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## Integrated social-behavioral and ecological risk maps to prioritize local public health responses to Lyme disease

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Lyme disease (LD) risk exhibits spatial variability that challenges public health authorities to prioritize prevention and control interventions that are adapted to the local context. The objective of this study was to link social-behavioral and ecological risk measures to create enhanced risk maps for public health decision-making: a social/behavioral-ecological vulnerability index map and a prioritization index map. The study was conducted in the Montérégie region of Southern Quebec, Canada, where LD is an emerging disease of increasing public health concern. Spatial variation in LD knowledge, risk perceptions and behaviors in the population were measured using web survey data collected in 2012, and used as a proxy for the social-behavioral component of risk. Tick vector population densities were measured in the environment during field surveillance from 2007 to 2012 to provide an index of the ecological component of risk. Social-behavioral and ecological risk measures were combined to create integrated risk maps and, with addition of human population densities, prioritization index maps. Map predictions were validated by testing the association between high risk areas identified by the risk maps and the current spatial distribution of human LD cases. Social-behavioral and ecological risks had incongruent distributions within the study region suggesting that both factors should be considered when making decision about locally adapted interventions. The occurrence of human LD cases in a municipality was positively associated with high tick density ( $P < 0.01$ ) but was not significantly associated with social-behavioral risk.

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