

Hazard Risk Analysis

Diseases

Animals - Air & Water
Animals - Human Transmitted
Animals - Animal Transmitted
Human - Air and Water Transmitted
Human - Animal Transmitted
Human - Human Transmitted
Human - Food Transmitted
Plants - Human Controlled
Plants - General
Plant and Pest Infestations

Diseases

This section introduces a number of types of diseases including those that affect animals, humans, and plants. It also includes plant infestations. There is one risk analysis for diseases that have a natural cause and for those caused by people (human-caused). Diseases have other causes as well such as those caused by water, food, insects and animals.

Resources are available to assist you in completing this analysis in the [Risk Analysis Resources](#) section.

Diseases – Animals - Natural or Human-caused

Definition

Animal diseases or sicknesses can be spread from animals to animals and from animals to humans. They are classified by a number of criteria into several groupings: non-infectious diseases, infectious diseases, and diseases caused by parasites.

It is impossible to review every single disease capable of leading to an epidemic or disease outbreak in animals. The risk indicators for those diseases that affect animals are presented from a very general perspective. Experts should always be contacted in determining the risk of any specific diseases. There have been outbreaks of BSE (Mad Cow), Avian Flu and other animal diseases in recent years in Canada. Diseases are considered from the perspective of those that are transmitted by air and water; by humans; and by other animals.

Discussion

In addition to animals contracting or dying from disease, animal diseases pose a serious threat to human health because of our dependence on a range of animal species for food and the risk of infection from a virus or disease carried by an animal host. The infection of a herd of animals being raised for food can have negative economic impact for farmers, as in the case of foot and mouth disease, in which animals exposed or suspected of exposure are slaughtered and destroyed, in order to limit risk of spreading the disease. The Canadian Food Inspection Agency tracks the number of herds or flocks on farms with federally reportable diseases on an annual basis.

Infectious diseases affecting livestock are caused by bacteria, fungi, viruses, and protozoa, otherwise known as microorganisms. For example, these microorganisms include foot and mouth disease, lumpjaw, rabies, gastroenteritis, anthrax, bovine tuberculosis, brucellosis, and swine fever. Of these diseases, viral infections such as anthrax, which cause rapid death in a number of commercially raised animals, and brucellosis which causes spontaneous abortion in infected animals, can have serious economic impact on farmers. In addition, while they rarely infect humans, there is a slight risk that farm workers, or those who handle the dead bodies of infected animals, could contract the disease. Foot and mouth is the most contagious animal disease known, it is extremely virulent and capable of surviving in the open for hundreds of days. There may be increased risk for disease transmission in communities where livestock are raised in close proximity or share pastures, which slaughter and process animals, where it is common for families to handle or come into contact with animals,

It Happened Here...

In 1997 Infectious Salmon Anemia (ISA) which is caused by the ISA Virus broke out in the Bay of Fundy, affecting Blacks Harbour, New Brunswick (population 952). It caused anemia and respiratory problems in the Atlantic salmon. Thousands of infected salmon had to be removed from the salmon farms resulting in economic losses. There were no cases of human infection because the virus stops producing at 25 degrees Celsius.

In 2003 the BSE (Mad Cow) scare arrived in Canada as officials confirmed infected cattle in Alberta had gone through the slaughter house—affecting Manola, Barrhead County, Alberta (county population 5,845). The U.S. and 40 other countries immediately put a ban on Canadian beef. This resulted in all of Alberta's municipal districts declaring economic disasters in 2004.

In February 2004, The Canadian Food Inspection Agency (CFIA) quarantined farms and ordered approximately 20 million birds destroyed in Abbotsford, BC and the surrounding rural communities from the Fraser Valley all the way to Hope BC. The CFIA also put restrictions on the movement of birds and poultry products in the area, but the disease spread to other nearby farms.

