

CONTROLLING EXPOSURE: PROTECTING WORKERS FROM INFECTIOUS DISEASE



About WorkSafeBC

WorkSafeBC (the Workers' Compensation Board) is an independent provincial statutory agency governed by a Board of Directors. It is funded by insurance premiums paid by registered employers and by investment returns. In administering the *Workers Compensation Act*, WorkSafeBC remains separate and distinct from government; however, it is accountable to the public through government in its role of protecting and maintaining the overall well-being of the workers' compensation system.

WorkSafeBC was born out of a compromise between B.C.'s workers and employers in 1917 where workers gave up the right to sue their employers or fellow workers for injuries on the job in return for a no-fault insurance program fully paid for by employers. WorkSafeBC is committed to a safe and healthy workplace, and to providing return-to-work rehabilitation and legislated compensation benefits to workers injured as a result of their employment.

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The WorkSafeBC Prevention Information Line can answer your questions about workplace health and safety, worker and employer responsibilities, and reporting a workplace accident or incident. The Prevention Information Line accepts anonymous calls.

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To report after-hours and weekend accidents and emergencies, call 604 273-7711 in the Lower Mainland, or call 1 866 922-4357 (WCB-HELP) toll-free in British Columbia.

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WorkSafeBC publications

Many publications are available on the WorkSafeBC web site. The Occupational Health and Safety Regulation and associated policies and guidelines, as well as excerpts and summaries of the *Workers Compensation Act*, are also available on the web site: WorkSafeBC.com

Some publications are also available for purchase in print:

Phone: 604 232-9704

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Introduction

The emergence of AIDS during the 1980s raised awareness of bloodborne diseases. Most people now cannot imagine handling blood without wearing appropriate gloves. The SARS crisis of 2003 heightened the need to address other infectious diseases in workplace health and safety programs.

Changes to the Occupational Health and Safety Regulation (the Regulation) in British Columbia have expanded the regulatory requirements for infectious diseases beyond blood and body fluids. Preventive action is now required for any infectious disease that is found in the workplace and may pose a risk to workers.

Workers in healthcare are at greater risk of exposure to infectious diseases; however, the information in this publication is relevant to every industry in B.C., including:

- Law enforcement and corrections
- Dentistry
- Funeral homes
- Hospitality
- Schools
- Animal hospitals
- Construction
- Food processing

This book:

- Describes common infectious diseases and how they are spread
- Explains how to protect workers from exposure to infectious diseases
- Explains the requirements of the Regulation that relate to infectious diseases

This book contains three appendices:

- Appendix 1: Common terms
- Appendix 2: Sample exposure control plan for pandemic influenza
- Appendix 3: Biological agents

Although this book summarizes the requirements related to infectious diseases, always refer to the relevant sections of the Regulation when determining your legal responsibilities.

Search the Regulation online

The WorkSafeBC web site includes a searchable version of the Occupational Health and Safety Regulation and its accompanying Guidelines, as well as excerpts from the *Workers Compensation Act*.

Visit WorkSafeBC.com and under “Quick Links” click “OHS Regulation.” Infectious diseases are found in sections 6.33–6.41 (Biological Agents).



Employer and worker responsibilities

Employers are required by law to ensure that work is being conducted safely, and to protect their workers from all work-related hazards, including exposure to infectious diseases. Section 115 of the *Workers Compensation Act* specifies that employers are not only responsible for their own workers, but also for any other workers who may be present at their workplace.

Employer requirements for protecting workers

Employers must do the following:

- Identify infectious diseases that are, or may be, in the workplace.
- Develop and implement an exposure control plan, when required (see “Exposure Control Plans” on pages 29–34).
- Inform workers about how they may be exposed to infectious diseases in the workplace.
- Educate, train, and supervise workers on safe work procedures, including hand washing and the proper use of personal protective equipment (PPE).
- Offer vaccinations as recommended in the BC Centre for Disease Control’s *Communicable Disease Control Manual*, without cost to workers who are at risk of occupational exposure.
- Purchase safety-engineered medical devices, where appropriate.
- Tell workers to seek medical attention, as required.

Employers should also encourage reporting of exposures, including needle-stick injuries.

What can workers do to protect themselves?

Workers have responsibilities to help reduce their risk of exposure to infectious pathogens, including the following:

- Attend education and training sessions.
- Follow safe work procedures, including hand washing and wearing PPE, if applicable.
- Seek immediate first aid and medical attention after an occupational exposure.
- Report exposure incidents to supervisors or managers.
- Refuse work that they have reasonable cause to believe will put themselves or others at risk.

Workers should also keep a record of personal vaccinations, and ensure that their vaccinations are up to date.

Bloodborne diseases

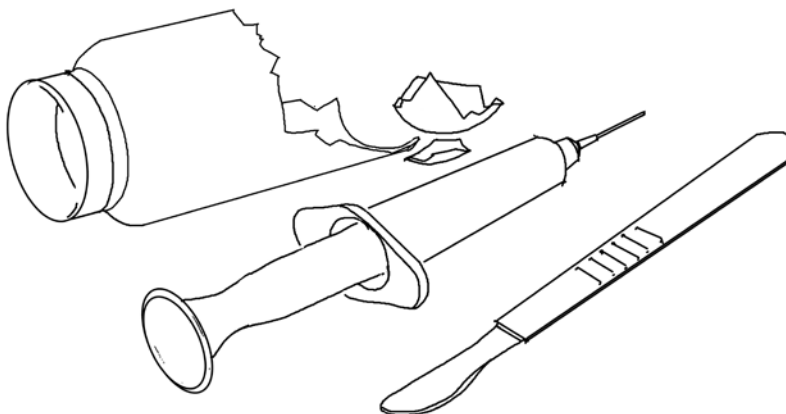
Generally, workers are most concerned about possible exposure to *bloodborne diseases*, infectious diseases that are transmitted through contact with infected blood or certain body fluids. Three bloodborne diseases that pose the greatest risk to workers are caused by three different viruses.

Virus	Disease
human immunodeficiency virus (HIV)	acquired immune deficiency syndrome (AIDS)
hepatitis B virus	hepatitis B
hepatitis C virus	hepatitis C

How are bloodborne diseases spread?

HIV and the hepatitis B and C viruses can be spread by direct contact with infected blood and certain other infected body fluids. To cause infection, the blood or body fluids containing the virus *must gain entry* into the bloodstream. The highest-risk exposures are from sharps injuries (puncture wounds from needles or cuts from scalpels) or splashes to a worker's mucous membranes (especially the eyes and mouth). Splashes of blood on intact skin are considered extremely low risk for infection because intact skin is an effective barrier that prevents the virus from gaining entry.

The following sections describe how these bloodborne diseases are transmitted, what to expect during the course of disease, who is at risk, and how to prevent exposure.



Injuries caused by sharps such as needles, scalpels, and broken glass specimen tubes can put workers at higher risk of exposure to bloodborne diseases, which must gain entry into the bloodstream to cause infection.

Body fluids that can spread HIV and hepatitis B and C

- blood
- any body fluid with visible blood
- amniotic fluid (fluid that surrounds the fetus in a pregnant woman's uterus)
- cerebrospinal fluid (fluid surrounding the brain and spinal cord)
- pericardial fluid (fluid around the heart)
- peritoneal fluid (fluid in the abdomen)
- pleural fluid (fluid in the lining of the lungs)
- synovial fluid (fluid in joints)
- semen (HIV and hepatitis B only)
- vaginal secretions (usually HIV and hepatitis B only)

HIV/AIDS

HIV is a virus that attacks the immune system, and can lead to AIDS.

Transmission

A person can become HIV infected through direct contact with HIV-infected blood, certain internal body fluids (fluid around the heart, lungs, joints, or brain), semen, or vaginal secretions.

Workers can be infected if they are stuck by a needle or other sharp object that contains HIV-infected blood or if blood splashes in their eyes or mouth. It is also possible for HIV to enter through breaks in the skin, especially if workers do not wear gloves when they have non-intact skin (for example, a cut or sore on their hands).

HIV/AIDS is not transmitted through casual contact (for example, shaking hands). If it was, many more of us would be HIV infected because many workers have either knowingly or unknowingly been in close contact with HIV-infected people.

Course of disease

HIV destroys the body's ability to fight off germs. In the early stages most people feel fine. Some have a brief flu-like illness for a few days or weeks when the virus enters their body. HIV-infected people look perfectly healthy. No matter what stage the disease is in, HIV-infected people are always considered infectious.

AIDS is the end stage of HIV infection. It is diagnosed once the virus has damaged the immune system to the point where the infected person cannot fight off other germs and becomes sick with a variety of illnesses. Without treatment, a person with AIDS may eventually die from overwhelming infections (such as pneumonia or tuberculosis) or cancer.

Hepatitis B and C

The term *hepatitis* describes any inflammation of the liver. It is generally caused by a virus, but alcohol or certain drugs can damage the liver and cause hepatitis.

The various hepatitis viruses are completely unrelated to one another, but they all attack and damage *only* the liver. Hepatitis B and C are the two hepatitis viruses that are of concern to healthcare workers because they are spread through blood, and can cause long-term complications.

Transmission (hepatitis B)

The hepatitis B virus is transmitted in much the same way as HIV (the AIDS virus), *but hepatitis B is much easier to catch*. A drop of blood infected with hepatitis B contains enough of the virus to infect someone. Like HIV, the hepatitis B virus *must gain entry into the bloodstream* to cause infection.

Course of disease (hepatitis B)

Many people have very few noticeable symptoms. The symptoms are similar to a flu-like illness: low fever, tiredness, nausea, stomach pain, and loss of appetite. A few weeks later, some may notice jaundice. People over 40 will usually have more severe illness. One concern with hepatitis B is the possibility of becoming a chronic carrier and developing long-term complications. People who become chronic carriers are always infectious, even though they feel fine.

Transmission (hepatitis C)

Hepatitis C is most commonly transmitted through exposure to infected blood. Outside of the workplace, intravenous drug users who share needles are at great risk. Unlike HIV and hepatitis B, sexual transmission of hepatitis C is rare.

Course of disease (hepatitis C)

Most people with hepatitis C do not have any symptoms of the infection, and do not know that they are infected. A small percentage will have symptoms many weeks or even months after the initial infection. Feeling sick is not the main issue with hepatitis C. Becoming a carrier and developing long-term complications are the real problems. Long-term liver damage from chronic hepatitis C infection can lead to death.

Hepatitis B vaccine

Hepatitis B vaccine in a three-dose series gives lifelong immunity to hepatitis B. Employers must offer the hepatitis B vaccine, at no cost, to all workers who have or may have occupational exposure to the hepatitis B virus (see section 6.39 of the Regulation).

Who is at risk?

Any worker who comes in contact with any of the body fluids that can spread bloodborne disease is at risk. Exposures can occur through needle sticks or other sharps injuries, or blood splashes.

Some occupations have higher risks due to the client population and the types of procedures being performed. These include: surgeons, nurses, operating and emergency room staff, lab workers, paramedics, fire fighters, police, staff in hemodialysis units, dentists, dental hygienists, and occupational first aid attendants.

Fortunately, it is rare to contract a disease from occupational exposure to bloodborne pathogens. However, contracting one of these diseases has significant consequences and long-lasting health implications, and could result in serious illness or even death.

Preventing exposure to bloodborne diseases

The good news is that the transmission of bloodborne pathogens is preventable, and preventing transmission is the same for all bloodborne diseases.

Treat all blood as potentially infectious

As explained earlier in this section, many people who are carriers of HIV, hepatitis B, and hepatitis C have no symptoms and *do not know* that they are infected. In order to protect yourself from possible exposure to bloodborne pathogens, consider all blood to be potentially infectious, and use appropriate precautions for all contact with blood and body fluids.

Prevention tips

A good way to start identifying potential exposures is to look at workplace inspections, staff feedback, incident investigations, first aid records, and claims records. Once potential exposures have been identified, consider the following prevention methods:

- Follow proper hand washing procedure (see page 45). Hand washing is the simplest, most effective means of controlling the spread of infectious disease.

