



Research on ticks and Lyme disease in Ottawa

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Outline

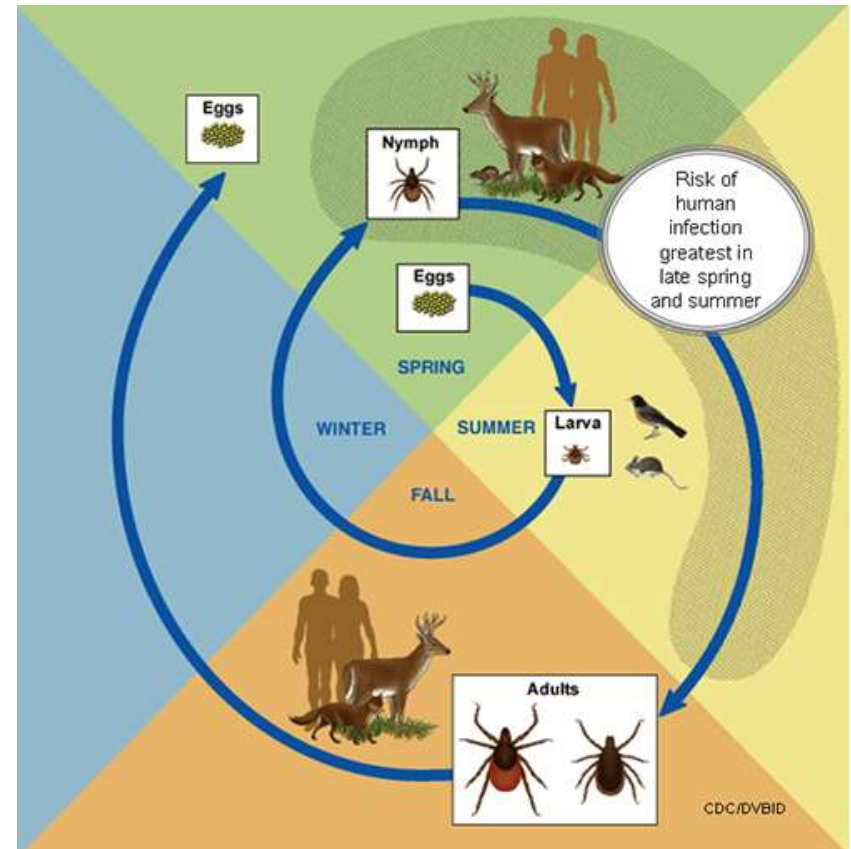
- What is Lyme disease?
- Why is it emerging in Ottawa?
- Research activities in Ottawa
- How can you prevent tick bites?



What is Lyme disease?



- Tick-borne bacterial disease with rodent intermediate hosts
- Blacklegged ticks (aka deer ticks) have a two-year life cycle with four life stages
- Highest risk of human infection in late spring and summer months



What are blacklegged ticks?



PHAC 2018

- Mainly found in deciduous forests
- Mainly found in areas with white-tailed deer
- Cannot fly or jump
- Ticks 'quest' on the tips of branches of low-growing shrubs or grasses and attach to hosts that brush by



What is Lyme disease?

- People can be infected if they are bitten by a tick infected with *Borrelia burgdorferi*
- Risk of infection following tick bite relates to how long tick has been attached (negligible risk if <24 hours)



Bull's eye rash occurs in about 70% of cases but may go unnoticed

Centers for Disease Control and Prevention, <http://phil.cdc.gov/phil/>

Why is Lyme disease emerging in Ottawa?