Animal Diseases Transmitted through Air and/or Water - Natural or Human-caused

Hazard Rating High Risk <input type="checkbox"/> Low Risk <input type="checkbox"/> Need More Info <input type="checkbox"/> Not Applicable <input type="checkbox"/>				
				FACTORS
Yes	No	Need More Info	Not Applicable	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Animal feces can infect water sources. Are the animal farms in your community in close proximity to a drinking water source?
Yes	No	Need More Info	Not Applicable	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Farms that do not sanitize water lines frequently (once a week) are more likely to encounter animal health problems from pathogen build-up (pathogens are anything that may cause disease, for example, bacteria, virus, or fungi). Do farms in your community sanitize water lines less than once per week?
Yes	No	Need More Info	Not Applicable	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> There is an increased risk of air-borne transmission of disease in areas of high humidity. Does your community experience high humidity?

Animal Diseases Transmitted through Humans - Natural or Human-caused

Hazard Rating High Risk <input type="checkbox"/> Low Risk <input type="checkbox"/> Need More Info <input type="checkbox"/> Not Applicable <input type="checkbox"/>				
				FACTORS
Yes	No	Need More Info	Not	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> **Movement of people and vehicles between farms (i.e., workers, service companies, etc.) increase the risk of spreading disease. Is there a lot of sharing of staff, vehicles, or equipment between the farms in and around your community?
Yes	No	Need More Info	Not	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Visitors can bring disease onto the farm if they do not have to put on special boots and coveralls. Do the farms in your community allow visitors without special protective gear?
Yes	No	Need More Info	Not	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Just as animals can pass disease to humans, humans can pass disease to animals when living in close proximity. Is the human population living in close proximity to the animal population in your community?
Yes	No	Need More Info	Not	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Does your community have traditions or events which involve contact with animals?

Animal Diseases Transmitted from Animal to Animal - Natural or Human-caused

Hazard Rating				High Risk	<input type="checkbox"/>	Low Risk	<input type="checkbox"/>	Need More Info	<input type="checkbox"/>	Not Applicable	<input type="checkbox"/>
Yes	No	Need More Info	Not Applicable	FACTORS							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Failing to quarantine animals new to a farm for at least 2 weeks increases the risk of infection on the farm. Do the farms in and around your community quarantine (separate and restrict movement) new animals for less than 2 weeks?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vaccination decreases risk of disease. Do farms in your community abstain from vaccinating the livestock? (Answer yes if livestock are not vaccinated)							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Livestock exhibitions such as fairs and agricultural shows increase the risk of disease. Does your community host exhibitions and/or contain farms whose animals participate in exhibitions?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	As the proximity to other poultry farms increases so does the risk of disease transmissions between poultry farms. Does your community have multiple poultry farms in close proximity?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A high density of small and/or backyard poultry farms in close proximity to commercial poultry farms increases the risk for the commercial farms. Does your community have a large number of small poultry farms in close proximity to a commercial poultry farm?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Free range poultry flocks (where animals can roam freely outdoors) are considered to be at more risk to the introduction of infection. Does your community have free range poultry flocks?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The presence of wild birds on breeder farms increases the risk of disease. Do the breeder farms in your community (if any) have large number of wild birds on their premises?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Older chickens are more susceptible to infection. Does your community often have old chickens on its farms?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If farms share pastures it increases the risk of disease spread between animals from different farms. Do any farms in your community share pastures?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Some viruses (e.g. avian influenza) can be transmitted from affected poultry to pigs, also increasing the risk for humans. Does your community have poultry and pig farms or raise poultry and pigs in close proximity?							

Diseases – Human - Natural or Human-caused

Definition

Human diseases of concern are diseases and epidemics which affect people, cause death, have serious economic implications and form the basis for a mass casualty emergency response. It is impossible to review every single disease capable of leading to an epidemic or pandemic. The risk indicators for those diseases that affect people are presented from a very general perspective. Experts should always be contacted in determining the likelihood of any specific diseases. The following diseases are those that affect people. Diseases that have affected humans in Canada in the last several years have ranged from SARS (Severe Acute Respiratory Syndrome) coronavirus, H1N1 (influenza virus), and West Nile Disease to outbreaks of listeriosis and E. Coli (bacterium). Diseases are considered from the perspective of those that are transmitted by: air and water, animals, humans, and food.