- Follow routine practices whenever there is any possibility of exposure to blood or other body fluids. Routine practices include hand hygiene, safe work practices, and the use of PPE such as gloves, eye protection, and gowns.
- Replace conventional sharps with needleless systems or devices that have safety-engineered features (for example, retractable needles, blunt-tip suture needles, and shielded scalpels).
- Develop safe work procedures that encourage immediate disposal after using a sharp, prohibit recapping of sharps, and make use of “hands-free” (or neutral zone) methods of passing instruments.
- Educate staff about safe work practices, the availability of a hepatitis B vaccine, the importance of reporting incidents and near misses, and their responsibilities for creating a safe workplace.
- Ensure that waste collection includes the separation and isolation of sharps and biomedical waste. Workers should not compress garbage bags by hand. Garbage bags should be held away from the body to avoid scratches from sharps inadvertently left in the bags. Sharps disposal containers should be puncture resistant.
- Identify laundry that is soiled with blood, and follow routine practices when handling it, including wearing gloves and gowns.
- Make sharps containers readily available wherever sharps may be used, including at bedsides, in a client’s home, in the operating room, or in an area known to have discarded needles.
- Use break- and leak-resistant sample collection containers.
- Develop general cleaning and blood-spill cleanup procedures that include disinfection of surfaces contaminated by blood. For small drops of blood, use a solution of 1 part household bleach to 50 parts water, mixed fresh daily. For large spills of blood, use 1 part household bleach to 10 parts water, mixed fresh daily.
- Refer anyone who suffers a possible occupational exposure to a bloodborne pathogen to the nearest appropriate medical facility. Someone who suffers a needle-stick injury should be assessed by a physician within two hours of the injury. Provide workers with psychological support after exposures.
- Investigate all exposures to help prevent recurrence.

What is the difference between routine practices and standard precautions?

Routine practices and standard precautions describe the same processes for preventing and controlling exposure to infectious disease. *Routine practices* is the term commonly used in Canada, and *standard precautions* is the term commonly used in the United States. Both were originally known as *universal precautions*.



If workers may encounter sharps, they should be trained in safe disposal procedures, and have access to sharps containers, gloves, and tongs.

Contact diseases

Contact diseases are infectious diseases transmitted through direct or indirect contact with bacteria or viruses.

Direct contact includes physical contact with an infected person, including contact with blood and body fluids. Outside of the workplace, direct contact includes sexual transmission.

Indirect contact involves touching something in the environment that has been contaminated by an infected person, usually an object or surface area (for example, telephones, computers, doorknobs, elevator buttons, used tissues, or contaminated medical equipment). The contaminated hands then deposit the bacteria or virus on the next object or person that they touch. Disease transmission through indirect contact includes transmission through contaminated food or water.

The diseases transmitted by direct or indirect contact that are covered in this section usually have temporary acute symptoms for workers, but may have serious consequences for clients and patients who are frail or immunocompromised.

Norovirus

Norovirus, which includes the Norwalk virus, is the general name used to identify several small viruses that cause diarrhea and vomiting in all ages, especially adults. The virus group is named after an outbreak of diarrheal disease in Norwalk, Ohio, in 1968.

Norovirus is extremely common. In the past few years, hundreds of outbreaks have been recorded in B.C. Next to the common cold, people get norovirus more than any other viral infection. Doctors usually refer to it as *viral gastroenteritis*.

Transmission

Norovirus spreads quickly through the fecal-oral route, from an infected person with unwashed hands to a susceptible person. Norovirus is spread by eating foods or drinking liquids that are contaminated with the virus, or by touching contaminated surfaces and then touching your own mouth. The virus is sturdy—it can live for days on surfaces if it is not disinfected. The good news is that norovirus does not multiply in food like salmonella does; the virus is easily destroyed by thorough cooking.

Hepatitis A

Hepatitis A is generally less serious than hepatitis B and C because it causes only temporary liver damage. As the infected person develops antibodies, the virus is eliminated, and the liver returns to normal with no long-term effects. Many people have very few noticeable symptoms, although people over 40 will usually have more severe symptoms.

Hepatitis A is of particular concern for food handlers and childcare workers. The virus is shed into feces, and then spread when contaminated food or water is ingested — this is called the fecal-oral route. The virus can survive on surfaces for up to three months.

A hepatitis A vaccine is available.

Outbreaks commonly occur in long-term care facilities, acute-care hospitals, schools, daycare centres, summer camps, restaurants, and vacation settings, including cruise ships. Many food items have been implicated in restaurant outbreaks: oysters, salads, sandwiches, cakes, frosting, raspberries, drinking water, and ice.

Large outbreaks in hospitals have been traced to just one patient who had come into the hospital with diarrhea. The close living quarters on ships make it easy for person-to-person transmission to occur. A passenger or crew member may bring the virus on board, and a single infected crew member can be responsible for a large outbreak as new susceptible passengers get on board every few weeks.

Course of disease

Symptoms come on suddenly—about 24 to 48 hours after ingesting the virus. The illness often starts with sudden episodes of vomiting and diarrhea. Other symptoms include abdominal cramps, tiredness, headache, and muscle aches. The illness usually lasts about two to three days.

Prevention

Wash your hands after using the toilet, changing diapers, and before preparing and eating food. If running water is not available, use an alcohol-based hand rub. Anyone suffering from diarrhea should not prepare food until three days after recovery.

Regular prevention

- Wash hands with soap and water, or alcohol-based hand rubs.
- Disinfect all contaminated surfaces with a solution of 1 part household bleach to 50 parts water, mixed fresh daily.

Prevention during an outbreak

- Workers with diarrhea should stay home until 48 hours after recovery.
- The elderly, very young children, and anyone with underlying medical conditions should not visit residents and patients in healthcare facilities.

Methicillin-resistant *Staphylococcus aureus* (MRSA)

Staphylococcus aureus (*S. aureus*) are bacteria normally found in the nose or on the skin in up to 30% of healthy people. *S. aureus* can cause a variety of infections, ranging from localized skin lesions such as impetigo, boils, or wound infections, to serious invasive disease. Methicillin-resistant *Staphylococcus aureus* (MRSA) are strains of *S. aureus* that have developed resistance to many antibiotics.

Transmission

In the past, most MRSA infections have occurred in healthcare facilities, and infected patients continue to be the main source of MRSA. Healthcare workers who care for patients with MRSA may pick it up on their hands, or from contaminated surfaces, including bed rails, patient care equipment, and over-bed tables.

Community-associated MRSA (CA-MRSA)

Strains of community-associated MRSA (CA-MRSA) have emerged in recent years. CA-MRSA infections are those acquired by people who have not been hospitalized or undergone a medical procedure (for example, dialysis, surgery, or catheter insertion) within the past year. CA-MRSA is more virulent than hospital-acquired MRSA and usually causes a mild skin infection that is often misdiagnosed as a boil or spider bite. In rare cases, the infection can cause severe invasive disease in otherwise healthy people.

Prevention

- Wash hands with soap and water, or alcohol-based hand rubs.
- Disinfect all contaminated surfaces with a solution of 1 part household bleach to 50 parts water, mixed fresh daily.

Who is at risk of MRSA and VRE?

A worker who provides direct patient care can be susceptible to acquiring or carrying any virus or bacteria that can be transmitted by contact. However, it is rare for MRSA or VRE to cause disease in healthy workers. MRSA and VRE pose a greater risk to clients and patients who are elderly, weak, or immunocompromised, and to those who are exposed to the unwashed hands of care providers.

Vancomycin-resistant enterococci (VRE)

Enterococci are bacteria that are commonly found in the gastrointestinal tract of 95% of healthy individuals. Vancomycin-resistant enterococci (VRE) have developed resistance to the antibiotic drug vancomycin.

Transmission

Human feces contain enterococci, which makes the fecal-oral route the most common route of transmission. VRE can be transmitted directly from patient to patient, or by a healthcare worker's hands to patients. It can be transmitted indirectly by contaminated medical devices (such as electronic thermometers) or contaminated environmental surfaces. The surfaces in rooms of patients infected with VRE are covered with VRE. The VRE bacteria can survive on inanimate surfaces for up to seven days.

Course of disease

VRE rarely causes illness in healthy people. Occasionally, enterococci can cause invasive disease, particularly in severely immunocompromised patients.

Prevention

Good hand hygiene and cleaning procedures are key parts of infection control in institutions. Thorough, daily disinfection of surfaces helps reduce the amount of bacterial contamination in the rooms of patients with VRE. Rooms of patients who have diarrhea or are incontinent can be heavily contaminated.

***Clostridium difficile* (C. difficile)**

Clostridium difficile (C. difficile) is a bacterium that causes diarrhea and more serious intestinal conditions such as colitis. It is the most common cause of infectious diarrhea among patients in hospitals and long-term care facilities.

Transmission

People with C. difficile infections carry the bacteria in their intestines, and it is shed in their feces. The bacteria can be passed from person to person

through direct or indirect contact. Healthcare workers may carry the bacteria on their hands, and as they move through a facility they may spread it to patients or contaminate surfaces such as bedding, commodes, bedpans, sinks, rectal thermometers, and handrails.

Course of disease

Symptoms of *C. difficile* infection include:

- Watery diarrhea (at least three bowel movements per day for two or more days)
- Fever
- Loss of appetite
- Nausea
- Abdominal pain or tenderness

Severe diarrhea can lead to serious complications, including dehydration. *C. difficile* can be fatal in debilitated patients.

Prevention

Follow thorough cleaning procedures that decontaminate the environment, using 1 part household bleach to 50 parts water, mixed fresh daily. In the case of an outbreak, disinfect surfaces using 1 part household bleach to 10 parts water, mixed fresh daily. Wash hands after handling contaminated waste (including diapers) and before eating, feeding, or providing personal care.

Note: Alcohol-based hand rubs are not effective against *C. difficile*.

Who is at risk for *C. difficile*?

Healthy workers are not usually vulnerable to *C. difficile*. Patients who receive antibiotics, especially the elderly, are at increased risk of acquiring *C. difficile*. Treatment with antibiotics alters the normal levels of good bacteria found in the intestines and colon. When there are fewer of these good bacteria, *C. difficile* can thrive and produce toxins that can cause infection. The combination of the presence of *C. difficile* in healthcare settings and the number of patients receiving antibiotics in these settings can lead to frequent outbreaks.

Scabies

Scabies is a skin infestation caused by the scabies mite, a tiny parasite related to ticks and spiders. Scabies mites burrow beneath a person's skin (they can do this within two to three minutes) to live and lay their eggs.

It may take two to six weeks before the person experiences severe itching. The infestation is visible as red, crusty, scaling skin — this is especially obvious on the webs between the fingers and toes; the insides of the wrists and elbows; and the thighs and buttocks.

Scabies is spread by prolonged skin contact with an infested person. The best way to prevent scabies is to recognize the physical symptoms of infestation and avoid skin contact with an infested person. Use disposable gloves, and wash with soap and water after contact with an infested person, or after handling their clothing or bedding.

Preventing exposure to contact diseases

The transmission of diseases that are spread by direct and indirect contact can be greatly limited by following infection prevention and control practices. Consider the following guidelines:

- Develop safe work procedures that encourage infection prevention and control practices. During an outbreak, minimize unnecessary patient activities, consider restricting public access to the facility, and temporarily reduce the intake of new clients.
- Educate staff about safe work practices.
- Follow proper hand washing procedure (see page 45). Hand washing is the simplest, most effective means of controlling the spread of infectious disease.
- Follow routine practices, which include hand hygiene and the use of PPE such as gloves, eye protection, and gowns.
- Develop laundry and waste collection procedures that minimize possible contamination of other surfaces.
- Develop procedures and schedules to ensure disinfection of contaminated surfaces. A dilute bleach solution (1 part household bleach to 50 parts water) is sufficient.
- Encourage staff who have signs and symptoms of illness to stay home until they feel better.

Airborne diseases

Airborne diseases are infectious diseases that are spread through the air in:

- Large respiratory droplets (droplet transmission)
- Aerosolized airborne droplet nuclei (airborne transmission)

Large droplets and aerosolized droplet nuclei are both generated by coughing, sneezing, and talking. They can also be generated by some medical procedures such as endotracheal intubation or airway suctioning.

Large respiratory droplets generally travel only a short distance (less than 2 m) through the air, and then settle out of the air quickly. Influenza is an airborne disease spread via droplet transmission.

Aerosolized airborne droplet nuclei are extremely light, and therefore can remain suspended in the air and travel considerable distances via air currents.

A person becomes infected by breathing in air contaminated with the virus or bacteria. It is unlikely but not impossible to become infected from even a brief exposure to contaminated air. The chances of infection increase the longer one is near an infected person.

Diseases that can spread through the air and present a risk to workers include tuberculosis, measles, chicken pox, mumps, and influenza. The following sections describe how these airborne diseases are transmitted, the course of disease (symptoms), who is at risk, and how to prevent exposure.

Tuberculosis (TB)

Tuberculosis (TB) is an illness that attacks the lungs and other organs, and can result in death if untreated. TB is caused by a bacterium called *Mycobacterium tuberculosis*.

Transmission

TB is spread through the air. The sputum of a person who has TB is loaded with TB bacteria. When other people nearby breathe in contaminated air, the bacteria enter their respiratory system, and they may become infected.

Most people need several days around someone with TB in order to breathe in enough germs to get the infection themselves. People living in the same household as an infectious TB patient have about a 30% risk of becoming infected. However, people infected with HIV can become infected with TB from brief exposures.

TB screening

The BC Centre for Disease Control recommends pre-employment screening for workers at risk of exposure to TB, including hospital-based healthcare workers, community and home care workers, and corrections officers. Establishing baseline data for new workers helps with future TB contact screening. For more information on TB screening, go to www.bccdc.org.

