CANADIAN WILDLIFE HEALTH COOPERATIVE

August 15, 2017

WILDLIFE HEALTH: A Snapshot on

URBAN PLANNING AND VECTOR-BORNE DISEASES

SUMMARY

Two trends will affect vector-borne disease (VBD) dynamics in Canada: climate change and urbanization. The former will affect the abundance, diversity and distribution of vectors and wildlife hosts. The latter will alter the interface between people, ticks and wildlife. Urban planners have been developing green and blue spaces, in part to combat non-communicable disease and effects of climate change. Less attention has been paid towards how urban planning and management may affect VBD risks in Canada. Little investment has been made in examining how urban wildlife ecology in Canada will change in response to urbanization and how that will influence VBD risks. Public health input into local planning may be useful for primordial or primary prevention of VBD.

BACKGROUND

Canada is rapidly urbanizing, creating the need to better understand how VBD will adapt to and expand in urban areas. VBD are increasing in cities and urban areas globally. Urban growth and planning effect land cover, local climate, water flows, flora and fauna; each of which are critical for VBD ecology. Urbanization effects will be compounded by climate change which will allow expansion of VBD into new areas that were previously unsuitable. For example, in 2012, the Canadian Wildlife Health Cooperative (CWHC) detected the first case of *Babesia odocoilei* infection in Saskatchewan elk and deer. In 2013, Canada had its first case of Babesiosis infection with a young boy contracting the tick-borne disease in Manitoba. Urbanization and climate change will also combine to effect wildlife hosts for vectors. For example, urban rat populations are expected to grow in coastal cities in Canada due to warmer weather and increased flooding.

CANADIAN
WILDLIFE HEALTH
COOPERATIVE

Challenges remain in anticipating the emergence, spread and effects of VBD. While, Lyme disease is now endemic in parts of BC, Manitoba, Ontario, Quebec, New Brunswick and Nova Scotia, migrating bird hosts can introduce the vector and etiological agent outside of endemic areas (climate change and urbanization are unpredictably affecting bird migration patterns). Our inability to confidently model climate and urbanization drivers of VBD emergence and impacts in the context of social gradients constrains public health response. Recent issues of the Canadian Communicable Disease Report (2016: 42-10) and the Canadian Family Physician (2016:62) note the need to better understand neighbourhood level risks. Public health input into urban design may be a precautionary means to modify human exposure and VBD risks.

URBANIZATION AND VBD ECOLOGY

Urbanization and suburbanization are progressively reshaping the Canadian landscape and population densities. The role of cities in disease is well established, but less is known about how urbanization influences VBD. Urbanization is a key driver of land-use changes that are likely to increase at an unprecedented rate in the coming decades. Encroachment of urban/suburban areas into natural areas coupled with the green cities movement lead to increased wildlife encounters and potential for zoonotic disease. For example, the CWHC recently diagnosed tularemia in a white-tailed jack rabbit and a squirrel within urban parks of Saskatoon, a first for the city. Features such as parks or greenways can attract and concentrate wildlife, influencing vector density and abundance (e.g. white-tailed deer and white-footed mice density effects on Lyme disease vectors). Although urbanization reduces the abundance of many wildlife species, disease transmission can increase among urban adapted hosts.

While debates remain about the “dilution effect” (where higher biodiversity may lower VBD disease risk), it is clear that landscape features, such as the presence of forest edges and density of forested areas, will influence host and vector resources as well as interfaces for encountering people. Some habitats, such as forest patches, wetland borders and semi-urban communities, are particularly prone to tick infestations. Within these areas, ticks thrive under conditions of humid leaf litter (particularly deciduous forest), abundant vegetation and lower elevations. The implications of changing human-wildlife-vector transmission networks are likely to be neighbourhood specific and vary by pathogen.

Spatial overlap between hosts and vector ranges are key requirements for the emergence and spread of VBD. More attention has understandably been directed towards how urban planning in tropical regions influence these overlaps. But Canada is not immune from the ecological implications of landscape changes as we urbanize and our climate changes.

IMPLICATIONS

There are many ways to prevent VBD impacts, such as insecticides, repellents, and prompt medical attention. While each of these strategies are important, where we live and how we build our communities may play a larger preventive role. Public health input into local planning can help to balance the community health risks and benefits of greening cities and suburban areas. Attention to changing epidemiological patterns in urban wildlife can provide foresight into new opportunities for changing VBD risk. Programs such as the CWHC passerine bird tick surveillance, surveys for Powassan virus, urban rat studies and scanning surveillance for West Nile infected birds provide a foundation for collecting urban VBD risk information.

CANADIAN
WILDLIFE HEALTH
COOPERATIVE

REFERENCES

1. Jackson LE, Hilborn ED, Thomas JC (2006): Towards landscape design guidelines for reducing lyme disease risk. International Journal of Epidemiology 35(2): 315-322.
2. Levy S (2013): The lyme disease debate: Host biodiversity and human disease risk. Environmental Health Perspectives 121(4): A120-A125.
3. Habegger S (2014): Lyme disease in canada: An update on the epidemiology. Purple Paper: National Collaborating Centre for Infectious Diseases 43: 1-11.
4. Kilpatrick AM, Dobson A, Levi T, Salkeld D, Swei A, Ginsberg H, Kjemtrup A, Padgett KA, Jensen PM, Fish D, Ogden NH, Diuk-Wasser M (2017): Lyme disease ecology in a changing world: consensus, uncertainty and critical gaps for improving control. Philosophical Transactions of the Royal Society B-Biological Sciences 372: 20160117.

CONTACT US

CWHC National Office
Western College of Veterinary Medicine
52 Campus Dr. Saskatoon, SK S7N 5B4
info@cwhc-rcsf.ca
1.306.966.50996
www.cwhc-rcsf.ca
www.healthywildlife.ca

FOLLOW CWHC

www.cwhc-rcsf.ca