

Exposure to Biological Hazards

Biological hazards discussed here include blood-borne diseases (e.g., HIV and hepatitis A, B, and C), West Nile virus, tick-borne diseases, and hantavirus.

Blood-Borne Diseases Such as HIV and Hepatitis A, B, and C

Blood and certain body fluids can be infected with tiny organisms that can cause disease in humans. These micro-organisms are known as blood-borne pathogens. Those of most concern are the human immunodeficiency virus (HIV) and the hepatitis B and C viruses. HIV causes the disease AIDS (acquired immune deficiency syndrome), and the hepatitis B and hepatitis C viruses cause diseases with the same names.

Employees who work outdoors in areas where public access can't be controlled, and inside workers who work at places frequented by the public, sometimes find used needles and condoms in their work areas. These items – which could carry HIV and the hepatitis B and C viruses – are often thrown away in parks, streets, alleys, empty lots, public washrooms, and on beaches.

Most workers won't ever come into contact with blood and body fluids that can spread HIV and the hepatitis B and C viruses. Still, even if you work in a setting where contact with blood and body fluids is not expected, you should take some basic precautions, because it is possible to become infected from a single exposure incident – that is, harmful contact with infected blood or body fluids.

Transmission of HIV and the Hepatitis B and C Viruses

HIV and hepatitis B and C viruses can all be spread by infected blood. They can also be spread by certain other infected body fluids. For infection to occur, viruses from infected blood and body fluids must enter the body. Whether the infection will occur depends on each individual's ability to fight infection. Human tissues and organs used for transplant can also transmit these viruses.

Some of the body fluids that spread these viruses include

- Semen
- Vaginal secretions
- Amniotic fluid (fluid that the fetus lives in within the womb)
- Fluid around the heart
- Fluid in the lining of the lungs
- Fluid in the abdomen
- Fluid in joints

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- Fluids surrounding the brain and spinal cord
 - Breast milk (known to transmit only HIV)
 - Saliva (known to transmit only hepatitis B)
 - Any body fluid with visible blood

The following body fluids **do not** spread HIV or hepatitis B or C unless you can see blood in them:

- Tears
- Nasal secretions
- Sputum (coughed up from the lungs)
- Vomit
- Urine
- Sweat
- Feces

These body fluids, however, may spread other infections (e.g., feces can spread hepatitis A and sputum can spread tuberculosis), but they are not of concern in the spread of HIV and the hepatitis B and C viruses.

Exposure to Infected Blood and Body Fluids at Work

For contact with infected blood and certain body fluids to pose a risk of infection, blood-borne viruses must have the opportunity to enter the body. Whether an infection occurs depends on the individual's ability to fight infection. Workers can be exposed to infected blood and body fluids at work in the following ways:

- By puncturing the skin with a sharp object contaminated with infected blood and body fluids (e.g., needles, scalpels, knives, razors, scissors, broken glass, and anything else that can pierce, puncture, or cut skin)
- By splashing infected blood and body fluids into the mucous membranes (the tissue lining of the eyes, nose, or mouth)
- By splashing infected blood and body fluids onto broken skin (e.g., fresh open cuts, nicks, wounds, skin abrasions, chapped or damaged skin, and skin with disease such as eczema and dermatitis)

Although HIV is considered fragile outside the human body, it is not known how long it can live on discarded needles and sharps.

Hepatitis B and C can pose much greater risk to workers than HIV because these viruses are more easily transmitted. The hepatitis B virus is also much hardier – it can survive in a dried state on surfaces at room temperature for at least one week. There is no data on how long the hepatitis C virus can last in the environment, and this has not been established as a route of transmission.

Protection Practices

- Recognize the common work-related risks, such as
 - Cleaning hotel rooms
 - Cleaning bathrooms
 - Picking up litter (e.g., needles, condoms, and other sharp objects) from the ground, alleys, parking lots, and streets
- Follow your employer's or your company's safe work procedures.
- Ensure that biological and other related waste is placed in specially marked containers.
- Wear gloves and a face mask.
- Make sure you cover cuts and scratches.

When exposed to infected or potentially infected blood or body fluids

1. Get first aid immediately.

- If the mucous membranes of your eyes, nose, or mouth have been affected, flush them with lots of clean water at a sink or eyewash station.
- If there is a sharps injury, allow the wound to bleed freely. Then wash the area thoroughly with non-abrasive soap and water.
- If an area of broken skin is affected, wash the area thoroughly with non-abrasive soap and water.

2. Report the incident.

Report the incident as soon as possible to your supervisor and first-aid attendant or occupational health staff. Make sure there is no significant delay in seeking medical attention.

3. Seek medical attention immediately.

Seek medical attention immediately – preferably within two hours – at the closest hospital emergency room or at a health care facility if there's no hospital emergency room in the vicinity. Immunizations or medications may be necessary. These may prevent infection or favourably alter the course of the disease if you do become infected. Blood tests should also be done at that time. You may need to see your family doctor within the next five days for follow-up, such as counselling and medications.