Course of disease

Ninety per cent of those infected do not ever develop active TB. These infected people have what is called *latent infection*, and are not contagious. Their bodies are able to keep the bacteria in check. Connective tissue in their lungs forms an enclosure that prevents the bacteria from reproducing and destroying the lungs. TB bacteria remain trapped in this enclosure in a dormant (latent) stage—alive, but not reproducing. In the latent phase, there are no symptoms.

If a person with latent TB suffers from another illness or their immune system falters, the live bacteria can escape the enclosure and multiply, resulting in active TB disease. This is called *reactivated TB*. The lifetime risk of active TB for people with latent infection is 5 to 10%.

People with active TB disease feel tired and weak. They cough constantly, sometimes bringing up blood. They also suffer chest pain, night sweats, fever, and fatigue. They have no appetite, and lose weight. Many people become short of breath. Among older people, males typically experience worse symptoms than females.

The incubation period for TB infection is about 4 to 12 weeks, after which a skin test will show positive or, in some cases, a lesion will appear on a chest X-ray.

Who is at risk?

Healthcare, social service, and prison workers who work with higher-risk population groups are at risk. In B.C., these vulnerable population groups include Aboriginal communities, the homeless, and immigrants from countries with high TB rates, including parts of Eastern Europe, Asia, and Africa.

Prevention

If a person has potential or confirmed infectious TB, give them a surgical mask to wear and place them in a separate room (in acute care hospitals this might include a negative-pressure isolation room with adequate ventilation and sinks). Workers should use personal respiratory protection (for example, an N95 filtering respirator) in areas where there is increased risk of exposure, including the following:

- Rooms where cough-inducing or dental procedures are done
- Homes of infectious TB patients
- Correctional institutions
- Interview rooms

Chicken pox

The medical name for chicken pox is *varicella*. It's easy to catch chicken pox because it spreads through the air. The tiny blisters of a child or adult who has chicken pox are filled with the chicken pox virus, which sheds into the air, and can infect anyone who breathes it.

Transmission

The varicella virus infects only humans. The virus does not live on surfaces. It can be transmitted through airborne transmission or direct contact with weeping sores or contaminated hands.

Course of disease

Chicken pox is usually a relatively mild childhood illness, but it can be dangerous and more severe when contracted by adults. The first signs appear anywhere from 10 to 21 days after infection. An itchy rash usually starts on the face, chest, back, shoulder blades, or armpits. Small red bumps or pimples appear, turn clear, burst, dry up, and scab over before finally healing. It takes about five days for all the bumps to appear, and five more days until the last of them crusts over. Other symptoms include fever, tiredness, and loss of appetite.

The varicella virus remains active in the body and may reactivate as *shingles* later in life. The vesicles of a patient with shingles are contagious to a non-immune person.

Who is at risk?

Chicken pox can occur anywhere in the population. Now that most infants receive the chicken pox vaccine, exposure is much less common. There is no risk of infection for workers who have been vaccinated or previously infected with chicken pox—they are considered immune.

Prevention

One chicken pox infection gives lifelong immunity; a person can get it only once. If a person is exposed again, antibodies will prevent another attack of chicken pox. For prevention tips, see page 24.

Chicken pox vaccine

There is a chicken pox vaccine that protects 85 to 90% of children completely, and protects all children from moderate to severe disease. It is not quite as effective in adults; however, even if the vaccine does not completely prevent chicken pox in adults, it does prevent severe disease. All infants in B.C. are eligible to receive one dose of the vaccine between the ages of 12 and 18 months.

Measles

The medical name for measles is *rubeola*, also known as red measles to distinguish it from German measles (*rubella*). Measles is one of the most highly contagious diseases known.

Transmission

When someone with measles breathes, coughs, sneezes, or talks, the virus is released into the air. It can survive on surfaces for up to two hours and in the air for about 30 minutes. If you enter a room soon after someone with measles has left, you can still catch measles from that person. Direct contact with the secretions from an infected person's runny nose, eyes, or cough can also spread the disease.

Course of disease

The first signs of measles appear about ten days after the virus enters the body. Symptoms include a high fever (as high as 40.6°C), followed by a cough; red, puffy, painful eyes; and a runny, stuffed-up nose. The fever lasts about six days—the rash usually appears on the second day of fever.

Who is at risk?

Like chicken pox, measles can occur anywhere in the population. Babies and older adults are usually the most seriously ill. There is no risk of infection for workers who have been vaccinated or previously infected with measles—they are considered immune.

Prevention

One measles infection gives lifelong immunity; a person can get it only once. After that, antibodies will prevent another attack of measles. Vaccine also gives lifelong immunity to measles. For prevention tips, see page 24.

Mumps

Mumps is caused by the mumps virus, which invades and multiplies in one or more of the salivary glands. It most commonly affects the parotid gland, causing swelling under the front of the ear lobe, between the jaw and ear. Since 1997, the incidence of mumps has declined dramatically. This is likely because of the two-dose measles, mumps, and rubella (MMR) vaccine schedule for young children, as well as booster vaccinations offered to post-secondary students and healthcare workers.

Transmission

Mumps does not spread as easily as chicken pox or measles. It spreads through direct contact and droplet transmission, when the saliva of an infected person contacts the mucous membranes of another person's mouth or nose.

Course of disease

Most people get swelling in the saliva gland between the jaw and ear. Swelling begins on one side of the face, and may spread to the other side within one or two days.

Older children and adults usually experience symptoms for three to five days before the swelling starts. These symptoms may include fever, chills, headaches, weakness, and a general sick feeling. Young children generally have fewer symptoms before the swelling starts.

Symptoms usually develop two to three weeks after exposure. People are most infectious from two days before swelling starts to five days after. Some may be infectious for as long as seven days before and nine days after the onset of swelling.

Who is at risk?

Children under the age of two rarely get mumps. People who have not been vaccinated or not been previously infected with mumps are at risk.

Prevention

Like measles and chicken pox, the mumps vaccine provides lifelong immunity. Anyone who has been infected with mumps is also immune. For prevention tips, see page 24.

Influenza

Most people are familiar with seasonal influenza (the flu). It is a common respiratory disease caused by a highly contagious virus that changes slightly from year to year.

Transmission

Influenza viruses are spread via droplet transmission when an infected person coughs or sneezes near a susceptible person. The susceptible person must be close to the infected person because large respiratory droplets generally travel only a short distance (less than 2 m) through the air, and then settle out of the air quickly.

A person can also catch influenza from direct or indirect contact. Infected people who do not wash their hands properly will have respiratory-tract secretions filled with the virus all over their hands. The virus can live for hours in dried mucus on doorknobs, telephones, faucets, or wherever infected people with unwashed hands have passed. A person can become infected by touching any of these surfaces and then touching his or her eyes, nose, or mouth.

Influenza can be spread by an infected person from about one day before symptoms start to appear, to as many as five days after symptoms appear. Children can be infectious for ten or more days after symptoms appear.

Course of disease

Common influenza symptoms include fever, headache, cough, fatigue, aches and pains, runny nose, and sore throat. The worst symptoms usually last about five days, and most people recover from the flu fairly easily.

Who is at risk?

All workers are at risk of acquiring or spreading seasonal influenza. Annual vaccinations are available, based on the viral strain that is anticipated for that flu season.

Prevention

Wash hands often, avoid touching surfaces in public places, and avoid touching your mouth, eyes, or nose. Flu vaccinations are also available.

Flu vaccine

One dose of influenza vaccine is highly effective in healthy adults younger than 65 years. When the vaccine and circulating viruses are a good match, the influenza vaccine prevents laboratory-confirmed influenza among 70 to 90% of healthy adults under 65. Vaccinated or not, it is still necessary to follow other safe work practices. Because the influenza strain mutates slightly from year to year, it is necessary to be revaccinated each flu season to remain protected.



Washing hands frequently using proper hand washing procedure (see page 45) is the best way to control the spread of influenza and other infectious diseases.

Pandemic influenza

Pandemic influenza is different than seasonal flu. An influenza pandemic is a global epidemic that occurs when a powerful new strain of human influenza virus appears. Few people have natural immunity to a new virus, so it spreads rapidly from person to person, and some people may become very ill and die. Flu pandemics can last from 12 to 36 months.

The 1918–19 pandemic was the worst on record; it killed close to 50 million people worldwide, mostly infants, elderly people, and people 20–40 years old. The 1957–58 and 1968–69 pandemics were less deadly.

Who is at risk?

If a pandemic influenza strikes, it will affect all workers in all industries. There will be a significant need for additional healthcare resources at a time when many healthcare workers will be off sick. All levels of government in B.C. and Canada are developing comprehensive preparedness plans for an influenza pandemic.

Preventing exposure to airborne diseases

The transmission of diseases that are spread through the air must be managed through a combination of engineering controls, administrative controls (including safe work practices), and personal protective equipment. Consider the following guidelines:

- Follow proper hand washing procedure (see page 45). Hand washing is the simplest, most effective means of controlling the spread of infectious disease.
- Follow routine practices, which include hand hygiene and the use of PPE such as gloves, eye protection, respiratory protection, and gowns.
- Develop safe work procedures that encourage infection prevention and control practices. During an outbreak, minimize unnecessary patient activities, consider restricting public access to the facility, and temporarily reduce the intake of new clients.
- Place patients with infectious TB, chicken pox, or measles in a separate room with the door closed. In hospitals, place patients in a negative air pressure room, if available.
- Educate staff about safe work practices.
- Develop laundry and waste collection procedures that minimize surface contamination.
- Develop procedures and schedules to ensure disinfection of contaminated surfaces. For example, dilute bleach solutions (1 part household bleach to 50 parts water) or alcohol-based disinfectants (for small surface areas) are usually sufficient.
- Encourage staff to get vaccinated, if vaccines are available.
- Encourage staff who have signs and symptoms of illness to stay home until they feel better.
- Encourage cough/sneeze etiquette (coughing into sleeves instead of hands), and put surgical masks on coughing people. Try to seat coughing people away from others, if possible.

Zoonotic diseases

Zoonotic diseases are diseases caused by infectious agents that can be transmitted between animals and humans. These diseases have affected human health throughout history. The bubonic plague, which is transmitted by rat fleas, has caused illness and death since ancient times. It was known as the Black Death during the Middle Ages. More recently, West Nile virus, SARS, and avian influenza have captured our attention—all of these diseases come from animals originally.

Zoonotic diseases can be transmitted in many ways. Several can be transmitted directly to humans through contact with skin (for example, *brucellosis* or *tularemia*). Some are transmitted through contact with saliva (for example, rabies). A few are airborne (for example, hantavirus). Many others are transmitted through insect bites, particularly mosquito or flea bites (for example, West Nile virus or plague).

People who work with animals have a higher risk of acquiring a zoonotic disease. The following table lists a few examples of animal-handling occupations and diseases of concern.

Common diseases associated with animal-handling occupations

Occupation	Diseases (and the organisms associated with them)
Veterinarians and pet shop workers	<ul style="list-style-type: none">• Ringworm (fungus)• Toxoplasmosis (protozoa)• Leptospirosis (bacteria)• Rabies (virus)• MRSA (bacteria)• Brucellosis (bacteria)• Psittacosis (bacteria)
Farmers and ranchers	<ul style="list-style-type: none">• Ringworm (fungus)• <i>E. coli</i> (bacteria)• Campylobacteriosis (bacteria)• Brucellosis (bacteria)• Hantavirus• Psittacosis (bacteria)
Groundskeepers and wildlife workers	<ul style="list-style-type: none">• Hantavirus• Rabies (virus)• Bubonic plague (bacteria)
Meat processors, butchers, and abattoir workers	<ul style="list-style-type: none">• Listeriosis (bacteria)• Campylobacteriosis (bacteria)• <i>E. coli</i> (bacteria)• Q fever (bacteria)

Campylobacteriosis

Campylobacteriosis is caused by *Campylobacter* bacteria, the most common agent of bacterial diarrhea among humans. In B.C. alone, there are approximately 2300 reported cases of campylobacteriosis each year.

Transmission

Campylobacter spreads quickly through the fecal-oral route, from infected pets or farm animals to susceptible people. Transmission between people is less common. The bacteria may also be consumed in undercooked meat, contaminated food, contaminated water, or raw milk.

Course of disease

Campylobacter infection causes severe watery or bloody diarrhea, fever, abdominal cramps, nausea, and vomiting. The incubation period is usually from two to five days, depending on the number of bacteria ingested, and the symptoms last from one to seven days or more.

Prevention

Wash hands with soap and water after handling animals or animal feces, and before preparing and eating food. If running water is not available, use an alcohol-based hand rub.

Hantavirus

Hantaviruses are a group of viruses carried by many different kinds of wild rodents (mainly wild rats and mice), all over the world. So far, only deer mice have been found to carry the virus in B.C.—however, other rodents could be potential carriers.

