# Infectious Disease and Climate Change Forum

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CANADIAN PUBLIC HEALTH ASSOCIATION

## Opening Plenary

### Dr. Nick Ogden, Public Health Agency of Canada, "Climate change and infectious diseases: What are the risks and what can we do about them?"

"We need to have, and we do have, the capacity to respond to outbreaks arising from emerging infectious diseases." —Nick Ogden

## Key Takeaways

- As our planet continues to warm, infectious disease risks will become more **complex and unpredictable**.
- Canada already has sophisticated **modelling** techniques to predict how shifts in climate may affect disease emergence. We also have **surveillance** capacity. But we need more knowledge and methods.
- Epidemic and pandemic responses will require quick, coordinated action across **diagnostics, vaccines, medical counter-measures** and more. Misinformation and fear will complicate our ability to respond.
- To mitigate and adapt, we will need expertise in **One Health**, recognizing the interconnectedness of environmental, wildlife, livestock and human health. We need to work across sectors and silos.

## What We Heard

### Climate factors affecting infectious disease

- Climate-related factors drive the emergence and re-emergence of infectious diseases. As the climate warms, exotic pathogens find new environments. Ecological changes cause transmission of endemic diseases to increase. And diseases endemic in wildlife and livestock can spill over into human populations.
- Zoonoses—diseases transmitted from animals to humans—are very sensitive to climate. The extent to which diseases like Lyme and West Nile are able to seek a host depends on temperature and rain. Warmer, rainier weather patterns increase transmission.

### Present and future risks

- We can expect complex effects of climate change on wildlife disease ecology, including hosts, vectors and seasonality.
- With climate warming, rodent-borne diseases such as hantavirus will likely increase. Ungulate-borne zoonoses (for example, tuberculosis and brucellosis) are likely to spill over more frequently from wildlife to livestock, and then to humans.

# What We Heard

**"It's important for individual jurisdictions to be looking at their own multi-hazard risks."**

—Nick Ogden

## **Present and future risks** continued

- We are also likely to experience more food-borne illness, more epidemics of water-borne diseases associated with heavy rainfall, and more environmental infections acquired by inhalation.
- In tandem, global instability will continue to rise. Societies will have less agricultural productivity, more civil unrest and human migration, and less capacity to control outbreaks. All of these factors will affect the spread of climate-sensitive infectious diseases.
- In Canada, endemic diseases—West Nile and hantavirus, for example—will take on more epidemic behaviour. We will experience more outbreaks of food and water-borne disease, and northward expansion of diseases like Lyme and La Crosse. New vectors may also bring exotic vector-borne diseases into the country.
- We should expect interruptions to our health care system along with broad economic impacts. Surprises, fear and misinformation will make our capacity to manage epidemics more difficult.

## Prevention And Response: What can we do?

- We can respond to outbreaks but also forecast risk. Prevention helps us "get ahead of the curve" (Dr. Ogden).
- We need to have strong epidemic/pandemic controls in place, and we do. They include diagnostic lab capacity, vaccine production and distribution, and the ability to communicate medical counter-measures.
- Detailed modelling points to the likelihood of novel disease emergence. Modelling can show where and when we might see climate change impacting disease transmission. Models must be grounded in reality.
- Surveillance techniques—in wildlife and livestock as well as humans—are crucial and can also provide early warnings. New technologies such as metagenomics and wastewater surveillance are promising interventions.

# Explore Further

To learn more about what is currently happening in Canada with respect to climate change and infectious diseases, read the CPHA report:

**Infectious disease and climate change in Canada: Key informant interviews.**