Discussion

Infectious diseases which affect humans, causing sickness or death, are often of great concern and require rapid and intensive response to treat the ill and help prevent further transmissions. Of major concern is a pandemic. A pandemic as currently defined by the World Health Organization (WHO) is an outbreak of an infectious disease that affects people or animals that is declared at Phase 5 (the highest phase as illustrated below (Figure 1), where there is widespread human infection).

Diseases that may possibly attain pandemic proportions include Influenza, Lassa fever, Rift Valley fever, Marburg virus, Ebola virus and Bolivian haemorrhagic fever. For some diseases, there are no vaccines or cures. Recent emergence or re-emergence of these diseases into the human population have 'burned out' in geographically confined areas or had limited effect on humans. However, disease strains evolve over time and some can combine, presenting the potential threat of an outbreak or pandemic in the future.

There are other diseases such as West Nile Virus which has affected hundreds of people in Canada but numbers in 2010 had declined considerably (see Risk Analysis Resources West Nile Virus).

HIV - the virus that causes AIDS - can be considered a global pandemic but it is currently most extensive in southern and eastern Africa. It is restricted to a small proportion of the population in other countries, and is only spreading slowly in those countries. If there was to be a true destruction-of-life pandemic it would be likely to be similar to HIV, i.e. a constantly evolving disease.

Antibiotic-resistant superbugs may also revive diseases previously regarded as "conquered." Tuberculosis (TB) was of pandemic proportions a Century ago and was largely 'conquered' but is re-emerging as a potential concern due to an increase in antibiotic-resistant cases.

In 2003, there were concerns that SARS coronavirus a highly contagious disease (of animal origin) that causes severe pneumonia or severe acute respiratory distress in humans, might have become a pandemic. Though SARS was eventually contained and subsided, there is still no vaccine for SARS.

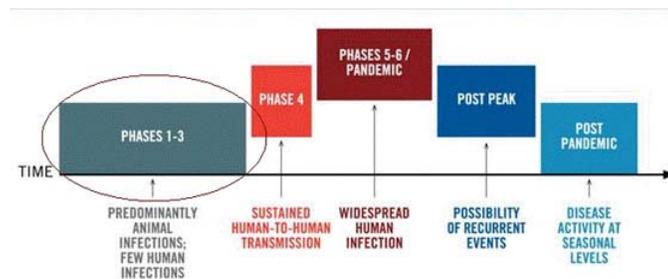


Figure 1 WHO Stages of a Pandemic

In February 2004, avian influenza virus was detected in pigs in Vietnam, increasing fears of the emergence of new variant strains. It is feared that if the avian influenza virus combines with a human influenza virus, the new influenza 'sub-type' created could be both highly contagious and highly lethal in humans. Such a subtype could cause a global influenza pandemic, similar to the Spanish Flu (1918-1920), or the lower mortality pandemics the Asian Flu (1956-1958) and the Hong Kong Flu (1968-1969). In November 2004 the director for the western region of the World Health Organization said that an influenza pandemic was inevitable and called for urgent plans to combat the virus. The most recent 2009 H1N1 outbreak was a result of a combination of human, avian, and swine viruses.

It Happened Here...

The severity of each influenza season varies, but on average, between 2,000 and 8,000 people die of influenza annually in Canada.

In 1953 there was a polio epidemic across Canada. In total 481 died and more 8000 Canadians were affected. The community of Cavendish, Prince Edward Island (population 272) was among the many affected communities.

In June 1983 an encephalitis outbreak swept across Manitoba affecting large and small communities alike, including Winnipegosis, Manitoba (population 630). The disease is thought to have been spread by infected mosquitoes carried northward by warm winds.

In 1992 a *Campylobacter* bacterium outbreak occurred, affecting Kaslo, British Columbia (population 1072). Birds are the suspected source of this waterborne disease outbreak but this remains unconfirmed. After the outbreak the community spent millions of dollars upgrading its water treatment system.