Transmission

Humans typically become infected when they inhale particles of saliva, urine, or feces of infected rodents. This may happen via direct contact with the rodents or by breathing airborne dust particles generated when rodent feces are disturbed.

Course of disease

Hantavirus pulmonary syndrome is the disease caused by hantavirus. It begins as a flu-like illness. As the disease progresses, fluid builds up in the lungs, making it difficult to breathe. Severe respiratory failure resulting in death can occur within a few days of the early-stage symptoms. Symptoms may appear from 5 to 45 days after exposure to the virus.

Prevention

Workers who handle rodents or clean up debris contaminated by rodent droppings must wear PPE, including a respirator. The type of equipment depends on the task and the amount of contaminated material present.

Rabies

Rabies is a viral disease in animals that is most often transmitted to humans through bites from rabid animals—usually wild animals such as raccoons, skunks, bats, and foxes. Pets and other domestic animals are responsible for less than 10% of reported cases, and most of these are from dog bites.

Transmission

Rabies is contracted when saliva from an infected animal enters a bite wound and spreads to the central nervous system (after a latency period that may last from days to months).

Course of disease

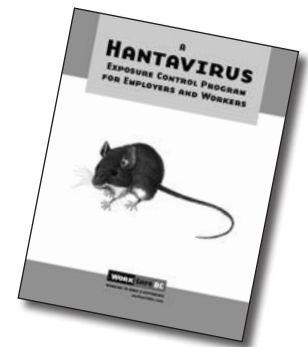
The first symptoms may be flu-like, followed by anxiety, confusion, agitation, insomnia, hallucinations, and eventually delirium. The disease is nearly always fatal.

Prevention

Observe animals for unusual aggressive behaviour. These animals should be adequately restrained, and only handled using bite-resistant gloves. Check for bites after handling animals—you might not realize that you have been bitten.

If you are bitten, wash the wound well with soap and water for at least five minutes. See your doctor as soon as possible, and have the wound examined. The biting animal should be tested for rabies. A rabies vaccine is available and recommended for those working with animals.

For more information on controlling exposure to hantavirus, see the WorkSafeBC publication *A Hantavirus Exposure Control Program for Employers and Workers*.



Insect-borne diseases

Many diseases such as West Nile virus and Lyme disease are transmitted by blood-feeding insects such as mosquitoes, fleas, and ticks. When working outdoors around biting insects, use insect repellent on all uncovered skin, and wear loose-fitting, long-sleeved shirts and pants.

Preventing exposure to zoonotic diseases

Prevention measures include safe work practices and PPE. Consider the following guidelines:

- Educate staff about safe work practices.
- Encourage staff to get vaccinated, if vaccines are available.
- Wash hands with soap and water after handling animals, animal feces, or soil that might be contaminated. Follow proper hand washing procedure (see page 45). If running water is not available, use an alcohol-based hand rub.
- Restrain aggressive animals, and use bite-resistant gloves when handling them. Plan an escape route when handling large animals.
- Wear respiratory protection if there is a potential for exposure to an airborne organism (for example, exposure to hantavirus while cleaning up rodent droppings).
- Wear face protection (for example, goggles or a visor) if there is a potential for exposure to sprays or splashes of blood or body fluids.
- Disinfect contaminated equipment (for example, with 1 part household bleach to 10 parts water, mixed fresh daily).

For more information on zoonotic diseases, see the following:

- US Centers for Disease Control and Prevention (www.cdc.gov/az/a.html)
- BC Centre for Disease Control (www.bccdc.org/topic_index.php)
- British Columbia Veterinary Medical Association (www.bcvma.org)

Exposure control plans

An exposure control plan is a document that describes how workers will be protected from infectious diseases in the workplace. It includes information on the nature of the hazards and the risks associated with exposure, as well as controls such as safe work procedures that the employer will use to protect workers.

Do I need an exposure control plan?

Exposure control plans may be required for many workplaces, including the following:

- Hospitals
- Nursing homes, residential care facilities, home healthcare, and hospices
- Doctors' and dentists' offices
- Ambulance and paramedic services
- Law enforcement, fire and rescue, and lifesaving services
- Correctional institutions
- Research laboratories
- Schools
- Daycare facilities
- Animal hospitals
- Wherever occupational first aid attendants are designated

What should my plan include?

Every workplace is unique, so you need to develop an exposure control plan that is specific to your workplace. Exposure control plans should only be developed by a qualified person.

An exposure control plan must include the following components, which are described further in the rest of this section:

- Statement of purpose
- Responsibilities of the employer, supervisors, and workers
- Risk identification and assessment
- Risk controls
- Written safe work procedures
- Worker education and training
- Written records

Occupational Health and Safety Regulation

The requirements for exposure control plans are described in sections 5.54 and 6.34 of the Regulation. Exposure control plans may also be required to reduce exposure to hazardous chemicals and other biological agents.

What does *qualified person* mean?

According to the Regulation, qualified "means being knowledgeable of the work, the hazards involved and the means to control the hazards, by reason of education, training, experience or a combination thereof."

Statement of purpose

The purpose of an exposure control plan is to prevent harmful exposure of workers to infectious diseases in the workplace. The following is an example of a typical statement of purpose:

“[Name of employer] is committed to providing a safe and healthy workplace for all of our staff. A combination of measures will be used to achieve this objective, including the most effective control technologies available. Our work procedures will protect not only our workers, but also any other workers who enter our workplace. All employees must follow the procedures described in this plan to prevent or reduce exposure to infectious diseases.”

Responsibilities of employers, supervisors, and workers

Employer

The employer has the following responsibilities:

- Ensure that the resources (for example, safe work procedures, worker training, and PPE) required to implement and maintain the exposure control plan are readily available where and when they are required.
- Select, implement, and document the appropriate site-specific control measures.
- Ensure that supervisors and workers are educated and trained to an acceptable level of competency.
- Ensure that workers use appropriate PPE (for example, gloves, gowns, eye protection, and respirators).
- Conduct a periodic review of the plan’s effectiveness. This includes a review of the available control technologies to ensure that these are selected and used when practical.
- Maintain records of training and inspections.
- Ensure that a copy of the exposure control plan is available to workers.

Supervisors

Supervisors have the following responsibilities:

- Ensure that workers are adequately instructed on the controls for the hazards at the location.
- Ensure that workers use appropriate PPE.

-
- If workers require respirators, ensure that they have been fit tested, and the results are recorded.
 - Direct work in a manner that eliminates or minimizes the risk to workers.

Workers

Workers have the following responsibilities:

- Know the hazards of the workplace.
- Follow established safe work procedures as directed by the employer or supervisor.
- Use any required PPE as instructed.
- Report any unsafe conditions or acts to the supervisor.
- Know how and when to report exposure incidents.

Risk identification and assessment

Risk identification and assessment begins with an understanding of the nature of infectious diseases and how they are transmitted. When identifying and assessing risks, consider factors such as the following:

Routes of transmission

These are the ways in which the virus or bacteria can infect a worker—for example, contact transmission, droplet transmission, or airborne transmission.

Work methods or procedures that may result in exposure

The potential for exposure will vary from workplace to workplace, and will depend on work activities. For example, in the healthcare industry direct patient care activities involve a higher potential for exposure to infectious diseases than activities that involve work at a distance (for example, cleaning, delivery of supplies, or maintenance where patients are not present). During direct activities, all routes of transmission are possible. During work at a distance, the routes are more likely to be restricted to indirect contact.

Workers who have a higher risk of exposure

Appropriate protective measures will vary according to the kinds of activities workers perform. Workers who are at risk of exposure to infectious diseases could be documented using a table such as the following:

Job title	Department or location	Task or procedure	Risk level (low, moderate, or high)

Risk levels could be interpreted as follows:

- *Low risk* might mean workers who rarely come into contact with potentially infected people or materials.
- *Moderate risk* might mean workers who rarely come into contact with infected people, but who may work in areas where infected people have been, or who handle potentially contaminated items (indirect contact).
- *High risk* might mean workers who work directly with people who are or may be infected.

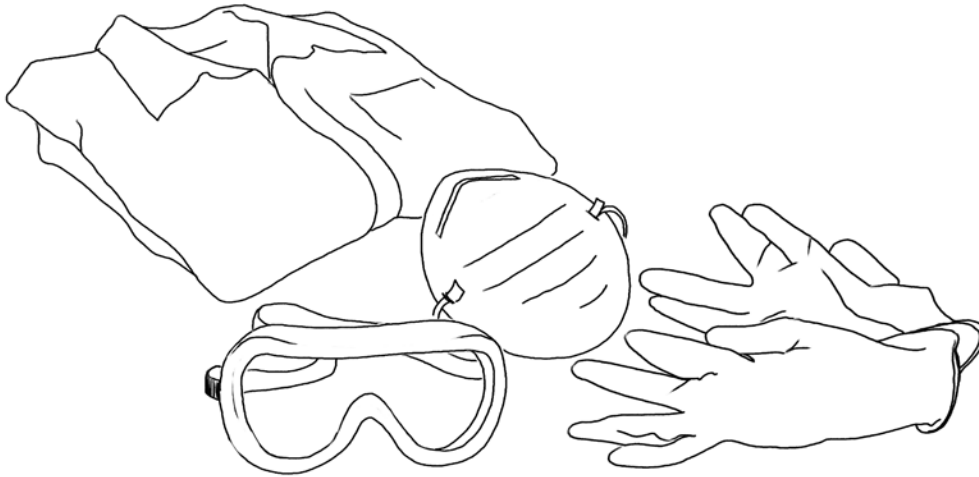
Risk controls

Risk controls are measures that are used to eliminate the risk to workers or, if elimination is not possible, minimize the risk. Controls must be implemented in the following order of preference:

1. **Engineering controls** reduce risk by mechanical means.
Examples: Safety-engineered medical devices, barriers, room ventilation, negative-pressure isolation rooms
2. **Administrative controls** involve changes to scheduling, job rotation, or work procedures to reduce exposure.
Examples: Hand washing, cough/sneeze etiquette, encouraging sick workers to remain at home, conducting telephone interviews, screening clients before they enter the office

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3. **Personal protective equipment (PPE)** is considered the last line of defense, and should only be used when other controls are not practicable, or in addition to other controls. The proper use, fit checking, and disposal of PPE must also be considered.

Examples: Gloves, gowns, goggles, respirators, and face shields



Workers must be trained in the use of any required PPE such as gloves, goggles, respirators, and protective clothing.

Using controls in healthcare settings

Controls that address routes of transmission may range from simple hand washing and cough/sneeze etiquette to more extensive measures that combine engineering and administrative controls with the use of PPE. If the route of transmission of an infectious organism is not known or fully understood, then the employer must implement controls that address all routes of transmission.

Written safe work procedures

Written safe work procedures may be required, depending on the nature of the workplace (for example, a hospital) and the exposure risks involved (for example, working directly with infectious people). Written procedures would likely be required in a hospital isolation ward, but probably not in a small, low-risk workplace such as a typical office environment, as long as education and training adequately address worker protection.

Occupational Health and Safety Regulation

The requirements for training of new and young workers are described in sections 3.22–3.25 of the Regulation.

If facilities are needed for proper hand washing, they should be included in the exposure control plan. Decontamination procedures will be needed in some higher-risk workplaces (for example, when cleaning reusable PPE such as gowns, face shields, or goggles).

Worker education and training

Employers must ensure that workers are informed about the contents of the exposure control plan, and that they are educated and trained to work safely. Exposure control plans should describe worker education and training, and how it will be carried out. Education and training is particularly important for new workers.

Written records

The exposure control plan should be written down, and records should be kept for each component of the plan. For example, document education and training activities—keep track of who was trained, when the training took place, and what it included. Other documentation should include the following:

- Workplace inspections
- Health and safety meetings
- Investigations that take place after exposure incidents
- Records of exposed workers and any health monitoring required
- Immunization records

These records can be especially useful for demonstrating compliance with the Regulation.

Reviewing the plan

Review the exposure control plan at least once a year, and update it as necessary. During this process, consult with the joint health and safety committee or worker health and safety representative.

Controlling exposure to infectious diseases

This part includes information on how to prevent exposure to infectious diseases. It describes basic guidelines for working safely, including routine practices, contact precautions, droplet precautions, and airborne precautions. This part also describes various controls that can be used in workplaces to prevent exposure to infectious diseases. For sample safe work procedures, see pages 45–53.

Routine practices

The use of routine practices is an approach to infection prevention and control in which all blood and body fluids are presumed to carry infectious pathogens. This approach consists of a collection of safe work procedures that helps prevent the transmission of infectious diseases in the workplace.

Routine practices include the following:

- Wash hands regularly.
- Wear disposable waterproof gloves when touching blood and body fluids, or when handling contaminated items.
- Wear other PPE (for example, face shields, eye protection, and gowns) if there is a risk of splashes or sprays of blood and body fluids.
- Handle contaminated equipment and linens according to safe work procedures to prevent the transfer of infectious organisms to people and other equipment.
- Handle and dispose of sharps according to safe work procedures.
- Use mouthpieces or other ventilation devices instead of mouth-to-mouth resuscitation, whenever possible.
- In healthcare settings, assign patients to private rooms, whenever possible, if they might contaminate the environment.

