



# Shifting North: Insects, Animals & Diseases They Can Carry

The occurrence of diseases transmitted by animals (called zoonotic diseases) is predicted to change with the changing climate.

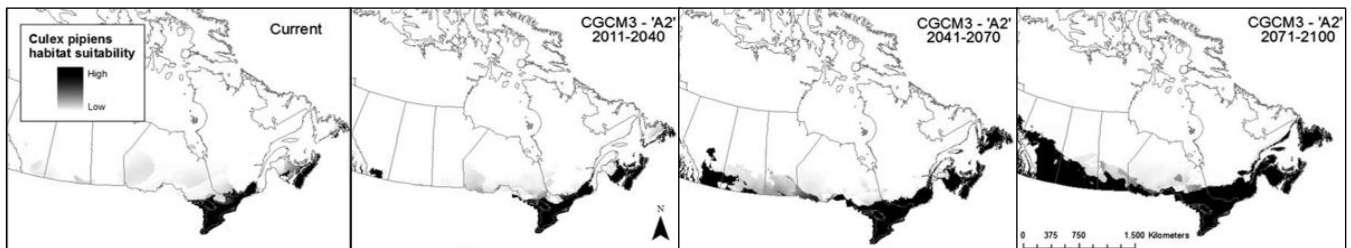
As ecosystems shift with changing climate, there is potential for the distribution of many insects and animals to change. This could pose challenges for the control of zoonotic diseases. Warmer temperatures, especially in winter, are allowing more southern species to exist further north. And warmer temperatures in spring and fall are increasing the length of time some carriers and vectors can remain active. West Nile virus (carried by mosquitoes), Lyme disease (carried by ticks) and rabies (carried by mammals) are examples of vector-borne diseases that have the potential to spread north.

## West Nile Virus (WNV)

West Nile Virus was introduced into Canada in 2001 and is transmitted by infected *Culex* mosquitoes. It is expected that the range of the *Culex* mosquito will expand northward. Very few people have severe illness from being infected by WNV; 80% of people have no symptoms at all. Of those who do show symptoms (fever, headache, fatigue, skin rash), most experience only mild illness, however, when WNV causes severe illness (1% of cases) it involves the brain and nerves. So, as the range of the mosquito that carries it moves north, it is important that people in more northern areas are aware of WNV and the steps that can be taken to avoid infection.



*Culex* mosquito Photo from [www.publichealthontario.ca](http://www.publichealthontario.ca)



Potential habitat shift of the *Culex pipiens* mosquito with predicted changes in climate. The darker the colour, the more favourable the conditions for *Culex pipiens* establishment. Taken from Hongoh et al., 2012.

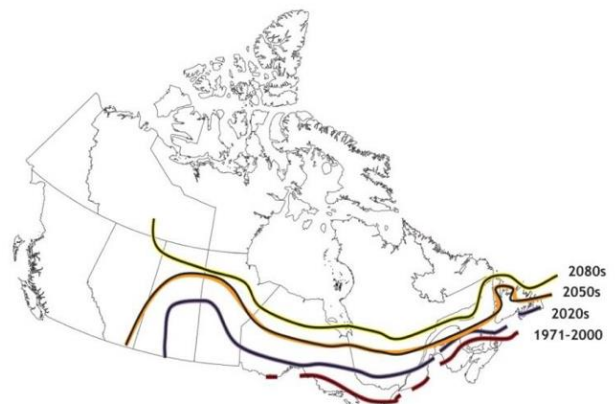
## Lyme Disease

The blacklegged tick (also called the deer tick) is the vector responsible for carrying the bacteria *Borrelia burgdorferi*, which is the cause of Lyme disease. Like the *Culex* mosquito, the range of the blacklegged tick has the potential to move north with a warmer climate. The number of Lyme disease cases in Canada has increased significantly from 144 cases in 2009 to 992 in 2016, with Ontario having the highest incident rate of 25-30 cases per 100,000 people. The map to the right shows the upper geographical limit of blacklegged tick historically (1971-2000) and projected into the future with predicted changes in climate. With the range potentially pushing to the far north of Ontario, it will be necessary to be aware of the potential risk of Lyme disease



Black-legged tick  
<https://www.ontario.ca/page/lyme-disease>

in your community and what can be done to mitigate the risk of exposure.



Potential range expansion of the blacklegged tick with continued climate change. Taken from Greer et al., 2008.



## Adapt and prepare

### Preventing bites

The best way to prevent infection from vector-borne diseases is to prevent bites.

To avoid rabies, do not handle injured wild animals like bats, foxes, raccoons and skunks.

To prevent insect bites, the Ontario Ministry of Health recommends:

- Wearing light coloured, long-sleeved shirts and pants – you can spot ticks more easily and mosquitoes are attracted to dark colours.
- Covering exposed skin - wear a hat, closed footwear, pull socks over your pants, and tuck in your shirt.
- Using insect repellents (bug spray, lotions) with DEET or Icaridin.



If you find a tick on your body, remove the entire tick including the head. See here for instructions: <https://www.ontario.ca/page/lyme-disease>

### Remove or limit habitat

Ticks:

- Keep grass mowed short and trim trees and bushes to let sunlight in (ticks avoid hot, dry places)
- Remove brush and leaf litter
- Create a border of gravel or woodchips at least 1 meter wide at the edge of wooded areas or areas with tall grasses
- Keep children's play sets away from the edges of wooded areas. Consider placing them on mulch or woodchips and in areas of sun.

Mosquitoes:

- Remove standing water. Mosquitoes lay their eggs in stagnant water, even small amounts.
- Keep lawn, trees and shrubs trimmed to let sunlight in and clear away brush and leaf litter. If you have a compost pile, turn it regularly. Adult mosquitoes like these cooler, darker areas.
- Put screens on windows and doors to keep mosquitoes out of your house.

### Be aware of diseases and their symptoms

Ensure community members are aware of the potential of these illnesses and are familiar with the signs and symptoms of infection. Prompt and proper treatment can help mitigate the potential health effects of illnesses like Lyme disease and rabies. Identification of these illnesses can also help provincial monitoring programs that track the spread of these and other illnesses. More information on these diseases can be found at: <https://www.ontario.ca/page/outdoor-health>

### Monitor

Climate change has the potential to allow species to live in areas where they couldn't live before. Monitoring can help alert communities when new species have entered their area. Consider including tick (<https://www.youtube.com/watch?v=t7rwiofSuKc>) and mosquito monitoring in your community-based monitoring program.



Animals that can carry diseases transmissible to humans are predicted to move north with climate change. People in northern Ontario should be aware of the risk, protect themselves from bites and monitor changes on the land.

Find out more: <https://www.publichealthontario.ca/en/diseases-and-conditions/infectious-diseases/vector-borne-zoonotic-diseases>