

Is the Southern Tier Region of New York on the verge of a major increase in Lyme disease? M McAuliffe¹, A Roome^{1,2}, R Spathis^{1,2}, I Li^{1,2}, V Al-Feghali^{1,3}, C Malone¹, A Hammond¹, P Barone¹, J Christophel^{1,3}, J Bermeo¹, G Blumberg¹, K Bower^{1,2}, G Buffa^{1,3}, L Chiu¹, N Kaur^{1,3}, C Koulouris^{1,3}, A Leighton^{1,3}, K Lupo^{1,3}, A Maliga¹, N Monroe¹, C Pabafikos^{1,3}, D Rios¹, U Syed^{1,3}, S Tyurin¹, S Alam¹, N Cicchetti¹, K Jones¹, A Nichter^{1,3}, P Patel¹, L Hill^{1,2}, A Ong^{1,3}, J Shepherd³, RM Garruto^{1,2,3}. ¹Laboratory of Biomedical Anthropology and Neurosciences, ²Department of Anthropology, ³Department of Biological Sciences, SUNY Binghamton, Binghamton, NY, USA.

Lyme disease is the most common vector-borne illness in the United States. The most competent reservoir host for the infectious agent is the white-footed mouse (*Peromyscus leucopus*) and the vector that transmits the Lyme pathogen (*Borrelia burgdorferi*) to humans is the black-legged (*Ixodes scapularis*). To assess prevalence of *B. burgdorferi* within peri-urban and rural counties in the Southern Tier of New York State, ticks were collected where people were perambulating in varying microecologies in fragmented ecospace. Collection proceeded by dragging a corduroy cloth over foliage and leaf litter and ticks attached to the cloth were placed in 70% ethanol and brought to the laboratory for pathogen analysis. Species, life cycle stage and sex of each tick were identified microscopically and DNA extracted and purified. The presence of *B. burgdorferi* was assessed by *ospC* PCR amplification and positive PCR products were Sanger sequenced. We collected and tested more than 1500 black-legged ticks for the presence of *B. burgdorferi* between October 2012 and November 2014 and found infectivity rates of 39.8% and 30.7% within Broome and Chenango counties, respectively. The density of infected ticks within Broome County was 1.9 per 1000m². Our findings suggest that areas of high human activity with fragmented ecospace within built environments such as college campuses, playgrounds, parks, jogging trails, and other recreational areas pose a significant risk of contracting Lyme disease. Human activities often perpetuate and increase the transmission of Lyme disease by enhancing

reservoir and vector prevalence in these areas. We conclude that the Southern Tier of New York State may be on the cusp of a surge in incidence of Lyme disease over the next 5 years, likely moving slowly from east of the Hudson River westward into the Upper Susquehanna River Basin of New York State.

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