In addition to the routine practices described above, there are also specific safety measures for contact precautions, droplet precautions, and airborne precautions.

Contact precautions (includes routine practices)

Contact precautions include routine practices, as well as the following:

- Wear gloves when entering rooms.
- Change gloves after contact with potentially infected materials.
- Wear gowns when entering rooms if direct patient contact is anticipated or if the patient has diarrhea, a colostomy, or wound drainage that is not covered by a dressing.
- Limit movement and transport of patients from the room.
- Ensure that there is daily cleaning of patient care items, bedside equipment, and frequently touched surfaces.
- Dedicate the use of non-critical patient care equipment to a single patient or patients with the same infection.
- Disinfect equipment that must be used for different patients.

Droplet precautions (includes routine practices and contact precautions)

Droplet precautions include routine practices and contact precautions, as well as the following:

- Place patients in private rooms or with other patients who have the same infection.
- Wear a face shield when working with patients.
- Place surgical masks on patients being moved.

Airborne precautions (includes routine practices)

Airborne precautions include routine practices, as well as the following:

- Place patients in private rooms with doors closed. Ideally, these rooms should have negative air pressure, at least six air changes per hour, and appropriate filtration of air before it is discharged from the room.
- Wear an appropriate respirator when entering rooms.

Controls for preventing exposure

There are numerous methods used to prevent exposure of workers to infectious diseases. Preventive measures for the workplace are commonly referred to as controls. Three basic types of controls are engineering controls, administrative controls, and personal protective equipment.

Engineering controls (equipment and work environment)

Engineering controls include modifications to the work environment or equipment, or the use of special equipment, to control hazards.

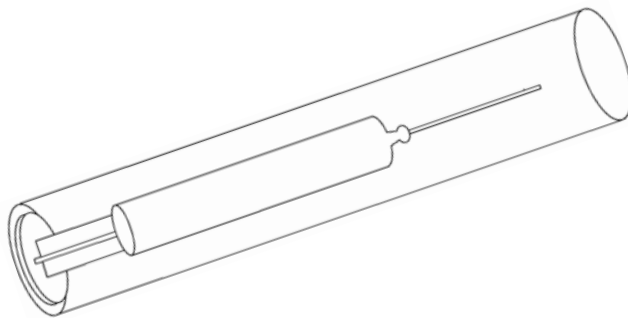
Safer sharps

Specially designed medical sharps (for example, hollow-bore needles, suture needles, and scalpels) reduce the risk of needle-stick injuries and other puncture wounds from contaminated sharps. Self-sheathing needles have a built-in sheath or sleeve that extends to cover the needle. Retractable syringes are designed so the needle can be pulled up inside the syringe. Needleless systems use threaded ports on IV tubing, so healthcare workers can remove the needle from the syringe after drawing up medication, and then simply screw the syringe directly into the port. Disposable safety scalpels have a built-in sheath that covers the blade between use and disposal, and suture needles for sewing tissues other than skin are available with blunted tips.

Sharps containers

Workers should dispose of sharps in rigid, puncture-resistant, leak-proof containers that have a closable lid. In situations where containers have not been installed, workers can use portable sharps containers. Containers should be replaced when they become three-quarters full.

Workers can also carry single-use containers—small, leak-proof, puncture-resistant units that are designed to hold one needle. They aren't meant to replace sharps containers, but are useful to carry around in case workers come across unexpected needles. Single-use sharps containers are designed to be thrown into the garbage once the recovered needle is safely contained.



Workers can carry single-use containers around to deal with unexpected needles when sharps containers aren't available.

Physical barriers

Clear, solid barriers help protect workers from exposure to diseases that spread via contact or droplet transmission. For example, clear glass or plastic barriers attached to countertops will reduce worker exposure when dealing with the public. Clear barriers in buses and taxis provide a protective divider between drivers and passengers.

Isolation rooms

In healthcare, isolation rooms are useful for patients who are infected with diseases that are spread through contact, droplet, or airborne transmission. Isolating such patients helps prevent the spread of infectious pathogens to healthcare workers and other patients, as long as workers are diligent about using other precautions such as hand hygiene and PPE when in contact with the infected patients. Patients who are infected with the same pathogen can share rooms or wards.

Specially designed isolation rooms may be used for diseases that are spread through airborne transmission. These rooms require ventilation that will prevent droplet nuclei from being spread through the air to other areas of the facility. When designing an isolation room, consult standards such as *CSA Z317.2-01 (R2008) Special requirements for Heating, Ventilation, and Air Conditioning (HVAC) Systems in Health Care Facilities*. Generally speaking, isolation rooms should have:

- Negative air pressure
- A dilution ventilation rate of at least six air changes per hour
- HEPA filters that air passes through before it is discharged from the room

Caregivers who need to enter such an isolation room must be trained to do so safely and equipped with appropriate PPE (for example, an approved respirator).

Administrative controls (safe work procedures)

Administrative controls include safe work procedures that workers can use to eliminate or minimize their risk of exposure. As a general rule, workers should follow routine practices (see page 35) such as washing hands and removing disposable gloves safely. Where necessary, workers should also follow contact, droplet, or airborne precautions as well (see page 36).

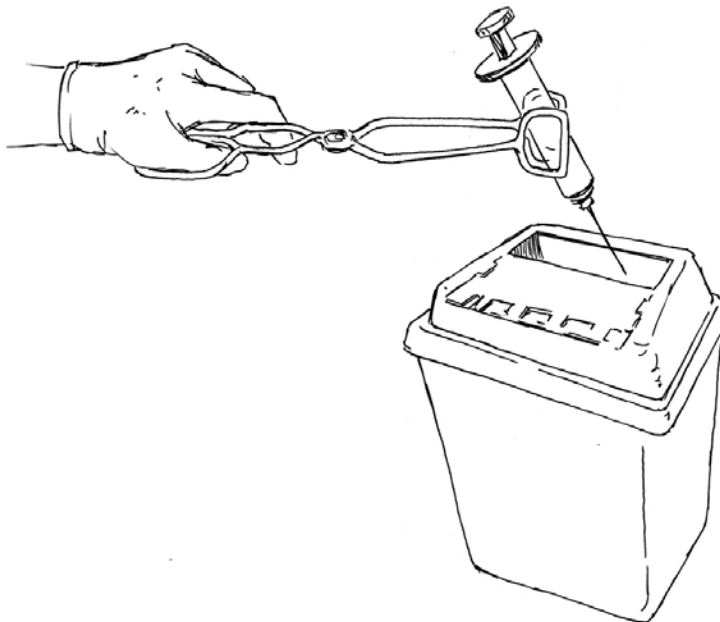
Cough/sneeze etiquette

All workers are expected to follow cough/sneeze etiquette, which is a combination of measures that minimizes the transmission of diseases via droplet or airborne routes. Cough/sneeze etiquette includes the following components:

- Educate workers in control measures, including hand washing.
- Post signs at entry points to instruct everyone about control measures.
- Cover your mouth and nose with a sleeve or tissue when coughing or sneezing.
- Use tissues to contain secretions, and dispose of them promptly in a waste container.
- Turn your head away from others when coughing or sneezing.
- Offer surgical masks to people who are coughing.
- Wash hands regularly.

Handling and disposing of sharps

Sharps such as needles may be contaminated with infected blood or body fluids, so workers need to handle them safely and dispose of them in designated sharps containers. Workers should not pick up sharps or other items unless they have been trained to do so and have appropriate equipment and PPE. For sample safe work procedures, see pages 51–52.



Workers should assume that all sharps are contaminated with infected blood or body fluids, and dispose of them safely in designated sharps containers.

Vaccination

One of the most effective ways to protect against disease is to get vaccinated. There is a vaccine for hepatitis B that is 95% effective. There are also effective vaccines for measles and chicken pox. There are no vaccines for hepatitis C, HIV, MRSA, VRE, or noroviruses. Regardless of a person's vaccination status, it is important to follow infection prevention practices to avoid becoming infected with these diseases.

According to Section 6.39 of the Regulation, employers must offer vaccinations to workers at no cost, for the infectious diseases that the workers are or may be exposed to. The BC Centre for Disease Control has established criteria for determining the conditions under which vaccinations are appropriate.

Disposing of garbage and other potentially infectious materials

Workers should always be careful when handling garbage because it may contain sharps or other objects contaminated with blood and body fluids. For a sample safe work procedure, see page 53.

Handling laundry

Although the risk of disease transmission from contaminated or soiled laundry is low, it should be handled carefully and only by workers who have been trained to do so and have appropriate PPE. Medical sharps are sometimes collected with laundry. For a sample safe work procedure, see page 53.

Cleaning up spills

Workers should not clean up spills of blood and body fluids unless they have been trained to do so and have appropriate equipment and PPE. Janitorial and safety-supply companies offer kits that contain all the supplies needed for cleaning up spills. For a sample safe work procedure, see page 52.

Cleaning patient care equipment

Workers must follow safe work procedures for cleaning and disinfecting patient care equipment used for potentially infectious patients because it may be contaminated. This means wearing gloves and, if necessary, other PPE as well. Some items may need to be cleaned by hand, but it's preferable to use mechanical cleaning equipment such as ultrasonic cleaners or washer-sterilizers. The level of disinfection needed may range from using a simple disinfectant to sterilizing in an autoclave.

Caring for patients in isolation rooms

When dealing with patients in isolation rooms, workers must follow safe work procedures, and use appropriate PPE. The following are basic guidelines:

- Wear appropriate respiratory protection, gloves, and gowns or aprons in the room.
- Keep the door closed at all times for patients on airborne precautions.
- Perform hand hygiene before and after contact with the patient.
- Follow safe work procedures for removing gloves and other PPE.
- Follow safe work procedures for disposing of sharps and other medical waste.
- Make sure disinfection procedures are followed for items such as

toilets and bedpans.

- Transfer patients only when necessary.

The level of precaution will depend on whether the patient is in a private room or a specially designed isolation room with ventilation. Contact isolation is a lower-level control used for patients who have contact diseases such as MRSA or VRE. Workers caring for patients who have an airborne transmissible disease such as TB must be trained to deal with the stricter procedures that are called for in this situation.

Personal protective equipment (PPE)

Personal protective equipment (PPE) such as gloves and goggles provides a barrier that helps protect against exposure to infectious disease. Employers must provide workers with PPE, train them in its proper use, and make sure they use it when necessary. Workers must use PPE according to their training. Workers must also inform their manager if they are having difficulty using PPE.

Gloves

Gloves protect you during patient care or while working with potentially infected blood and body fluids. Make sure your gloves are appropriate for the task.

Gloves may be made of natural rubber latex, vinyl, neoprene, or nitrile rubber. Thicker gloves provide more protection, but they also make it harder to handle objects. Follow safe work procedures when putting on or removing gloves. For a sample safe work procedure for removing gloves, see page 50.

Eye protection

Eye protection such as goggles or a face shield is useful during procedures that are likely to generate splashes or sprays of blood and body fluids. A face shield is especially useful because it covers the nose and mouth as well as the eyes.

Other barriers

Other barriers that can help protect skin against exposure to infectious material include gowns and aprons. If there's a chance that infectious material may contaminate footwear, it is a good idea to wear waterproof covers over shoes or boots.



Surgical masks

A surgical mask is a protective barrier that is worn on the face, covers at least the nose and mouth, and is used to prevent the spread of airborne droplets and droplet nuclei generated by the person wearing the mask.

Many healthcare workers still believe that surgical masks are adequate protection against airborne transmissible pathogens—this is not true. Surgical masks are not designed to seal to the user's face, and do not provide respiratory protection against small inhalable particles.

Respirators

There is often confusion in the healthcare industry about the term *respirator* because it is typically used to refer to equipment that provides respiratory support for patients. When it comes to PPE, a respirator is a device that is worn on the face, covers at least the nose and mouth, and is used to reduce the risk of inhaling hazardous gases, vapours, and aerosols (which include infectious pathogens).

For example, approved N95 particulate respirators are used to reduce the risk of inhaling droplets or other particles containing infectious organisms. The N95 respirator is a common and effective choice, but there are alternatives. For more information on approved respirators and filters, see Regulation Guideline G8.33(2)-1.

If respirators are necessary to protect workers, then a respirator program must be implemented. The respirator program must:

- Help protect the health of workers, and prevent illnesses related to breathing hazards in the workplace
- Promote more effective use of respirators

Ideally, you should designate a program administrator who will be responsible for the respirator program and who is knowledgeable about respirators. The administrator can delegate parts of the program to others, but ultimately the administrator should have the final authority for running the program.



Respirators must be approved by the National Institute for Occupational Safety and Health, rated at N95 or better, and fit tested to each worker to ensure proper protection.