Between Oct 1999 and March 2000 170 band members were evacuated from their homes as a unknown toxic mold invaded the community of Little Saskatchewan India Reserve, Manitoba (population 654). The invasion was severe that several homes had to be destroyed.

In 2009 the H₁N₁ pandemic proved to be far less fatal than previously thought, nevertheless, thousands did become ill and 66 persons died as a result of the infection.

Human Diseases Transmitted through Air and Water - Natural or Human-caused

Hazard Rating				High Risk	<input type="checkbox"/>	Low Risk	<input type="checkbox"/>	Need More Info	<input type="checkbox"/>	Not Applicable	<input type="checkbox"/>
Yes	No	Need More Info	Not Applicable	FACTORS							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Is your community listed under a “Do Not Consume Water” or “Boil Water Advisory?”(Check Risk Analysis Resources – Water Advisories)							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Does your community fail to regularly test your water system for adequate chlorination levels and for a bacterial and virus count?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Cattle feces can contaminate drinking water and produce E. coli. Does your community farm cattle in close proximity to the drinking water source?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Rodents searching for higher grounds (i.e., during flooding) can contaminate water, mud and damp vegetation. Waterborne diseases can be transmitted when skin membranes come into contact these contaminated substances. Does your community experience flooding? (Refer to section on Floods)							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There is an increased risk of air-borne transmission of disease in areas of high humidity. Does your community experience high humidity?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All known human influenza pandemics in humans came from viruses that originated in birds. Do residents live in close proximity to birds i.e., poultry farms, “pets” and/or used for personal egg supply?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pigs can contract viruses from humans and birds as well as pass them off to humans and birds. Do residents live in close proximity to pigs i.e., hog farms?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mosquitoes can easily transmit some diseases. Scientists are predicting that with changes in climate, such as increased precipitation or warmer temperatures further North, there will be increased ranges of insect-borne and tick-borne diseases. Does your community experience a large number of mosquitoes in the spring and summer months? Is your community experiencing increased precipitation or warmer temperatures and increasing number of mosquitoes? Do you have stagnant pools of water, or marshland, where mosquitoes are known to lay their eggs?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	People are more vulnerable to mosquitoes, ticks and other animal borne diseases (i.e., West Nile Virus, Lyme Disease) if hiking or sleeping outside. Are camping and/or other outdoor activities that require spending the night outdoors popular in your community and do you experience mosquitoes and ticks?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Wild animals can pass infectious diseases to humans (e.g., Rabies). Does your community have infected wildlife/human contact?							
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Some northern/remote communities have access to medical services and some medical centers can use robots to perform certain operations, ensuring people can receive treatment for various diseases. Does your community have limited or no access to medical services or medical centers?							

Human Diseases transmitted from human to human - Natural or Human-caused

Hazard Rating High Risk <input type="checkbox"/> Low Risk <input type="checkbox"/> Need More Info <input type="checkbox"/> Not Applicable <input type="checkbox"/>				
Yes	No	Need More Info	Not Applicable	FACTORS
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The more interactions between people, the larger the risk of spreading disease within a community. Does your community have many cultural or other type of gatherings?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The more interactions between different communities, the larger the risk of spreading disease between communities. Does your community frequently interact with other communities or people (i.e., is tourism popular, do a lot of people holiday out of country or work in another town)?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vaccines are important in fighting of diseases such as influenza. Does your community have a large number of people who go unvaccinated?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Health care workers are likely to be at a higher risk due to their exposure in the workplace. Does your community have a high proportion of individuals employed in the health care field?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Children 5-15 years old are most at risk to infection. Is a high proportion of your community 5-15 years old?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Underweight children are more susceptible to disease. Are underweight children a concern in your community?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Crowded housing and poor nutrition increase the risk of TB (Tuberculosis). Does your community have high rates of crowded housing and/or poor nutrition?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Some northern/remote communities have access to medical services and some medical centers can use robots to perform certain operations, ensuring people can receive treatment for various diseases. Does your community have limited or no access to medical services or medical centers?

