



## Blood-borne Pathogens Training

This information is not intended to be a detailed, technical look at every aspect of every possible pathogen. The term pathogen refers to any disease-causing agent, typically a virus, bacterium, or some other microorganism. This basic training should provide all Chayce employees a foundational understanding of:

- *What* blood-borne pathogens are
- *How* they get into our bodies/systems
- *Their* effects and symptoms
- *What* precautions to take when dealing with them
- *How* to properly clean up after an incident

Some, if not many, of the terms and diseases you will likely have heard of, perhaps even know someone who is coping with one of them. Each person should take this training seriously, always being mindful of the genuine hazards such pathogens bring.

### OSHA's Blood-borne Pathogen Standard

This standard places requirements on employers whose workers can be reasonably anticipated to contact blood or other potentially infectious materials (OPIM), such as unfixed human tissues and certain body fluids.

OSHA standards are intended to be implemented as a means to *prevent* occupational injuries and illnesses. Our clients, such as Facebook, are not required by law to provide things like 'sharps containers' for syringes, broken glass, etc—things which may cause a 'stick' or puncture hazard. However, they may (by law) require a person using syringes to provide some kind of protective container to prevent potential exposure to others in the workplace. Having said that, most 'host' vendors will make accommodations for their sub-vendors if such a need exists. There is a lot more to it than that, but for purposes of our operational understanding that is what's important.



### What Are Blood-borne Pathogens?

**Blood-borne pathogens are infectious microorganisms in human blood that can cause disease in humans.** These pathogens include, but are not limited to, hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV).

Needlesticks and other sharps-related injuries may expose workers to blood-borne pathogens. Workers in many occupations may be at risk for exposure to blood-borne pathogens.

### Hepatitis B

Hepatitis B attacks the liver. It can cause fatal liver conditions like cirrhosis, liver cancer and liver failure. The CDC estimates that 3,000 people die each year from Hepatitis B related illness in the United States. Hepatitis B is commonly transmitted among drug users through shared

needles and **can be transmitted through any blood contact that involves a puncture of the skin or mucosal contact with other infectious body fluids.**

### Hepatitis C

The CDC lists Hepatitis C as the most common chronic blood-borne infection in the United States. **Hepatitis C is transmitted most efficiently through direct blood contact involving a skin puncture.** Transmission through sex or contact with other bodily fluids is possible but uncommon. As with Hepatitis B, Hepatitis C can result in chronic, fatal liver diseases. The CDC estimates that four times as many people die from Hepatitis C related illnesses than from Hepatitis B.

*A Hepatitis B vaccine* became available in 1982 and vaccinated individuals have virtually no chance of contracting the disease. *No Hepatitis C vaccine is available.*

### HIV

Human immunodeficiency virus causes AIDS (Acquired Immune Deficiency Syndrome). AIDS weakens the immune system making it difficult for infected persons to resist other illnesses. AIDS is a late stage of the HIV viral infection, **HIV is transmitted through unprotected sexual activity but can also be contracted through direct blood contact through skin punctures or to mucus membranes.**

Currently there is no HIV vaccine.

### Viral Hemorrhagic Fever

Viral Hemorrhagic Fever (VHF) refers to a group of illnesses that affect multiple organ systems. Bleeding, or hemorrhaging, can be a major symptom of these diseases. Insects and rodents are known hosts of VHFs but the hosts of some VHFs are unknown. Ebola and Marburg are two of the most well-known and dangerous VHFs. **VHFs can be transmitted through blood and other bodily fluids but the fluids do not have to enter the skin through a puncture to cause infection.**

Treatment for these viruses is limited and there are no vaccines available.

Although not transferred by blood, and are not classified as blood-borne diseases, there are other types of serious infectious diseases that workers need to be aware of. **These can be transmitted by skin exposure or by inhalation.**

- Methicillin-Resistant Staph Aureus (MRSA)
- Tuberculosis
- SARS
- Hepatitis A (fecal to oral contact, typically from food contamination)



### How Blood-borne Pathogens Enter The Body

Cool fact: Our skin is the largest organ we have. It is *also* the first line of defense against intrusion of pathogens; understand, however, **it is not** the only entrance for pathogens. Inhalation (breathing in) or oral routes work for some pathogens. Even rubbing the eyes—we touch or scratch our faces around 20 times every hour—can give pathogens a way in.