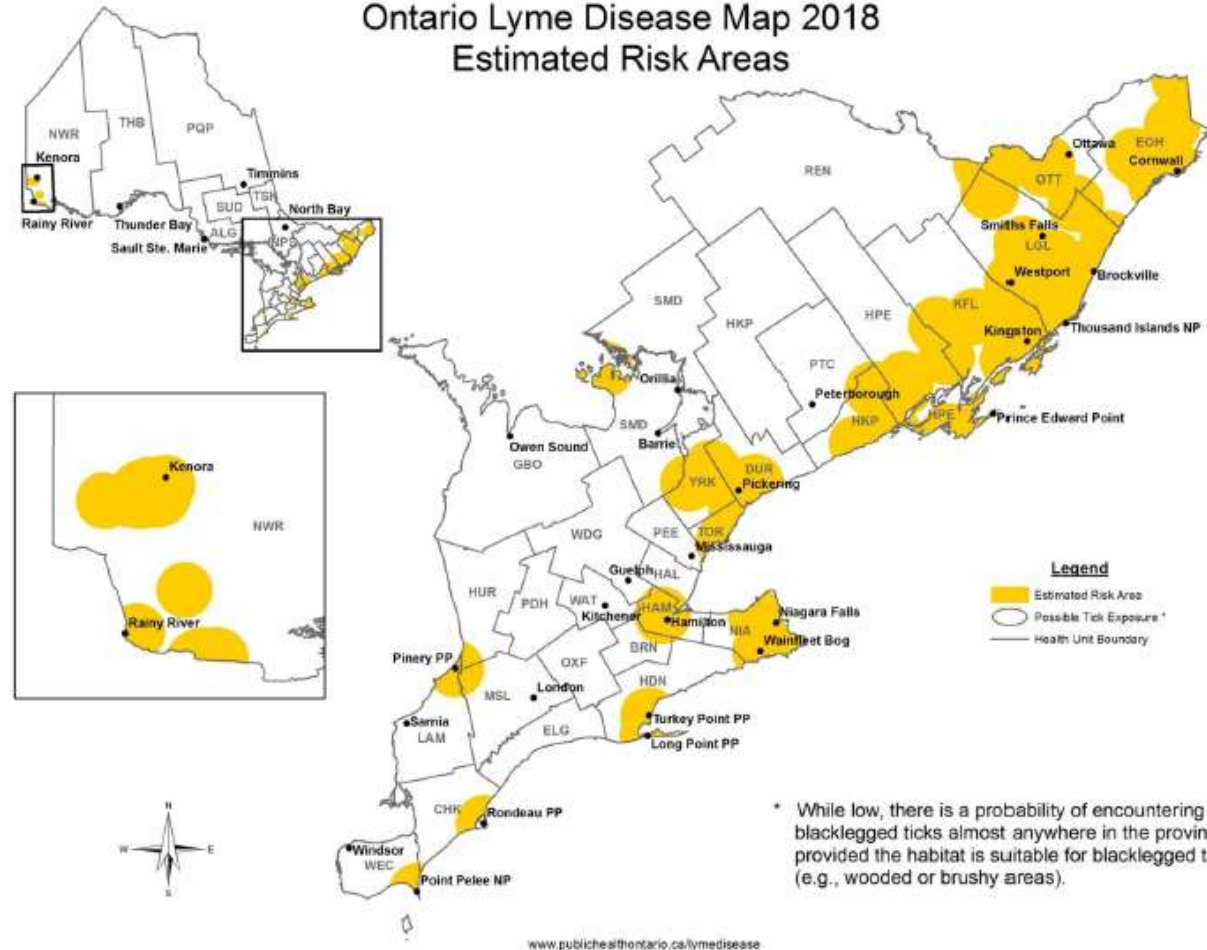
- Warming temperatures permit expansion of tick vector geographic range into parts of Canada
- Northward transport of ticks by migratory birds
- Expanding range of white-footed mouse and white-tailed deer
- Habitat fragmentation and biodiversity loss



Distribution of blacklegged ticks in the US (CDC)

Where does Lyme disease risk occur?

Ontario Lyme Disease Map 2018
Estimated Risk Areas



Public Health Ontario (2018)

