Climate Change and Zoonotic Infectious Diseases in the Arctic: Actions to Improve Knowledge, Disease Detection and Prevention and Control

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Introduction
- The Arctic, like most other parts of the world, has warmed substantially over last few decades.
- Warmer temperatures may allow infected host species to survive winters in larger numbers, increase in population and expand their range of habitation thus increasing the opportunity to pass infections on to other animals and humans.
- The impact of these changes on human and animal diseases in the Arctic has not been fully evaluated but there is clear potential for climate change to shift the geographical distribution of certain vector borne, parasitic and other zoonotic diseases.

Arctic Warming: Global temperature anomalies for 2000-2009 compared to 1951-1980

For 2000-2009 global temperatures were on average about 0.6°C higher than they were 1951-1980. The Arctic was about 2°C warmer. Arctic climate models project continued warming with a 3-7°C mean increase by 2100.

Credit: NASA image by Robert Simmon, based on GISS surface temperature analysis data including ship and buoy data from the Hadley Centre. Caption by Adam Voiland.

Human Health


Actions to improve knowledge, disease detection and prevention and control
- Conduct research into the relationship between weather, climate and infectious diseases.
- Enhance the surveillance capacity in northern regions to monitor potentially climate sensitive infectious diseases that are likely to have the most impact on human and animal populations.
- Conduct research into the relationship between weather, climate and infectious disease emergence to guide early detection and intervention.
- Promptly investigate hemolyticus outbreaks to establish potential links to climate.

Actions to improve knowledge, disease detection and prevention and control

- Conduct serosurveys to establish baseline levels of infection in people and animals
- Improve diagnostics and expand use of molecular typing to explore the ecology of infectious diseases in animal and human populations
- Improve communication strategies targeting:
  - Human and animal health care providers
  - Indigenous communities
  - Public, wildlife and environmental health professionals “One Health”
- Expand local, regional, and international networks
  - Establish community-based monitoring (e.g. Local Environmental Observer network and Circumpolar based monitoring network)
  - International Circumpolar Surveillance (ICS)

Share knowledge by linking local, regional, international networks

International Circumpolar Surveillance of Emerging Infectious Diseases

Graph shows the mean daily water temperature at an oyster farm in Prince William Sound, Alaska, together case patients by date of consumed farmed oysters. The sea water temperature had increased by 0.21 degree C per year since 1997 (p<0.14, P<0.001) reaching an optimal temperature for bacterial growth, above 15 degree C, in oysters by 2004.

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Actions to improve knowledge, disease detection and prevention and control

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