Intact skin, meaning no cuts, scrapes, or punctures, does an amazingly good job of keeping harmful pathogens at bay. But once some kind of breach happens—a paper cut, a sliver, a needle stick, etc.—germs stampede in like a Black Friday crowd at Walmart. Pathogens can also enter the bloodstream through other ‘vectors’ such as mosquitoes, ticks, cat or dog scratches, or contaminated needles.

As unsettling as that may sound, it is equally important to remember the body is usually remarkably good at providing natural defenses to foreign bodies. Blood clotting and white blood cells help during an immune system response to a wound; the eyes have enzymes to help protect them; the nose has mucous membranes to trap particulates and saliva has both antiviral and antibacterial properties. But all life forms evolve to adapt to changing environments, and pathogens are no exception.

**Microbes gain access to human tissues via two main routes:** **mucosal** surfaces within the body (linings of the respiratory, digestive, reproductive, or urinary tracts) or **epithelial** (skin) surfaces on the outside of the body (areas of skin that are either damaged or compromised due to insect bites, cuts/scrapes, or other wounds).

Transmission of microorganisms occurs directly from one person to another by one or more of the following means:

- droplet contact by coughing or sneezing on another person
- direct physical contact by touching an infected person
- direct physical contact (usually by touching soil contamination or a contaminated surface)
- airborne transmission (if the microorganism can remain in the air for long periods)
- fecal-oral transmission (usually from contaminated food or water sources)
- contamination via intravenous drug use
- contamination from blood given via transfusion or organ transplants

Transmission can also be indirect via another organism, either a vector (like a mosquito) or an intermediate host (like how a tapeworm from a pig can be transmitted to humans who ingest improperly cooked pork).



**Anti-Hysteria Note:** You cannot get an infectious disease by sitting on a toilet seat or shaking someone’s hand! But . . . if you don’t practice good hygienic (such as washing your hands thoroughly or using antibacterial hand gels) then you *can* run the risk of transferring pathogens.



### **Pathogenic Effects and Symptoms**

Many pathogens cause symptoms similar to a cold or flu. The dark side to pathogens, though, is their potential for remaining dormant or their slow but steady replication within cells. You could contract an infectious disease and not know it until weeks, months, or even years after infection.

**Hepatitis B Virus (HBV):** The most common form of hepatitis; a liver disease that initially causes inflammation of the liver and frequently leads to more serious conditions, including cirrhosis and liver cancer.

## After exposure, it can take two to six months for HBV to develop.

The initial symptoms of HBV infection are like those of a mild case of the flu:

- fatigue
- stomach pain
- loss of appetite and nausea.
- As the disease progresses, jaundice (yellowing of the skin) and darkened urine will occur.
- Loss of appetite and stomach pain commonly appear within 1-3 months, but can occur as soon as 2 weeks or as long as 6-9 months after infection.

Although there is no cure, vaccination directly after contact (well before symptoms appear) can prevent infection.

**Hepatitis C:** The hepatitis C virus is considered the most serious out of all of the hepatitis viruses. There are two main disease courses of hepatitis C: *acute hepatitis C* and *chronic hepatitis C*. The length of time you experience symptoms will depend on the type of illness.

With acute hepatitis C, the symptoms are more short-term, lasting six months or less. However, acute hepatitis can lead to chronic hepatitis which can last your entire life, because it's very difficult for your body to get rid of the virus.

According to the Centers of Disease Control and Prevention (CDC), **up to 80 percent of those with acute hepatitis C will not experience symptoms**. Conversely, in some cases, people will experience symptoms not long after the virus has infected them. These symptoms can be mild or severe and include:

- fever
- feeling tired
- poor appetite

If you develop hepatitis C symptoms soon after infection, you might also have these symptoms:

- nausea or vomiting
- pain in your stomach
- joint or muscle pain
- abnormalities in urine or bowel movements
- a yellowing in your eyes or skin

Early symptoms would be most likely to occur around six or seven weeks after exposure to the hepatitis C virus.

While some people may develop hepatitis C symptoms within two weeks of infection, others might experience a much longer delay before noticing any symptoms.

It could take anywhere from six months to 10 years or more before someone with the virus becomes aware of any symptoms. This is because it can take years for the virus to lead to liver damage.