Fit-test requirements

A respirator won't be effective unless it forms a seal against the worker's face. The only way to tell for sure if a respirator forms a seal is to do a fit test. Fit-test kits and equipment are available from safety suppliers.

Workers must be fit tested if they may be exposed to an airborne contaminant that is listed in the Regulation, and a risk assessment has indicated that this contaminant poses a hazard. See the "Table of Exposure Limits for Chemical and Biological Substances," in the Guidelines for Part 5 of the Regulation.

Follow these requirements for fit tests:

- Provide fit tests when workers are first fitted with respirators and then once a year afterward.
- Use a fit test that follows a protocol that is acceptable to WorkSafeBC, such as the protocol described in *CSA Standard Z94.4-02*. Details of this protocol are included in the WorkSafeBC publication *Breathe Safer*.
- Keep records of fit tests.

Components of a respirator program

A respirator program must be documented, and must include the following:

- A statement of purpose and responsibilities
- Written procedures for the selection, use, inspection, cleaning, maintenance, and storage of respirators
- Education and training for workers
- Medical assessment of workers who will be wearing respirators, where required
- Details of the annual program review

Sample safe work procedures

This section includes some sample safe work procedures that can be adapted for your workplace as part of your exposure control plan. These are only a few of the possible procedures that may be needed in your plan. Your risk assessment may indicate a need for other procedures to keep workers safe.

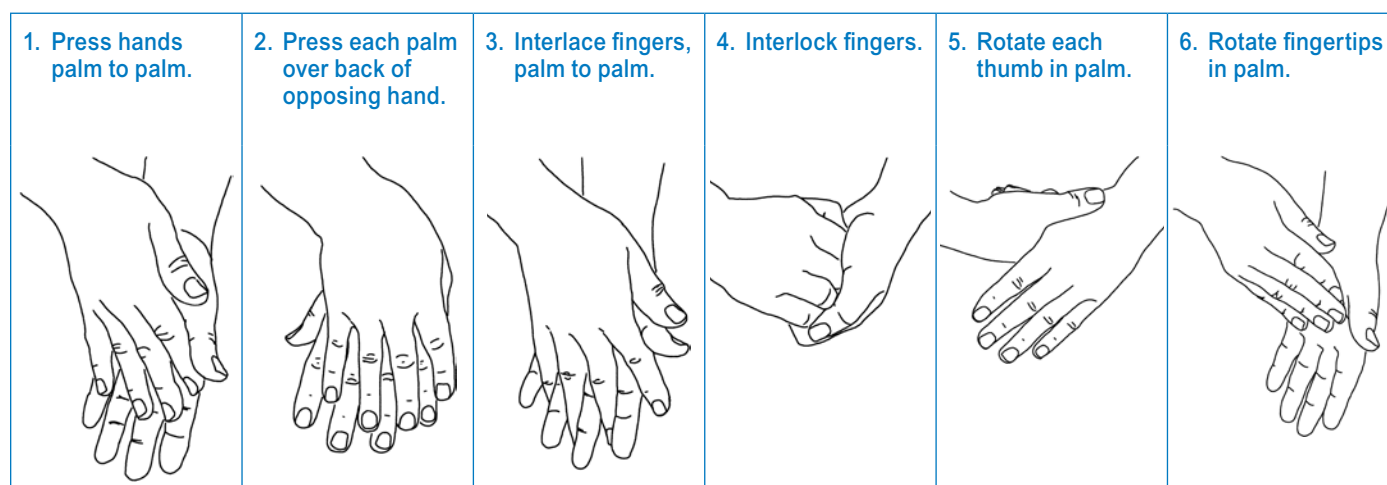
Hand washing

Hand washing is one of the best ways to minimize the risk of infection. Proper hand washing helps prevent the transfer of infectious material from the hands to other parts of the body—particularly the eyes, nose, and mouth—or to other surfaces that are touched.

You should wash your hands:

- After handling materials that may be contaminated
- Before leaving a work area
- After arriving at and before leaving a patient's home
- Before and after direct contact with a patient
- If blood or body fluids come into contact with your skin
- After removing gloves (even if the gloves appear to be intact)
- After removing other PPE (for example, goggles or respirators)
- Before eating, drinking, smoking, handling contact lenses, or applying makeup

Hand washing procedure



Use soap and warm running water, and wash for 20–30 seconds. (The water does not have to be hot to do the job.) If water is unavailable, use an alcohol-based hand rub as long as the hands are not visibly soiled. Hands do not need to be rewashed with soap and water afterward.

Putting on and taking off PPE

The following sections describe general procedures for putting on and taking off PPE. Please note that these are general procedures, and that procedures may differ depending on the nature of the workplace (for example, a healthcare facility versus a poultry barn).

Putting on PPE—general

When using more than one piece of PPE, put it on using the following steps (ignore the steps for any PPE that is not applicable):

1. Wash your hands or use an alcohol-based hand rub.
2. Put on a hair cover.
3. Put on a respirator.
4. Put on eye and face protection (such as goggles or a face shield).
5. Put on a gown or apron.
6. Put on foot covers.
7. Put on gloves.

Taking off PPE—general

While still inside the work area (for example, an isolation room), remove PPE using the following steps (ignore the steps for any PPE that is not applicable):

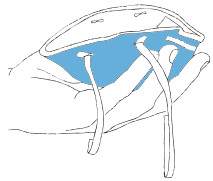


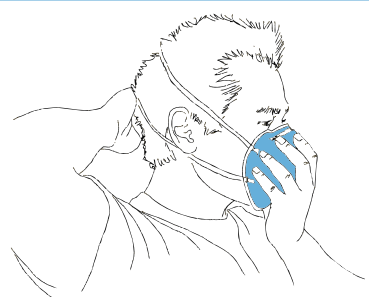

1. Remove and dispose of footwear covers.
2. Remove gloves.
3. Remove the gown or apron, and put it in the laundry hamper.
4. Wash your hands, or use an alcohol-based hand rub.
5. Exit the room.

Immediately outside the room, follow these steps:

1. Wash your hands, or use an alcohol-based hand rub.
2. Remove eye and face protection, and clean it as necessary.
3. Wash your hands, or use an alcohol-based hand rub.
4. Remove and discard the respirator, handling it by the straps.
5. Remove and discard the hair cover.
6. Wash your hands, or use an alcohol-based hand rub.

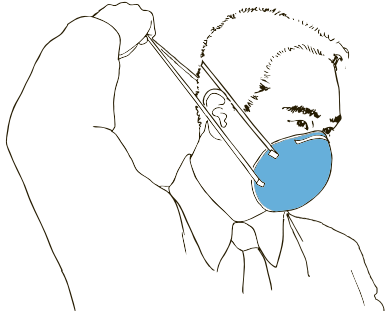
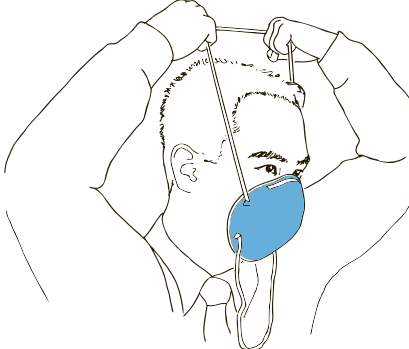
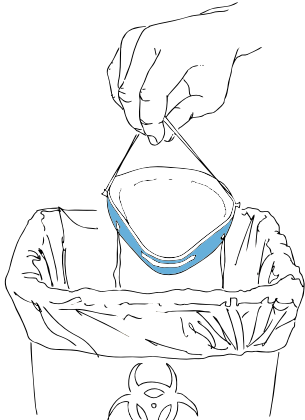
Putting on respirators

Only use a respirator for which you have been fit tested, and fit check the device as instructed before using it.

1. Cup the respirator in your hand with the nose piece at the fingertips.	
2. Place the respirator over your nose, mouth, and chin.	
3. Secure the respirator's top band over your head and above your ears.	
4. Secure the respirator's bottom band behind your head and below your ears.	
5. Mould the flexible nose piece over the bridge of your nose and adjust the respirator to fit. 6. Perform a fit check.	

Removing respirators

Remember the front of the respirator is contaminated – avoid contact with your hands. Use the following procedure:

1. Grab the bottom strap and pull it over your head.	
2. Grab the top strap and pull it over your head.	
3. Discard the respirator, handling it by the straps.	

Putting on gowns

Follow these steps:

1. Select the appropriate type of gown for the task in the right size for you.
2. Make sure the opening of the gown is in the back, and secure the gown at the neck and waist.
3. If the gown is too small to cover your torso fully, use two gowns. Put on the first gown with the opening in front and the second gown over the first one with the opening in the back.

Removing and disposing of gowns

Follow these steps:

1. Pull the gown off inside-out.
2. Roll the gown away from your body so the outer surface of the gown is on the inside of the roll.
3. Put the gown into a laundry receptacle or, if it is disposable, a waste receptacle.

Putting on gloves

The use of disposable, waterproof gloves is another effective way to prevent contact transmission of infectious materials. Gloves should always be the last piece of PPE that you put on. Follow these steps:

1. Select the appropriate type of gloves for the task in the right size for you.
2. Insert your hands into the gloves, and adjust as necessary.
3. If you are wearing an isolation gown, tuck the gown cuffs securely under each glove.



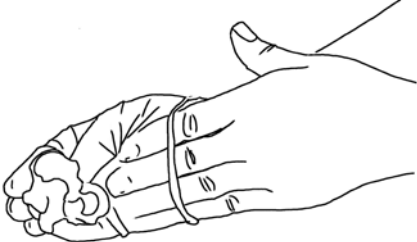


Removing gloves

For gloves to be effective, they must be removed safely to prevent exposure to blood or body fluids. Workers should remove gloves:

- After completing a task that required gloves
- Before leaving the work area
- As soon as possible if the gloves become damaged or contaminated

Use the glove removal procedure on page 50.

Glove removal procedure

<p>1. With both hands gloved, grasp the outside of one glove at the top of your wrist.</p>	
<p>2. Peel off this first glove, peeling away from your body and from wrist to fingertips, turning the glove inside out.</p> <p>3. Hold the glove you just removed in your gloved hand.</p>	
<p>4. With your ungloved hand, peel off the second glove by inserting your fingers inside the glove at the top of your wrist.</p>	
<p>5. Turn the second glove inside out while tilting it away from your body, leaving the first glove inside the second.</p>	
<p>6. Dispose of the entire bundle promptly in a waterproof garbage bag. Do not reuse the gloves.</p> <p>7. Wash your hands thoroughly with soap and water as soon as possible after removing the gloves and before touching any objects or surfaces.</p>	

Handling and disposing of sharps

Follow these guidelines when dealing with sharps:

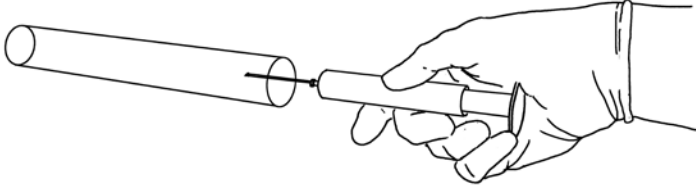
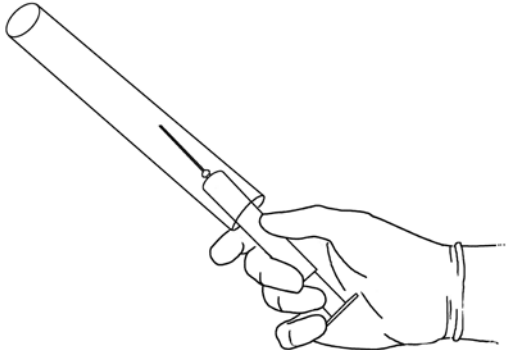
- Don't pick up sharps with the intention of disposing of them later. For example, don't put a used needle in your pocket unless you have a proper one-needle container to put it in.
- Don't try to recap needles.
- Don't try to remove contaminated needles from disposable syringes. Discard them as a single unit.
- Don't dispose of sharps in regular garbage—this may create a hazard for others.
- Don't fill sharps containers to the top. When a sharps container is about three-quarters full, replace it with a new one and properly dispose of the old one. Contact your municipality for disposal information.

How to handle and dispose of sharps

Follow these steps:

1. Wear disposable waterproof gloves (for example, latex or neoprene gloves), and have a proper sharps container ready.
2. If you are using a portable sharps container, place it next to the needle or other item.
3. Use tongs or pliers to pick up the needle.
4. Place the needle in the sharps container, pointed end first, away from you. Don't insert your fingers into the opening of the container, and keep your free hand out of the way.
5. Remove and discard the gloves, then wash your hands with soap and water, or use an alcohol-based hand rub.