West Nile Virus

West Nile virus infection occurs when the virus is transmitted to humans, primarily by bites from mosquitoes. People infected with the West Nile virus usually either show no symptoms at all, or develop West Nile fever. West Nile fever is a mild disease, like the flu, that typically lasts only a few days and is not believed to have any long-term effects. Severe cases of West Nile virus infection, however, can result in one of the following:

- West Nile encephalitis, an inflammation of the brain
- West Nile meningitis, an inflammation of the membrane around the brain
- West Nile meningoencephalitis, an inflammation of the brain and the membrane around it.

The signs and symptoms of these severe diseases may last several weeks and could result in permanent neurological effects.

Protection Practices

You can reduce or eliminate the risk of becoming infected with the West Nile virus by taking preventive measures to minimize mosquito bites. One of the best ways to do this is to reduce or eliminate mosquito populations. That is usually done by getting rid of sources of stagnant or standing water that serve as mosquito breeding grounds. Mosquitoes need only four days to breed in stagnant or standing pools of water.

If you have to work outside, there are several measures you can take to prevent mosquito bites:

- Cover as much of your skin as possible by wearing long-sleeved shirts, long pants, and socks. Wear light colours, since dark colours attract mosquitoes.
- Cover exposed areas of your skin with an insect repellent. According to the B.C. Centre for Disease Control, insect repellents containing DEET offer the best protection against mosquitoes. (The percentage of DEET in repellents should not exceed 30 percent for adults or 10 percent for children.) Make sure you follow the directions when using insect repellents and do not apply it to skin that is already cut, burned, or otherwise irritated.
- Apply insect repellent to the outside of your clothing, as well as to all exposed skin.
- Do not wear perfume or cologne, which may attract mosquitoes.
- Do not pick up dead birds with your bare hands. The birds may be carrying the virus.

Mosquitoes are most likely to swarm during the late evening and early morning hours, so take extra precautions at these times.

Tick-Borne Diseases

If you are working in a grassy or wooded area, it is important to protect yourself from ticks. Two species of ticks in British Columbia can cause diseases in humans:

- The Rocky Mountain wood tick is found in the British Columbia interior dry belt from the U.S. border north to Williams Lake and east to Alberta. If these ticks remain on the body for several days, their bites can cause tick paralysis, which usually stops shortly after the tick has been removed. Symptoms start with numbness in the feet and legs, making walking or standing difficult. These ticks can also carry Rocky Mountain spotted fever, but that disease rarely occurs in Canada.
- The western black-legged tick lives in vegetation in the warm, moist coastal areas of Vancouver Island and along the mainland from the U.S. border to Powell River. Its range extends eastward along the Fraser River to Hope and north to Boston Bar. The bite is often painful and may result in a slow-healing ulcer. In rare cases, some western black-legged ticks carry bacteria that may cause Lyme disease, with symptoms such as a red skin rash, fever, headache, fatigue, sore throat, and swollen glands.

Protection Practices

- Wear long pants and a long-sleeved shirt. Tuck pants into socks and shirt into pants. Spraying insect repellent containing DEET on your pants may help repel ticks.
- Avoid walking or resting in areas overgrown with vegetation.
- After working, examine your body and clothes closely for ticks.
- Remove ticks immediately when you find them.

Hantavirus

Hantavirus infection is caused by a virus that is found in some rodents, especially deer mice. The virus is rarely transmitted to people, but when it is, it can cause severe illness – hantavirus pulmonary syndrome (HPS) – and even death.

Although only deer mice have been found to carry the virus in British Columbia, other rodents should not be ruled out as potential carriers. The virus does not appear to cause illness in rodent hosts. Infected rodents shed the virus in saliva, urine, and feces, and it is then spread to humans when particles of infected saliva, urine, or feces are inhaled. The virus may be inhaled during direct contact with the rodent, or from breathing airborne dust particles that are generated when rodent excreta are disturbed. The virus can be spread if infected materials contact broken skin or the membrane lining of the eyelids and the eyeball.

It is not known whether someone can become infected from a rodent bite or by eating or drinking food or water contaminated by rodents.

Many of the confirmed cases of Hantavirus Pulmonary Syndrome in British Columbia have been work related, and most of these cases have appeared to involve direct contact with mice or their droppings. Cases of hantavirus in the United States, Alberta, and British Columbia have been associated with activities such as

- Sweeping out a barn and other ranch buildings
- Trapping and studying mice
- Using compressed air and dry sweeping to clean up wood waste in a sawmill
- Handling grain contaminated with mouse droppings and urine
- Entering a barn infested with mice
- Planting or harvesting field crops
- Occupying previously vacant dwellings
- Disturbing rodent-infested areas while hiking or camping
- Living in dwellings with a sizable indoor rodent population

Protection Practices

The primary prevention strategy for minimizing worker exposure to hantavirus is to control rodent populations in and around the worksite. An effective rodent control program requires an integrated approach and includes

- Ongoing inspections for rodents – ensuring the area is inspected by qualified people who can determine if active rodent control is required
- Sanitation – reducing the number of places, both inside the worksite and in the immediate vicinity, where rodents may feed or find shelter
- Rodent proofing – ensuring rodents cannot get into building spaces (e.g., by closing openings where rodents gain entry, installing barrier materials such as steel wool, fine mesh screens, mortar, and sheet metal)
- Rodent population reduction – reducing and controlling the population through the use of poison or traps