There is no cure or vaccination currently available for HepC, although antiviral medications may be prescribed to attempt to flush the virus from the bloodstream and reduce inflammation and scarring of the liver.

**Human Immunodeficiency Virus (HIV):** A blood-borne pathogen that attacks the immune system. Symptoms of HIV can include:

- weakness
- fever
- sore throat
- nausea
- headaches
- diarrhea
- some forms of cancer.

Many people can go years before showing any symptoms. HIV eventually may lead to Acquired Immune Deficiency Syndrome (AIDS) and the breakdown of the immune system. Currently, there is no vaccination against HIV and no proven cure. However, there have been some major breakthroughs in recent years in controlling HIV and significantly delaying the onset of AIDS.



### Precautions For Dealing With Blood-borne Pathogens

The CDC recommends an overall approach of 'universal precautions', treating all human blood and body fluids as though they are known to be infectious for HIV, HBV and other blood-borne pathogens

Employees should observe Universal Precautions to prevent contact with blood or other potentially infectious materials (OPIM).

When telling the difference between body fluid types is difficult or impossible, *all body fluids* shall be considered potentially infectious materials. Treat all blood and other potentially infectious materials with appropriate precautions such as:

- Use gloves, masks, and gowns if blood or other exposure is anticipated.
- Use engineering and work practice controls to limit exposure (such as sharps containers).



If you are tasked with cleaning up a potential biohazard, **take a moment to carefully consider the potential for exposure to pathogens**—if you're going to clean dried vomit on carpet you may have to do a little scraping to loosen it from carpet fibers; potential inhalation hazard, right? How about cleaning blood—no matter how little the quantity—off a floor or countertop; might not some droplets get splashed onto skin, into eyes, or inhaled?

Gloves—absolutely.

Eye protection—not a bad idea.

Face mask or shield—it's your system you risk contaminating, but at minimum a face mask would be worthwhile.

### TO PREVENT INFECTION, FOLLOW THESE GUIDELINES:

- Avoid contact with blood and other body fluids.
- Use CPR breathing barriers, such as resuscitation masks, when giving ventilations (rescue breaths).
- Cover any cuts, scrapes or sores and remove jewelry, including rings, before wearing disposable gloves.
- Remove disposable gloves without contacting the soiled part of the gloves and dispose of them in a proper container. (see below)

- Thoroughly wash your hands and other areas immediately after cleaning an incident. Use alcohol-based hand sanitizer where hand-washing facilities are not available if your hands are not visibly soiled.



### Proper Cleanup After An Incident

This may sound simple, if not a little gross. But to prevent potential infection we can't simply use a few paper towels and mop or vacuum the affected area. Pathogens are quite happy to be vacuumed or mopped because those do nothing to deactivate or disrupt their infectious mechanisms—they still function and can still easily contaminate. Would you shake someone's hand immediately after they sneezed into it? Didn't think so. Then why would we only partially clean and not disinfect a potential biohazard area?



### Do you need to use a specific disinfectant?

No. Matter of fact, OSHA recommends a very simple disinfectant solution comprised of 1 part bleach to 9 parts water. A typical bottle of water is 20 ounces, so 1 ounce of bleach then fill to the halfway point with water. Bleach is much more effective at killing nasties like *C. Difficile* and *Norovirus* than most ammonium-based disinfectants.

Whatever the incident, **always** have 3-4 pairs of gloves with you when cleaning up. You will need a fresh pair at each stage of cleanup.

- 1) **Assess the area and degree of event.** Is it a few drops of blood in one area, or was it dripped down a hallway? Is it on door handles or the doors themselves? Did someone vomit around the toilet or did they not make it that far? Is there potentially infectious material on a table in the cafeteria—what about the surrounding chairs and floor?
- 2) **Do not approach the area without the appropriate personal protective equipment (PPE)!** At a bare minimum gloves will be needed, and best to have eye protection and a face mask as well. **This goes for each person working on the cleanup.**
- 3) **Have all your cleaning materials gathered in the area.** Don't make several trips back and forth as this may possibly serve to spread pathogens. Have plenty of paper towels or other towels at the ready; have fresh mop water if necessary; have disinfectant solution in a spray bottle. **Very Important:** have a biohazard bag or some other means of properly containing all the items used during cleanup! Do not simply toss used gloves and paper towels into the regular trash!