Procedure for using a one-needle container

<ol style="list-style-type: none">1. Wear disposable, waterproof gloves.2. Using one hand only, ease the sharp end of the needle into the container. Do not use your other hand to guide it.	
<ol style="list-style-type: none">3. Lift and tip the needle and container so the container falls down over the needle.4. Once the sharp end is in the container, grasp the container and syringe in the other hand, and place the cap securely on the container.5. Discard in a suitable disposal container as soon as possible.	

Cleaning up spills

Workers need to be careful when dealing with spills of blood or body fluids, or any other materials that may be infectious. If a person has been exposed to blood and body fluids, attend to them first before cleaning up a spill.

How to clean up spills that may contain infectious material

Follow these steps:

1. Restrict access to the area.
2. Gather the necessary tools and materials (for example, plastic bags for contaminated items and bleach or germicide for the spill).
3. Put on disposable, waterproof gloves. Other necessary PPE may include a face shield, a gown, and waterproof covers for footwear.
4. Wipe up and dispose of visible material first (for example, using disposable towels). If necessary, change your gloves before the next step.
5. Decontaminate the area using a fresh solution of household bleach and water. Carefully pour the solution over the spill site, leave it on for 10 minutes, wipe it up with disposable towels, and dispose of the towels.
6. Clean and decontaminate all soiled and reusable equipment.
7. Wear the gloves to remove other PPE. Dispose of or clean PPE according to the manufacturer's directions.
8. Remove and dispose of your gloves, and wash your hands.

Mixing a bleach solution

A solution of 1 part common household bleach to 10 parts water will kill HIV and the hepatitis B and C viruses when used for larger spills.

Disposing of garbage and other potentially infected materials

Follow these guidelines for handling and disposing of medical waste:

- Handle garbage as little as possible.
- Use waterproof garbage bags or other appropriate containers.
- Never reach into garbage or disposal containers with your bare hands.
- Watch for sharps sticking out of bags or containers, and listen for broken glass.
- Don't compress garbage bags.
- Don't overfill garbage bags. Leave enough free space at the top so the bag is light and easy to grab.
- Don't use bare hands to pick up bags or to support them from underneath.
- Hold bags by their tops, away from your body. Don't hold them against your body.

Handling soiled or contaminated laundry

Follow these guidelines for handling soiled or contaminated laundry:

- Handle laundry carefully – there may be hidden sharps.
- Isolate contaminated laundry from other linen, and bag it separately.
- Place wet laundry in leak-proof bags or containers.
- Label or colour code contaminated laundry bags or containers.
- Don't rinse contaminated laundry at the original location. Send it directly to the laundry room or commercial laundry.
- Wash contaminated laundry and laundry bags in hot water (minimum 70°C) with detergent for 25 minutes. If using lower water temperatures, use an appropriate concentration of cold water and low-temperature detergents, which may include bleach.
- Identify to cleaners in writing any items that pose a hazard to workers handling contaminated laundry, as well as the precautions to follow when handling the laundry.

What if a worker is exposed to or develops an infectious disease?

When we talk about work-related diseases, generally we are referring to diseases that have serious health effects—hepatitis, TB, and the like. Work-related exposure does not include relatively minor illnesses such as common colds or seasonal flu.

Treat exposures to blood or body fluids involving non-intact skin or mucous membranes more seriously. Follow the five steps described in this section.

Exposure incidents involving airborne-disease organisms such as TB are a bit different because they usually don't involve first aid such as washing a cut or flushing an eye.

1. Get first aid immediately.

If the exposure involves an area of non-intact skin such as a cut, wash it thoroughly with soap and water. For sharps injuries, allow the wound to bleed freely—do not squeeze the wounded area while washing it. If a mucous membrane such as the eyes, nose, or mouth is affected, flush the area with lots of clean water at a sink or eyewash station.

2. Report the incident.

Report the incident to your supervisor and a first aid attendant as soon as possible. Reporting the incident promptly is important because there may be a recommended post-exposure treatment to reduce your risk of contracting a disease.

Note: If reporting the incident will significantly delay medical attention, skip Step 2 and report the incident as soon as possible.

3. Seek medical attention immediately.

Within two hours of exposure to blood or body fluids, go to the nearest appropriate medical facility that will provide treatment and evaluation. Time is of the essence—there are immunizations or medications that can help prevent infection or reduce the impact of a disease after exposure.

Note: Employers are responsible for transportation costs when a worker seeks medical attention.

WorkSafeBC claims

For more information on claims, visit WorkSafeBC.com, or contact the Claims Call Centre at 604 231-8888 in the Lower Mainland or 1 888 967-5377 toll-free in B.C.

4. Complete WorkSafeBC claim forms.

Any time there is a work-related exposure incident that requires medical attention beyond the level of service provided by a first aid attendant, it must be reported to WorkSafeBC, even if there are no symptoms of illness. Employers must fill out and submit claim forms to WorkSafeBC. Workers should tell doctors if the injury or exposure is work related. Visit WorkSafeBC.com for up-to-date forms.

Responsibility for submitting WorkSafeBC forms

Individual	WorkSafeBC form
Employer	Form 7 — Employer's Report of Injury or Occupational Disease
Worker	Form 6 — Application for Compensation and Report of Injury or Occupational Disease
Doctor	Form 8/11 — Physician's Report

5. Exposure incident investigations

Under section 173 of the *Workers Compensation Act* and section 5.59 of the Regulation, employers must investigate exposure incidents in any of the following cases:

- A worker required medical treatment
- An incident had a potential for causing serious injury to a worker
- A worker exhibits signs or reports symptoms of exposure to a hazardous substance present in the workplace

For more information

For more information on preventing workplace exposures to infectious diseases, contact WorkSafeBC or OHSAH.

WorkSafeBC Prevention Information Line

Phone: 604 276-3100 in the Lower Mainland

Toll-free: 1 888 621-7233 (621-SAFE) in B.C.

Web site: WorkSafeBC.com

Occupational Health and Safety Agency for Healthcare (OHSAH) in British Columbia

Phone: 778 328-8000 in the Lower Mainland

Toll-free: 1 877 328-7810 in B.C.

Web site: www.ohsah.bc.ca

For more information on the spread and treatment of infectious disease, talk to your family doctor, contact your local public health unit (see the blue pages of the telephone directory), or contact the BC Centre for Disease Control.

BC Centre for Disease Control

Phone: 604 660-0584

Web site: www.bccdc.org

WorkSafeBC publications and multimedia resources

Visit WorkSafeBC.com and click “Publications” to find health and safety publications, slide shows, and videos that you can view online or download free of charge.

Appendix 1: Common terms

This section describes some common terms that are used in this booklet.

airborne transmission

Transmission of pathogens by inhaling infectious aerosols (solid or liquid particles in the air). This can occur when an infected person coughs, sneezes, or talks; or during some medical procedures that generate aerosols.

alcohol-based hand rub

An alcohol-based antiseptic with a minimum of 70% alcohol that is applied all over the hands to reduce the number of pathogens on the hands.

carrier

A person who is infected and capable of transmitting an infection to others, but who does not have symptoms of the disease; often called asymptomatic or healthy carriers.

contact transmission (direct and indirect)

Direct contact occurs when pathogens are transferred directly from an infected person (body surface to body surface).

Indirect contact involves the transfer of pathogens from a contaminated intermediate source (for example, a door handle, table surface, or tray), contaminated instruments, or hands. Some bacteria and viruses can survive on surfaces for several hours or days.

contamination

The presence of an infectious agent on a person's body, clothes, or inanimate objects.

control measure (risk control)

A method that eliminates or minimizes the risk to workers.

droplet nuclei

Particles that are formed by the evaporation of airborne droplets (see *airborne transmission*).

droplet transmission

Transmission that occurs when droplets containing a pathogen are propelled a short distance through the air and deposited on mucous membranes such as the eyes, nose, or mouth.

epidemic

The rapid spread of a disease through a community, infecting more people than usual.

exposure

The condition of being subject to an infectious disease through contact with an infected person or a contaminated environment.

Appendix 1 (continued)

fecal-oral route

Often a “hand-to-mouth” means of transmitting infectious disease organisms. The germs are shed in feces and spread by hands, flies, or other means to food, water, or objects that may come in contact with a person’s mouth.

hand hygiene

Washing hands thoroughly with soap and water for 20–30 seconds, using an alcohol-based hand rub, or using hand wipes that contain effective disinfectant.

immunity

The ability of the immune system to fight off infectious diseases.

immunization

A process in which a vaccine is given (for example, by injection) to provide protection against a specific disease.

incubation period

The interval between an initial exposure to infection and the appearance of the first symptoms or signs of disease.

medical sharp

Any object that has the potential to puncture or cut the skin (for example, a hypodermic needle, suture needle, scalpel, or lancet). Sharps present a risk of exposure to bloodborne pathogens to workers because they may be contaminated with an infected patient’s blood or body fluids.

mucous membrane

A moist layer of tissue that lines body cavities or passages that have an opening to the outside world. The mucous membranes referred to in this booklet include the eyes, nose, and mouth.

non-intact skin

Skin that has been compromised by a cut or abrasion, including a healing wound less than three days old or a skin lesion causing disruption of the outer layer of skin (for example, acute dermatitis, a hangnail, or chapped or abraded skin).

occupational exposure

Contact with a biological agent resulting from the performance of a worker’s duties. For example, harmful contact with bloodborne pathogens includes needle-stick injuries or splashes of blood to the eyes, nose, or mouth; it does not include blood splashing on intact skin.

pandemic

An epidemic that occurs worldwide. See *epidemic*.

Appendix 1 (continued)

pathogen

A micro-organism that can cause disease. Bloodborne pathogens can spread through blood and body fluids. Airborne pathogens can spread through droplets in the air, as well as physical contact.

personal protective equipment (PPE)

Barriers worn to protect mucous membranes, skin, and clothing from contact with infectious agents. PPE includes gloves, respirators, goggles, face shields, aprons, and gowns.

respirator

A personal protective device that fits tightly around the nose and mouth, and reduces the risk of inhaling hazardous airborne particles and aerosols (including biological agents).

risk control

See *control measure*.

routine practices

Also known as *standard precautions*. A group of infection-prevention practices that applies to all patients, regardless of suspected or confirmed diagnosis. Routine practices are based on the principle that all blood, body fluids, secretions, excretions (except sweat), non-intact skin, and mucous membranes may contain transmissible infectious agents. Routine practices include hand hygiene and, depending on the anticipated exposure, the use of gloves, gowns, respirators, and eye/face protection.

surgical mask

A protective barrier that is worn on the face, covers at least the nose and mouth, and is used to contain large droplets generated when the wearer coughs or sneezes in order to minimize the spread of disease from the wearer to other persons.

Appendix 2: Sample exposure control plan for pandemic influenza

Pandemics are worldwide outbreaks of disease such as influenza. Three outbreaks of pandemic influenza (as opposed to seasonal influenza) occurred in the 20th century: 1918 (Spanish influenza), 1957 (Asian influenza), and 1968 (Hong Kong influenza).

The World Health Organization (WHO), Health Canada, and the BC Centre for Disease Control have recommended that all jurisdictions and workplaces create pandemic influenza preparedness plans to diminish the potential adverse effects of a flu pandemic. The WHO has advised that there is a risk of pandemic influenza that could cause widespread illness and death in humans.

The following sample exposure control plan for pandemic influenza is intended to address exposure in a typical office environment where there is little interaction with the general public. If workers do interact with the general public on a regular basis, their risk of exposure will increase, and additional measures must be taken to reduce exposure to the influenza virus.

Company information

[name]

[address]

[contact information (names and phone numbers)]

Health hazards of pandemic influenza

The effects of pandemic influenza are expected to be much more severe than for seasonal influenza because most people will not have any immunity to the virus.

Symptoms

Seasonal flu affects people to varying degrees, with symptoms including headache, fever, fatigue, sore throat, and runny nose. In some cases, secondary infections such as pneumonia may develop. Symptoms of pandemic influenza are likely to include high fever (higher than 38°C), chest pain, and difficulty breathing.

Transmission

The BC Centre for Disease Control advises that influenza is communicable for 24 hours before the onset of symptoms and 3–5 days afterward (this may be longer in some children and some adults).

Pandemic influenza is spread in the same way that seasonal influenza is spread. Exposure to the virus may occur in a variety of ways, including the following:

- Shaking hands with an infected person or touching a surface contaminated with the virus, followed by touching one's eyes, nose, or mouth
- Infectious droplets (from a coughing or sneezing person) landing in the eye or onto the mucosa (moist inner surfaces) of the nose or mouth
- Breathing infectious airborne droplets or particles (from coughing, sneezing, or aerosol-generating medical procedures on infected patients)
- Sharing food items or utensils with an infected person

Statement of purpose

Our company is committed to providing a safe and healthy workplace for all of our staff. A combination of measures will be used to minimize worker exposure to pandemic influenza, including the most effective control technologies available. Our work procedures will protect not only our workers, but also other workers who enter our facilities. All employees must follow the procedures outlined in this plan to prevent or reduce exposure to pandemic influenza.

