do not need to wash hands when gloves have been used to handle items contaminated with blood or body fluids.

a. True

b. False

8. Needles or contaminated sharps should:

a. Be disposed of immediately after use into puncture-resistant containers.

b. Always be recapped after use to prevent a needle stick.

c. Always be recapped using both hands if recapping is essential.

d. Be bent and broken prior to disposal to prevent needle sticks.

9. To decrease chance of contracting bloodborne illness:

a. Only employees trained to empty sharps containers are allowed to reach into the containers.

b. Because sharps containers must be replaced when filled to the top the lids should not be closed.

c. Employees must never reach by hand into containers of contaminated sharps.

d. Sharps containers should be opened, emptied, and cleaned manually.

10. When you use Standard Precautions you are in full compliance with OSHA's requirement to use Universal Precautions.

a. True

b. False

11. Standard Precautions:

a. Do not cover all the requirements of the Bloodborne Pathogens Standard.

b. Consider all body fluids of all patients to be potentially infectious.

c. Require wearing of gloves for dry skin contact with all patients.

d. Are not feasible in settings such as correctional institutions.

12. Personal protective equipment:

a. Should be purchased by employees who are in frequent contact with blood or other body fluids.

b. Include only latex gloves, which have been shown to be the only type of glove that protects against bloodborne pathogens.

c. Are devices that isolate or remove the bloodborne pathogen hazard from the workplace.

d. Must be provided by the employer, who is required to clean, repair and replace it as needed.

13. The Bloodborne Pathogens Standard requires annual retraining of workers and must:

a. Cover problems currently being addressed in the workplace.

b. Cover specific content required by OSHA.

c. Be provided both in-house and on mobile devices.

d. Be documented with a written test.

14. Regulated waste:

a. Must be poured into flushable tanks.

b. Includes all items that have been in an HCV patient's room.

c. Includes any object soiled with blood.

d. Must be placed in closeable, leak-proof containers that are color-coded.

15. Contaminated laundry should be:

a. Placed in labeled or color-coded bags at the location where it was used.

b. Shaken carefully to be sure no sharps go to the laundry.

c. Placed in red bags for incineration.

d. Rinsed before bagging to reduce gross soiling.

16. The hepatitis B vaccine:

a. Is a series of four injections that must be completed to ensure immunity.

b. May occasionally cause mild illness in the vaccinated person.

c. Should not be given to those who are already immune or who may be HBV carriers.

d. Conveys full protection when a series of three injections is completed.

17. An occupational exposure:

a. Is any skin contact with blood, tissue or OPIM.

b. Should be reported within a week so that similar situations can be avoided in the future.

c. Is a percutaneous injury or contact of mucous membrane or non-intact skin with potentially infectious material.

d. Has often led to HIV infection in healthcare workers.

18. Post exposure prophylaxis, or PEP:

a. Provides post exposure protection against hepatitis C.

b. Protects against hepatitis B and should be started within 28 days after initial exposure.

c. Against HIV must be started immediately in consultation with experts on anti-retroviral therapy.

d. Can be as simple as taking one pill.

19. The employee's HIV and HBV status must be reported to employers.

a. True

b. False

20. What is an employee's responsibility regarding the OSHA Bloodborne Pathogen Standard?

a. Nothing. The employer has the responsibility.

b. Follow the law regarding correct use of PPEs, sharps use and reporting of incidents.

c. Complete the annual training.

d. b and c.

12. Answer Sheet: BBP (246)

Name (Please print) _____

Date _____

Passing score is 80%

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
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16. _____
17. _____
18. _____
19. _____
20. _____

13. Course Evaluation: BBP (246)

Please use this scale for your course evaluation. Items with asterisks * are required.

5=Strongly agree 4=Agree 3=Neutral 2=Disagree 1=Strongly disagree

*1. Upon completion of the course, I was able to:

1. Describe the scope of suicide in Washington State and nationally. 5 4 3 2 1

2. Explain the 4 main components of suicide risk screening and assessment. 5 4 3 2 1

3. State 5 groups that are disproportionately impacted by suicide. 5 4 3 2 1

4. Relate 3 differences between high risk of suicide and low risk. 5 4 3 2 1

5. Describe 3 commonly used psychosocial techniques that have been shown to reduce the risk of suicidal ideation and behaviors. 5 4 3 2 1

6. Explain 3 reasons why psychiatric medications may reduce suicidal ideations and behaviors. 5 4 3 2 1

7. Relate 3 reasons why supportive third parties can help reduce suicidal ideation and behaviors in their communities. 5 4 3 2 1

8. Explain 3 aspects of military culture that may affect the incidence of suicide in active-duty military and veterans. 5 4 3 2 1

9. Describe 3 protective factors against suicidal ideation and suicidal behaviors for veteran populations. 5 4 3 2 1

*2. The author is knowledgeable about the subject. 5 4 3 2 1

*3. The author(s) cited evidence that supported the material presented. 5 4 3 2 1

*4. This course contained no discriminatory or prejudicial language. Yes No

*5. The course was free of commercial bias and product promotion. Yes No

*6. As a result of what you have learned, do you intend to make any changes in your practice? Yes No

If you answered Yes above, what changes do you intend to make? If you answered No, please explain why.

*7. Do you intend to return to ATrain for your ongoing CE needs?

_____Yes, within the next 30 days.

_____Yes, during my next renewal cycle.

_____Maybe, not sure.

_____No, I only needed this one course.

*8. Would you recommend ATrain Education to a friend, co-worker, or colleague?

_____Yes, definitely. _____Possibly. _____No, not at this time.

*9. What is your overall satisfaction with this learning activity? 5 4 3 2 1

*10. Navigating the ATrain Education website was:

_____Easy. _____Somewhat easy. _____Not at all easy.

*11. How long did it take you to complete this course, posttest, and course evaluation?

_____60 minutes (or more) per contact hour

_____50-59 minutes per contact hour

_____40-49 minutes per contact hour

_____30-39 minutes per contact hour

_____Less than 30 minutes per contact hour

12. I heard about ATrain Education from:

_____Government or Department of Health website.

_____State board or professional association.

_____Searching the Internet.

_____A friend.

_____An advertisement.

_____I am a returning customer.

_____My employer.

_____Social Media (FB, Twitter, LinkedIn, etc)

13. Please let us know your age group to help us meet your professional needs.

_____18 to 30 _____31 to 45 _____46+

14. I completed this course on:

_____My own or a friend's computer.

_____A computer at work.

_____A library computer.

_____A tablet.

_____A cellphone.

_____A paper copy of the course.

Please enter your comments or suggestions here:

14. Registration and Payment: BBP (246)

Please print and answer all of the following questions (* required).

*Name_____

*Email_____

*Address_____

*City_____*State_____*Zip

*Country_____

*Phone_____

*Professional Credentials/Designations _____

*License Number and

State_____

*Please email my certificate _____Yes _____No

(If you request an email certificate we will not send a copy of the certificate by US Mail.)

Payment Options

You may pay by credit card or by check. Course price: $19.00

Fill out this section only if you are paying by credit card.

Credit card information

*Name_____

Address (if different from above)

_____

*City_____*State_____ *Zip_____

*Card type: ____Visa ____Master Card ____American Express ___Discover

*Card number_____

*CVS#_____

*Expiration date _____