Food Transmitted Diseases - Natural or Human-caused

Hazard Rating				High Risk	Low Risk	Need More Info	Not Applicable
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Yes	No	Need More Info	Not Applicable	FACTORS			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Food can become contaminated with <i>Salmonella</i> and other bacteria during the slaughter and processing of an animal, when food is handled by a person infected with <i>Salmonella</i> , or by cross-contamination from other animals. Does your community have a slaughter house in or near to the community? Does your community have traditions involving slaughter and processing of an animal?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Regulations help prevent contamination of potable water and irrigated land with sewage. Is there a lack of regulations to ensure that potable and irrigation water is not contaminated with sewage?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Food is often contaminated as a result of unsanitary food handling practices. Does your community frequently have events when home cooked meals are served?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Eating raw meat or drinking unpasteurized milk and cheeses can increase the risk of disease transmission. Do residents in your community frequently eat or drink raw meat or drink unpasteurized milk and raw milk cheeses?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Outbreaks of botulism have also occurred in Canada's Inuit populations when people have eaten improperly prepared raw or parboiled meats from marine mammals? Does your community eat raw or parboiled marine mammal meat?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Vegetables and fruits can become contaminated from improperly composted manure, contaminated water, and poor hygienic practices of farm workers. Is there a lack of farming standards regarding the use of manure or contaminated water in any agricultural areas in your community? Is the practice of hiring farm workers poorly administered?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Are residents and visitors unaware of when and where areas are closed for shellfish harvesting?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Do community residents and visitors frequently disregard the rules regarding open shellfish harvesting?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Some northern/remote communities have access to medical services and some medical centers can use robots to perform certain operations, ensuring people can receive treatment for various diseases. Does your community have limited or no access to medical services or medical centers?			

Diseases – Plants – Natural or Human-caused

Definition

Plant diseases are any series of harmful physiological processes caused by irritation of the plant by some invading agent (the cause). These invading agents are typically referred to as plant pathogens and include viruses, bacteria, fungi, and algae. Plant diseases can also be classified as a pandemic.

It is impossible to review every single disease capable of leading to a disease outbreak in plants. The risk indicators for those diseases that affect plants are presented from a very general perspective. Experts should always be contacted in determining the risk of any specific diseases. There have been outbreaks of Blackleg Disease in rapeseed, Mountain Pine Beetle infestations in Western Canada and Potato Disease in the Maritimes. The following presents risk factors for plants under human control and those in general.

Discussion

Increasingly our crops are becoming more vulnerable to plant diseases and infestations. The risk of disease is increased when only one crop is produced in an area – for example, if only wheat is grown in a particular area and the wheat becomes diseased there are no other crops between plots of wheat and thus there is a greater likelihood that the disease will spread more quickly. The risk of crop loss due to disease continues to pose a major problem to agricultural producers.

It Happened Here...

In 1993, the PVYN Potato virus swept through Prince Edward Island and New Brunswick, affecting Rogersville, New Brunswick (population 1,165). Potato crops were affected and financial losses were experienced by farmers.

In July 2010, an outbreak of Downy Mildew was confirmed throughout Southern Ontario: including several fields of cucumbers in Norfolk, Elgin and Chatham/Kent Counties.

Human Controlled – Human-caused

Hazard Rating High Risk <input type="checkbox"/> Low Risk <input type="checkbox"/> Need More Info <input type="checkbox"/> Not Applicable <input type="checkbox"/>				
Yes	No	Need More Info	Not Applicable	FACTORS
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dense agricultural crops are more susceptible to invasion. Are agricultural crops grown in your community?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Areas where monoculture is practiced (growing of one crop type) are at greater risk to disease. Is your community's agriculture based solely on one (or two) crops?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The migration of seasonal workers may facilitate the movement of plant pathogens. Does your community receive an influx of seasonal workers at some point during the year?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Overuse of pesticides can result in resistant pathogens which cause disease. Are large amounts of pesticide used in your community?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Forestry enables the spread of infections by unintentionally transporting pests or diseases on timber-harvesting vehicles to unaffected areas (the strongest influence on the rate of spread of some diseases). Is there active timber-harvesting in and/or around your community?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Tree nurseries are one of the main pathways exotic plant diseases are introduced. Does your community have tree nurseries?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Epidemics can occur if plants are introduced to an area that contains a disease i.e., soil-borne fungus. This can occur when a new crop that is susceptible to infection is planted in an infested field. Has your community started planting new crops and/or is planning to do so?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Recent emerging plant diseases have been assisted by trade of infected material among countries. Does your community receive overseas plants and/or plant material?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Soil-less production is an increasing trend in horticulture that has potential for new diseases. Does your community have soil-less horticulture production?