Responsibilities

Employer responsibilities

Our company will:

- Ensure that the materials (for example, gloves, alcohol-based hand rubs, and washing facilities) and other resources (for example, worker training materials) required to implement and maintain the plan are readily available where and when they are required.
- Select, implement, and document the appropriate site-specific control measures.
- Ensure that supervisors and workers are educated and trained to an acceptable level of competency.
- Ensure that workers use appropriate personal protective equipment (PPE)—for example, gloves, gowns, eye protection, and respirators.
- Conduct a periodic review of the plan's effectiveness. This includes a review of the available control technologies to ensure that these are selected and used when practical.
- Maintain records of training and inspections.
- Ensure that a copy of the exposure control plan is available to workers.

Supervisor responsibilities

Our supervisors will:

- Ensure that workers are adequately instructed on the controls for the hazards at the location.
- Ensure that workers use proper respirators, they have been fit tested, and the results are recorded.
- Direct work in a manner that eliminates or minimizes the risk to workers.

Worker responsibilities

Our workers will:

- Know the hazards of workplace.
- Follow established work procedures as directed by the employer or supervisor.
- Use any required PPE as instructed.
- Report any unsafe conditions or acts to the supervisor.
- Know how and when to report exposure incidents.

Risk identification and assessment

Three primary routes of transmission are anticipated for pandemic influenza, all of which need to be controlled. These include contact, droplet, and airborne transmission.

Contact transmission, both direct and indirect

Direct contact involves skin-to-skin contact, such as patient care or emergency response activity that requires direct personal contact (for example, turning or bathing a patient). Indirect contact involves a worker touching a contaminated intermediate object such as a table, doorknob, telephone, or computer keyboard, and then touching the eyes, nose, or mouth. Contact transmission is important to consider because influenza viruses can persist for minutes on hands and hours on surfaces.

Droplet transmission

Large droplets may be generated when an infected person coughs or sneezes, and also during certain medical procedures such as cough induction. Droplets travel a short distance through the air, and can be deposited on inanimate surfaces or in the eyes, nose, or mouth.

Airborne transmission

Airborne (inhalable) particles can be generated from some medical procedures such as endotracheal intubation, bronchoscopy, nebulizer treatment, or airway suctioning. They can also be generated from coughs and sneezes.

Coughs and sneezes produce both large droplets and smaller airborne particles. The smaller particles remain suspended in air for longer periods, and can be inhaled. The large droplets can also evaporate quickly to form additional inhalable particles. As the distance from the person coughing or sneezing increases, the risk of infection from airborne exposure is reduced; but it can still be a concern in smaller, enclosed areas, especially where there is limited ventilation. As the number of infected people in a room increases, the risk of infection can increase.

The following risk assessment table is adapted from Regulation Guideline G6.34-6. Using this guideline as a reference, we have determined that the risk level of our workers is **moderate to low**. Our workers work in an office environment, and have little contact with the general public. However, they may be handling potentially contaminated objects.

Risk assessment for pandemic influenza

	Low risk Workers who typically have no contact with people infected with pandemic influenza	Moderate risk Workers who may be exposed to infected people from time to time in relatively large, well-ventilated workspaces	High risk Workers who may have contact with infected patients or with infected people in small, poorly ventilated workspaces
Hand hygiene	Yes (washing with soap and water, using an alcohol-based hand rub, or using hand wipes that contain effective disinfectant)	Yes (washing with soap and water, using an alcohol-based hand rub, or using hand wipes that contain effective disinfectant)	Yes (washing with soap and water, using an alcohol-based hand rub, or using hand wipes that contain effective disinfectant)
Disposable gloves	Not required	Not required (unless handling contaminated objects on a regular basis)	Yes, in some cases (for example, when working directly with pandemic influenza patients)
Aprons, gowns, or similar body protection	Not required	Not required	Yes, in some cases (for example when working directly with pandemic influenza patients)
Eye protection — goggles or face shield	Not required	Not required	Yes, in some cases (for example when working directly with pandemic influenza patients)
Airway protection — respirators	Not required	Not required (unless likely to be exposed to coughing and sneezing)	Yes (minimum N95 respirator or equivalent)

Risk control

The Regulation requires employers to implement infectious disease controls in the following order of preference:

1. Engineering controls
2. Administrative controls
3. Personal protective equipment (PPE)

It is not necessary to implement engineering controls in our workplace because the risk of exposure can be controlled using administrative controls (for example, hand washing and cough/sneeze etiquette) and PPE (respirators).

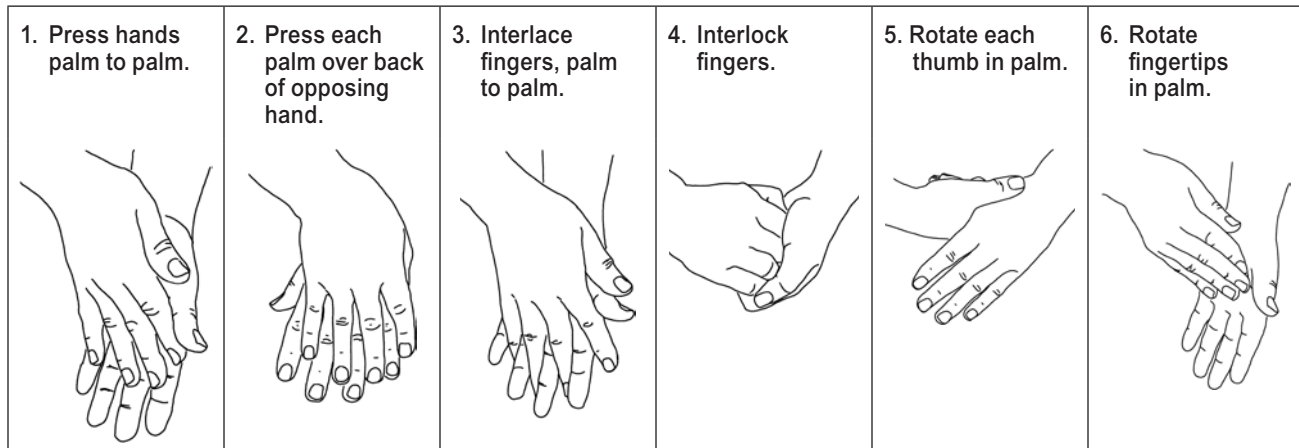
Hand washing

Hand washing is one of the best ways to minimize the risk of infection. Proper hand washing helps prevent the transfer of infectious material from the hands to other parts of the body — particularly the eyes, nose, and mouth — or to other surfaces that are touched.

Wash your hands immediately:

- Before leaving a work area
- After handling materials that may be contaminated
- Before eating, drinking, smoking, handling contact lenses, or applying makeup

Hand washing procedure



Use soap and warm running water. (It doesn't have to be hot to do the job.) If water is unavailable, use a waterless hand cleanser that has at least 70% alcohol. Follow the manufacturer's instructions on how to use the cleanser. Alcohol-based hand rub dispensers are located adjacent to the washrooms and kitchen area.

Cough/sneeze etiquette

Our workers are expected to follow cough/sneeze etiquette, which is a combination of measures that minimizes the transmission of diseases via droplet or airborne routes. Cough/sneeze etiquette includes the following components:

- Educate workers in control measures, including hand washing.
- Post signs at entry points to instruct everyone about control measures.
- Cover your mouth and nose with a sleeve or tissue when coughing or sneezing.
- Use tissues to contain secretions, and dispose of them promptly in a waste container.
- Offer surgical masks to people who are coughing.
- Turn your head away from others when coughing or sneezing.
- Wash hands regularly.

If workers show symptoms of pandemic influenza

If workers are ill with pandemic influenza, they should stay home. If they develop symptoms of influenza while at work, they should leave the workplace. Workers should only return to the workplace once they have recovered from influenza and no longer show symptoms. Workers should inform their manager or supervisor if they are ill with pandemic influenza.

Use of surgical masks

A surgical mask is a protective barrier that is worn on the face, covers at least the nose and mouth, and is used to contain large droplets generated during coughing and sneezing *by the person using the mask*. Surgical masks help minimize the spread of potentially infected material from the wearer to other people.

Under some circumstances (for example, an emergency), some workers who have pandemic influenza may be required to return to work. These workers should wear surgical masks and practice cough/sneeze etiquette to avoid infecting other workers. Workers who develop symptoms of pandemic influenza or suspect that they might have influenza must wear surgical masks in the workplace. Surgical masks are available in the First Aid room.

Worker training

Our workers will receive training in the following:

- The risk of exposure to pandemic influenza, and the signs and symptoms of the disease
- Safe work procedures to be followed, including hand washing and cough/sneeze etiquette
- Location of washing facilities, including dispensing stations for alcohol-based hand rubs
- Proper use of surgical masks
- How to seek first aid
- How to report an exposure to or symptoms of pandemic influenza

Health monitoring

Our workers will promptly report any symptoms of pandemic influenza to their manager or supervisor and the first aid attendant.

Record keeping

Our company will keep records of instruction and training provided to workers regarding pandemic influenza, as well as exposure reports and first aid records.

Annual review

We will review the exposure control plan every year and update it as necessary, in consultation with our joint health and safety committee or worker health and safety representative.

Appendix 3: Biological agents

The following table lists the more common biological agents and their assigned risk groups.

Biological agent (organism)	Risk group 2	Risk group 3	Risk group 4
Bacteria			
<i>Actinobacillus</i>	X		
<i>Actinomyces pyogenes</i>	X		
<i>Bacillus anthracis</i>		X	
<i>Bacillus cereus</i>	X		
<i>Bartonella</i>	X		
<i>Brucella</i>		X	
<i>Burkholderia</i>		X	
<i>Campylobacter</i>	X		
<i>Chlamydia</i>	X		
<i>Chlamydia psittaci</i>		X	
<i>Clostridium</i>	X		
<i>Coxiella burnetii</i>		X	
<i>Escherichia coli</i>	X		
<i>Francisella</i>	X		
<i>Francisella tularensis</i>		X	
<i>Haemophilus</i>	X		
<i>Helicobacter pylori</i>	X		
<i>Klebsiella</i>	X		
<i>Legionella</i>	X		
<i>Leptospira</i>	X		
<i>Listeria</i>	X		
<i>Mycobacteria</i> (except <i>M. tuberculosis</i> and <i>M. bovis</i>)	X		
<i>Mycobacterium tuberculosis</i> , <i>M. bovis</i>		X	
<i>Mycoplasma</i>	X		
<i>Neisseria gonorrhoeae</i>	X		
<i>Pasteurella multocida</i> type B		X	
<i>Rickettsia</i>		X	
<i>Salmonella</i>	X		
<i>Shigella</i>	X		
<i>Staphylococcus</i>	X		

Appendix 3 (continued)

Biological agent (organism)	Risk group 2	Risk group 3	Risk group 4
<i>Streptococcus</i>	X		
<i>Vibrio</i>	X		
<i>Yersinia pestis</i>		X	
Fungi			
<i>Aspergillus flavus</i>	X		
<i>Aspergillus fumigatus</i>	X		
<i>Blastomyces dermatitidis</i>		X	
<i>Cladosporium bantianum</i> , <i>C. trichoides</i>		X	
<i>Coccidioides immitis</i>		X	
<i>Cryptococcus</i>	X		
<i>Candida albicans</i>	X		
<i>Epidermophyton</i>	X		
<i>Histoplasma capsulatum</i>		X	
<i>Microsporum</i>	X		
<i>Paracoccidioides brasiliensis</i>		X	
<i>Penicillium marneffeii</i>	X		
<i>Sporothrix schenckii</i>	X		
<i>Trichophyton</i>	X		
Viruses			
Adenoviridae	X		
Caliciviridae (including norovirus)	X		
Coronaviridae	X		
Creutzfeldt-Jakob agent, kuru		X	
Cytomegalovirus	X		
Dengue virus	X		
Ebola virus			X
Epstein-Barr virus	X		
Filoviridae			X
Hantavirus		X	
Hepatitis viruses (A, B, C, D, and E)	X		
Herpesviruses (except monkey B virus)	X		
Herpesvirus — monkey B virus			X

Appendix 3 (continued)

Biological agent (organism)	Risk group 2	Risk group 3	Risk group 4
Human immunodeficiency virus (HIV)		X	
Influenza viruses (A, B, and C)	X		
Lassa virus			X
Machupo virus			X
Marburg virus			X
Measles virus	X		
Mumps virus	X		
Monkeypox			X
Papillomavirus	X		
Parvoviridae	X		
Poliovirus	X		
Rabies virus		X	
Human respiratory syncytial virus (RSV)	X		
Rhinovirus	X		
Rotavirus	X		
Rubella virus	X		
Scrapie, bovine spongiform encephalopathy (BSE) (except kuru, Creutzfeldt-Jakob agent)	X		
Smallpox viruses			X
Tick-borne encephalitis viruses			X
Yellow fever virus		X	

Notes

Notes

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