

Bridging Urban Planning and Public Health: Investigating the Relationship Between Land Use Change and Vector-Borne Disease Risks in Ontario

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Executive Summary

Zoonotic diseases are diseases that are transmitted from animals to humans, and incidences of zoonotic spillover are on the rise globally due to several anthropogenic factors which have intensified the animal-human interface in recent decades; reshaping reservoir host communities and increasing the novel interactions between people and wildlife (UNEP 2020; Gibb, 2020). Urbanization and anthropogenic land use change has been identified as an important driver in this phenomenon, and several papers and reports have been published which call on urban planners to help mitigate zoonotic and vector-borne disease risks by safeguarding the planet's natural resources and ensuring environmentally and socially responsible development practices (Patz et al., 2004; Ahmed, S., et al., 2019; UNEP 2020; Wernecke et al., 2020). The aim of this report was to explore the ways in which Ontario planners can address this global challenge. The primary questions guiding this research are: what are the most prevalent zoonotic and/or vector-borne diseases in Ontario, as identified by Public Health Ontario, that are driven by land use or environmental factors? What is the current understanding of the risks of land use-induced zoonotic spillover in Ontario among epidemiological and public health experts, as well as planning and geography experts? And, what are urban planning recommendations and best practices that would help manage the risks of zoonotic disease transmission in Ontario?

To answer these questions, a scan of data published by Public Health Ontario identified Lyme disease and West Nile Virus (WNV) as the most prevalent zoonotic/vector-borne diseases of public health significance which involve spillover that is impacted by land use and environmental conditions. Next, a scoping literature review of eighty-five peer-reviewed articles and reports from reliable organizations was conducted to gain an in-depth understanding of the factors driving Lyme disease and WNV enzootic spillover. The results were organized in two ways: first, a summary of the epidemiology of both Lyme disease and WNV was synthesized to provide planners and non-experts with an explanation of how and why spillover and human infection occur. Then, the literature on the landscape and ecological determinants of spillover was summarized thematically. Themes were then used to guide seven semi-structured interviews with public health and planning experts. The interviews generated approximately fifty recommendations for planners and policy-makers regarding the ways in which the planning frameworks in Ontario could address the issue of vector-borne disease risks. A few recommendations include: develop provincial policy direction and support through the *Provincial Policy Statement*; utilize site plan control bylaws to promote landscaping practices that are less favourable for ticks and their hosts; share risk and hotspot maps through GIS; encourage planning methods that follow natural processes, such as low impact development; regard vector-borne disease hotspots as a natural hazard and direct development away from these areas; ensure that communities are designing high quality green spaces; incorporate holistic

assessments of well-being and biodiversity into the process of due diligence; and invest in multidisciplinary research networks that explore “upstream” determinants of health.

This study serves as a preliminary step in bridging urban planning and public health towards a multi-target goal of fostering healthier, sustainable communities, from a vector-borne disease perspective. Ultimately, while it has not historically been a mandate of the planning profession, this study has shown that there are connections between land use/environmental practices and the drivers of Lyme disease and WNV risks in Ontario. There is potential for planners to be part of the strategy of correcting the ecosystem imbalances which lead to heightened pathogen pressures in the natural world. This study also sheds light on the ways in which global health and environmental crises can converge at local scales, and the results should help enhance planners’ and the public’s literacy on this issue, emphasize its urgency to politicians and decision-makers, and hopefully inform strategic and sustainable urban and regional development from this often-overlooked epidemiological perspective.