Ask your supervisor or security personnel where biohazard bags, sharps containers, etc. may be located. Do not place broken glass from an incident area into a plastic bag—always use some kind of solid container, preferably one marked as biohazard. These types of containers, by law, should always have an orange or reddish-orange label with the biohazard symbol.



In case of broken glass—or anything else with sharp edges—you should always try to use something else besides your hands/fingers to pick up tiny, very sharp pieces. Why?

Besides the fact that cuts are not painless, anything which may puncture the barrier between you and potential disease-causing pathogens should not be picked up by hand to avoid possible self-harm and subsequent potential infection. 'Nuff said?

**Remove large debris:** Use a brush and dustpan or tongs/forceps to remove broken glass or other pointed shards that could break through your protective wear. Place each piece into a leak-proof sharps container. **Under no circumstances should you ever remove these objects by hand.**

**First cleaning:** Cover the spill in durable cloth towels to soak up as much fluid as possible. The disinfectant will not properly disinfect if the surface is still covered in blood, vomit, etc. Discard the used towels into a biohazard bag.



Remove your gloves properly (see below) then put on a fresh pair before proceeding

**Second cleaning:** You put on fresh gloves, right? Pour most of the disinfectant onto the area of the spill and let it soak for ten minutes. Once this time has elapsed, you should work from the outside toward the center while scrubbing the area with durable cloth towels. Place the towels in the biohazard bag. **Important: Do not use any bleach solution on carpet or other fabrics!**



Once again, remove your gloves properly, then put on a fresh pair before proceeding

**Third cleaning:** New gloves again! Now, dampen some more cloth towels (or liberally spray the area) and treat the area of the spill once more,. If you use towels discard them in a biohazard bag as well. Allow the area to air dry—do not wipe dry!

**Dispose of all materials used:** Carefully dispose of your personal protective equipment into the biohazard bag: gloves, face mask, and glasses. Be certain that all exposed surfaces have been thoroughly treated. You should seal the bag and place it into a second bag, then seal it and mark it with a biohazard label. Contact your local health department for proper disposal.

**Disinfect equipment:** Use the disinfectant to decontaminate any reusable equipment, such as dustpans, brooms, buckets, tongs, etc. After you've allowed the disinfectant to soak for 10 minutes, you should proceed to scrub the equipment and wash it off with fresh water.

**Double check yourself:** Do a final, careful check of your body for any contamination. Whether fluid managed to splash onto your shirt or the back of your elbow, it's important to recognize if you've been exposed. It is strongly recommended that you have a colleague or manager assist you with this step of the procedure.



#### **If You Are 'Stuck' Or Cut While Tending To An Incident**

If you experienced a needlestick or sharps injury or were exposed to the blood or other body fluid during the course of your work, immediately follow these steps:

- Wash needlesticks and cuts with soap and water
- Flush splashes to the nose, mouth, or skin with water
- Irrigate eyes with clean water, saline, or sterile irrigants
- Report the incident to your supervisor and/or Security
- If appropriate, seek medical attention

## REMOVING DISPOSABLE GLOVES

*Note: To remove gloves without spreading germs, never touch your bare skin with the outside of either glove.*

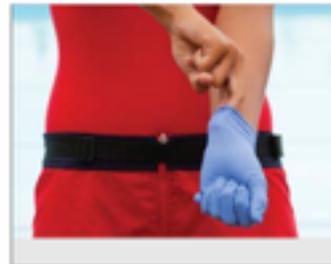
### 1 PINCH GLOVE

Pinch the palm side of one glove near your wrist. Carefully pull the glove off so that it is inside out.



### 2 SLIP TWO FINGERS UNDER GLOVE

Hold the glove in the palm of your gloved hand. Slip two fingers under the glove at the wrist of the remaining gloved hand.



### 3 PULL GLOVE OFF

Pull the glove until it comes off, inside out. The first glove should end up inside the glove you just removed.



### 4 DISPOSE OF GLOVES AND WASH HANDS

After removing the gloves:

- Dispose of gloves and other personal protective equipment (PPE) in a proper biohazard container.
- Wash your hands thoroughly with soap and running water, if available. Otherwise, rub hands thoroughly with an alcohol-based hand sanitizer if hands are not visibly soiled.