General Diseases – Natural or Human-caused

Hazard Rating				High Risk <input type="checkbox"/>	Low Risk <input type="checkbox"/>	Need More Info <input type="checkbox"/>	Not Applicable <input type="checkbox"/>
Yes	No	Need More Info	Not Applicable	FACTORS			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Following an outbreak both the host (the infected plant) and pathogen (the basis of the infection) rarely disappear completely resulting in the possibility of a subsequent outbreak. Has your community experienced a plant disease outbreak in the past?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Wetter areas are more susceptible to fungal infections. Is your community located in a wet area (i.e., experiences a lot of rain and/or humidity)?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The Appalachians has what is considered a disease-inducing climate. Is your community located in the Appalachians in the East Coast?			

Plant and Pest Infestations

Definition

Pest infestations are classified by the feeding habits of the pest: bark, foliage feeding or root feeding.

Discussion

In Canada, pests such as the spruce budworm or the mountain pine beetle have been known to damage marketable timber and affect the health of forests for other cultural or traditional uses. These infestations can cause millions of dollars worth of damage to forests and tree farms and cause secondary economic impacts in subsidiary industries.

Additional concern includes the large variety of pests which may feed on agricultural crops including potatoes, grain, fruit and other produce. For example, Agriculture Canada reports that infestations of grasshoppers can result in crop losses of up to 50%.

It Happened Here...

Agriculture and Agri-Food Canada reported that in 2006, a wheat midge infestation caused an estimated \$40 million in yield and grade losses in Saskatchewan and Manitoba, while the pest can cause up to \$100 million in losses in a year of high infestation. Currently pesticide application is the only defence against wheat midge.

In 2009 Agriculture and Agri-Food Canada reported that Culicoides, "...a biting fly that makes its home and takes its meals in livestock facilities can spread viral diseases among cattle, including the devastating bluetongue disease. Apart from the Okanagan Valley in British Columbia, Canada is free of this disease. However, the potential for outbreaks elsewhere has caused severe restrictions on animal movement and loss of international trade."

Plant and Pest Infestations

Hazard Rating				High Risk <input type="checkbox"/>	Low Risk <input type="checkbox"/>	Need More Info <input type="checkbox"/>	Not Applicable <input type="checkbox"/>
Yes	No	Need More Info	Not Applicable	FACTORS			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Following an infestation the pest often does not disappear completely resulting in the possibility of a subsequent outbreak. Has your community experienced a pest infestation outbreak in the past?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Increased moisture in certain dry regions of Eastern Canada has increased the likelihood of pest infestations. Is your community located in Eastern Canada and has it experienced increased moisture?			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Longer growing seasons without frost or very warm winters increases the likelihood of pest infestations. Has your community seen warmer winters or longer periods without frost?			

Risk Analysis Resources

Human Diseases, Epidemics and Pandemics

The Public Health Agency of Canada includes a lot of information on their website regarding potential epidemics and pandemics. It also publishes a weekly Canadian Communicable Disease Report.

<http://www.phac-aspc.gc.ca/index-eng.php>

Keywords: Communicable Disease, Canada

Health Canada has a lot of information on diseases and disease prevention.

<http://www.hc-sc.gc.ca/index-eng.php>

Keywords: Disease Prevention, Canada

Plant Diseases

The Canadian Plant Disease Survey is a periodical of information and record on the occurrence and severity of plant diseases in Canada and on the analysis of losses from disease.