RESEARCH AT THE INSIGHT LAB



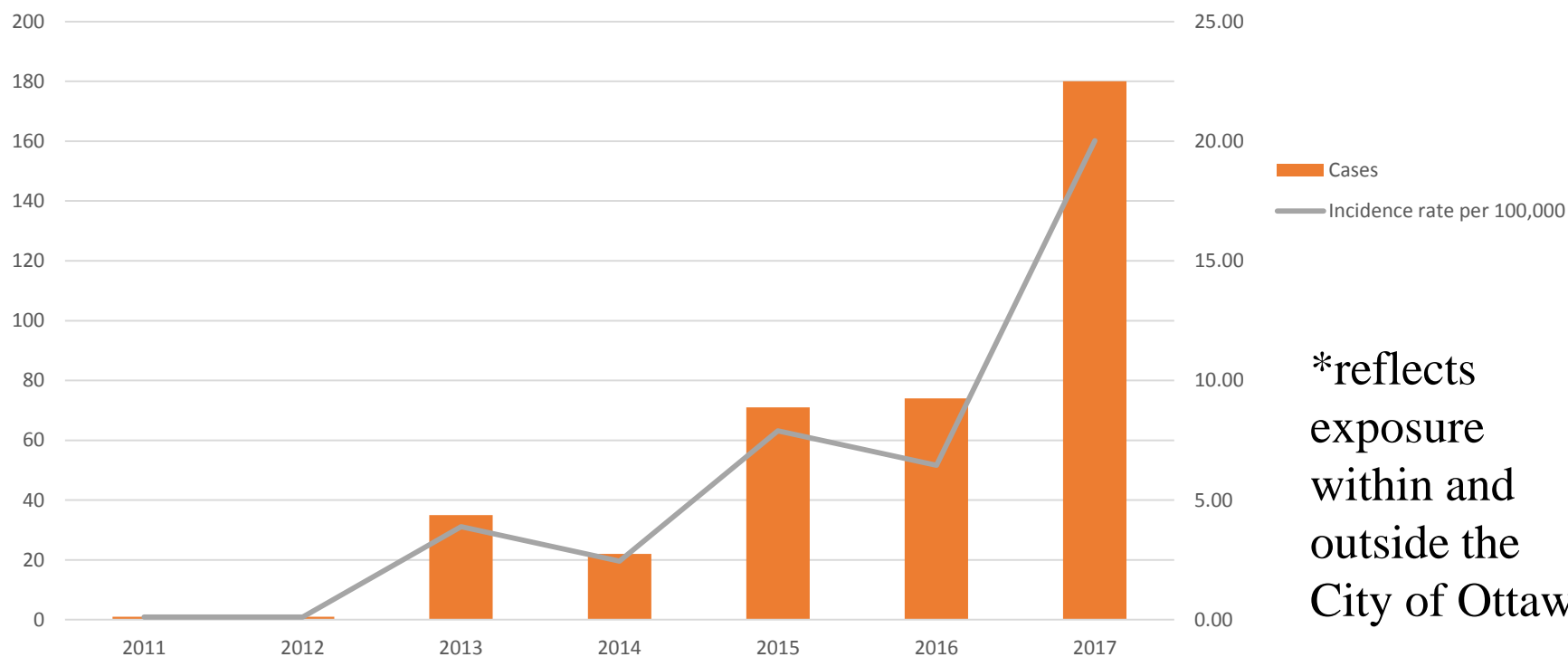
Research at the INSIGHT Lab, uOttawa

- **Goal:** To understand the social and ecological determinants of vector-borne disease emergence and risk and develop practical risk assessment tools and maps for public health end users
- **To do this, we are investigating:**
 - the distribution of mosquitoes and ticks (*'vectors'*) that can transmit diseases to humans
 - spatial and temporal trends in vector populations and infection rates
 - risk factors for human exposure and infection

INSIGHT Lab: www.globalhealthepi.com

Why are we doing research in Ottawa?

Lyme disease incidence by year, 2011-2017, Ottawa*



*reflects exposure within and outside the City of Ottawa

Data source: <http://www.ottawapublichealth.ca/en/reports-research-and-statistics/infectious-diseases.aspx#cases>

Sentinel surveillance sites to monitor tick populations in Ottawa, 2017-2019

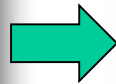
- South March Highlands Conservation Forest
- Stoney Swamp
- Greenbelt Pathway West
- Shirley`s Bay
- Carling Campus Northern Access Trail
- Carp Hill
- Britannia Conservation Area
- Pine Grove (Conroy Pit)
- Dominion Arboretum
- Brown's Inlet Park
- Rideau River Eastern Pathway
- Hog's Back Park
- Beryl Gaffney Park
- Heritage Park
- Meadowbrook Park
- Prescott & Russell Recreational Trail
- Pinhey's Point Park
- Fairmont Park
- Petrie Island Park
- Beacon Hill
- Greely
- Morris Island Conservation Area*
- Rideau River Provincial Park*
- Murphy's Point Provincial Park*

*2017 only

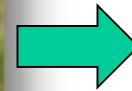
How do we monitor tick populations?



