



Panel Presentation

“Tick and mosquito surveillance: Understanding the impact of climate change on pathogens and vectors”

“We should really be aware of what’s happening in the insect world.”
—Dr. Bernadette Ardelli, University of Manitoba

Speakers

Dr. Jade Savage, Bishop’s University;

Dr. Samira Mubareka, Sunnybrook Research Institute;

Dr. Bernadette Ardelli, University of Manitoba

Key Takeaways

- Climate warming encourages the spread of **infectious disease vectors**. In turn, this increases the risk of infection from vector-borne diseases in humans and animals. To anticipate and address the health impacts, researchers are doing passive and active surveillance of vectors such as ticks and mosquitoes, as well as disease cases.
- We heard about **three surveillance projects** in this panel. Methods ranged from the citizen science approach of eTick.ca, to **testing sheep** on Ontario farms for orthobunyaviruses, to **trapping mosquitoes and ticks** in Manitoba and testing their RNA for emerging pathogens.

What We Heard

Quick Facts

- As of early October 2021, eTick.ca had received 12,635 submissions of tick images—for the year alone.
- The majority of submissions to eTick.ca are photos of the *dermacentor* species (American dog tick).
- Of 374 sheep recently tested for orthobunyaviruses in Ontario, one-third tested positive for Cache Valley virus (CVV), with a 0-90% positivity range per farm.
- In approximately 33,000 mosquitoes trapped in 2020 and 2021 throughout Manitoba, RNA testing revealed more than 40 viruses, including viruses of concern such as La Crosse and Turlock.



What We Heard

Jade Savage

“Overview and summary of the eTick project”

- [eTick.ca](https://etick.ca), now both a website and app, is an image-based, crowdsourced platform for tick identification. The project was created to streamline the time spent identifying and mapping individual ticks in Canada.
- Through eTick, anyone submitting a tick image receives public health messaging tailored by province. Each submission is represented on the website as a dot on an interactive map.
- The project engages all 10 provinces. Most submissions come from Ontario and Nova Scotia.
- The app and website are extremely popular. The app had over 31,000 downloads in 2021.

Samira Mubareka

“Arbovirus surveillance in Ontario: Understanding pathogen and vector bioecology and epidemiology in the context of climate change”

- This project is studying the prevalence of orthobunyaviruses—a group of relatively rare viruses present in Canada, including California serogroup viruses and Cache Valley virus—in humans and sheep.
- Researchers plan to look at environmental factors affecting virus activity in hosts. They will use weather, mosquito and virus data to develop predictive climate-health models.
- So far the study has tested sheep from 18 farms in Ontario, as well as over 7,000 mosquitoes. Results suggest that “small ruminant seropositivity isn’t uncommon, but detection in pools of mosquitoes is rare” (Dr. Mubareka).

Bernadette Ardelli

“Surveillance of neglected mosquito and tick-borne pathogens in the Canadian Prairies”

- This study has sampled several thousands of mosquitoes and ticks throughout rural and urban sites in Manitoba.
- Researchers aim to identify emerging pathogens in these vectors (for example, Rocky Mountain spotted fever and California serogroup viruses). To do so, they are analyzing tick and mosquito RNA.
- The team captured approximately 7,500 tick and 270,000 mosquito samples during 2020 and 2021 combined. Results show greater mosquito species sampled during 2021, likely due to warmer winter weather.
- Data will be used to identify areas of the province with the most vectors, and to model seasonal prevalence.