<http://phytopath.ca/>

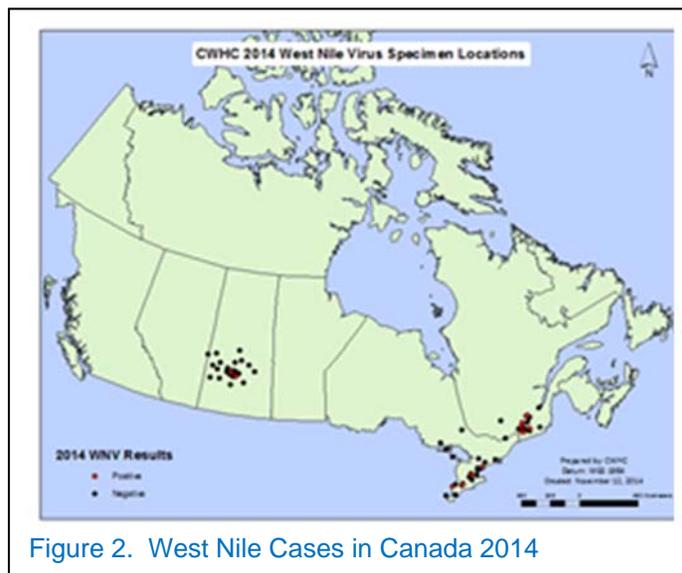
Keywords: Canadian Plant Disease Survey

Water Advisories

For all of Canada except for British Columbia, check for up-to-date listings for First Nations communities where there is a “Do Not Consume” or “Boil water” advisory from <http://www.hc-sc.gc.ca/fniah-spnia/promotion/public-publique/water-dwa-eau-aqep-eng.php#more>

In British Columbia, First Nations community members can obtain the most up-to-date information on drinking water in their community through Chief and Council, or their local First Nations Health Authority from <http://www.fnha.ca/what-we-do/environmental-health>

West Nile Virus



The following map indicates the number of West Nile cases in Canada in 2014. (see Figure 2)

Historical Events – General Information

Please Note: See your Provincial/Territorial Risk and Resilience Information Guides for additional resources, including information regarding your community emergency manager, contact with Aboriginal Affairs and Northern Development Canada, and provincial or territorial Emergency Management Organization (EMO). EMO websites generally provide information specific to the hazards in your territory or province. Band websites or regional Aboriginal community websites can provide more information.

Resources
<p>The “Canadian Disasters - An Historical Survey” website by Robert L. Jones provides a great list of past disasters which have occurred since the 1500s in Canada and have resulted in at least 20 deaths.</p> <p style="text-align: center;">http://web.ncf.ca/jonesb/DisasterPaper/disasterpaper.html</p> <p>Keywords: Canadian disasters historical survey</p>
<p>The Public Safety Canada “Canadian Disaster Database” contains a list of past disasters in Canada.</p> <p style="text-align: center;">http://www.publicsafety.gc.ca/prg/em/cdd/srch-eng.aspx</p> <p>Keywords: Canada disaster database</p>
<p>Wikipedia has a list of disasters in Canada and links to various events; however, it does not have a lot of information about British Columbia.</p> <p style="text-align: center;">http://en.wikipedia.org/wiki/List_of_disasters_in_Canada</p> <p>Keywords: Canada disasters wiki</p>
<p>SOS! Canadian Disasters is supported by Library and Archives Canada, and provides some interesting stories on historical events and also has a great website on an education program (Grades 7 to 12) on understanding hazards and disasters in Canada.</p> <p style="text-align: center;">http://www.collectionscanada.gc.ca/sos/index-e.html</p> <p>Keywords: sos! Canada library archives</p>
<p>CBC Archives have a wide variety of news clips on historical and current disasters in Canada as well as educational information on hazards for teachers. On the CBC Digital Archives webpage, search for “disaster” in their own keyword search bar.</p> <p style="text-align: center;">http://www.cbc.ca/cgi-bin/MT4/mt-search.cgi?search=disaster&IncludeBlogs=777&limit=20</p> <p>Keywords: CBC archives, Disaster</p>

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