Drag sampling

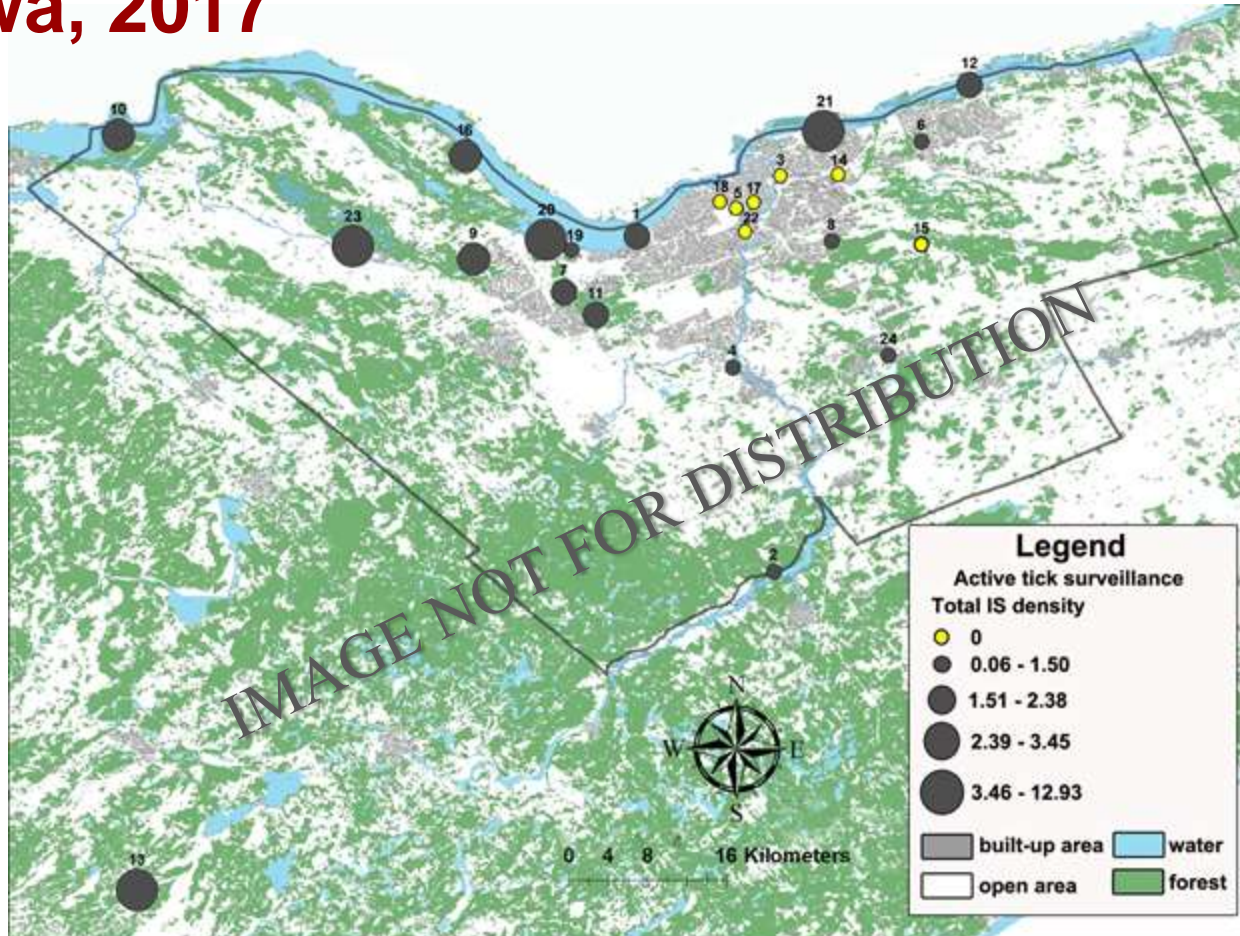


Transport to lab



Extract DNA and test for pathogen genetic markers

Results of active tick surveillance by INSIGHT Lab in Ottawa, 2017

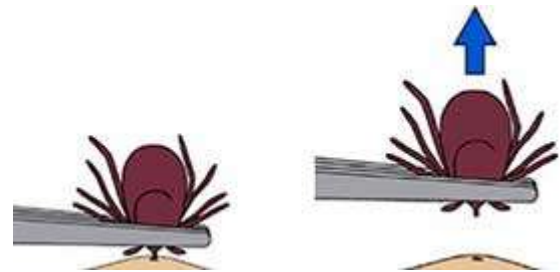


*Density refers to the number of blacklegged ticks per person-hour of drag sampling (*Is=Ixodes scapularis*)

Kulkarni M *et al.* Canadian Communicable Disease Report (manuscript under review)

How can you prevent a tick bite?

- Wear long pants, a long sleeved shirt, shoes and socks to cover exposed skin
- If possible, stay on the trails when hiking in the woods or walking in long grass
- Apply an approved insect repellent containing DEET or icaridin
- Do a "full body" check on yourself, your children, and pets for ticks
- Remove ticks as soon as possible



How can you reduce ticks around your home?

- Keep the grass in your yard mowed
- Remove brush and fallen leaves from the edges of your property
- Clean up areas under and around bird feeders
- Discourage deer from entering your yard
- Use a 1-metre barrier of woodchips or rock to separate woods from lawn

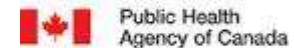


From: Stafford K. (2004) Tick Management Handbook. Connecticut Agricultural Experiment Station.

Acknowledgements

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