

Supplementary Data

Data for all climate variables were downloaded from the PRISM Climate Group Data Explorer website (www.prism.oregonstate.edu/explorer; accessed April 23, 2017), with interpolated information for each county-year supplied through the PRISM model. (“PRISM Climate Group, Oregon State University” 2004.) Relative humidity was calculated based on mean temperature and dew point (converted to Celsius), using the following equation (“Humidity Conversion Formulas” 2013):

$$100 * \frac{\exp\left(\frac{17.625 * DP}{243.04 + DP}\right)}{\exp\left(\frac{17.625 * T}{243.04 + T}\right)}$$

Socioeconomic data (population density and median household income) were downloaded from the U.S. Census Bureau through the Social Explorer website (www.socialexplorer.com). The 2010 census data were applied for 2010. For the remaining years, data from the U.S. Census Bureau American Community Survey 5-year estimates were used. These estimates are averaged for the 60-month collection period, providing the largest sample size over all areas of the state. Because these are 5-year averages, we used available data from the two 5-year periods encompassing our date range of interest. The 2009 5-year estimate was applied for years 2004–2009, and the 2015 5-year estimate was applied for years 2011–2015. Median household income is given in inflation-adjusted dollars for the year the data were released (2009, 2010, or 2015). Total number of dogs per county was calculated based on the estimate of average number of dogs per household in North Carolina provided by the American Veterinary Medical Association (# dogs = # of households per county * 0.68) (U.S. Pet Ownership & Demographics Sourcebook 2012).

Elevation was considered as an average for each county, obtained through the state geodetic survey, and did not take into account local within-county variation (“County and State Boundaries” 2016). Land cover data were downloaded from the Multi-Resolution Land Characteristics (MRLC) Consortium website (www.mrlc.gov). This consortium provides a 16-class land cover classification scheme applied consistently across the conterminous United States at a spatial resolution of 30 meters. The data are created based on Landsat satellite data for the years specified (Homer et al. 2011, 2015). Since there is not new land use data each year, but rather two data sets produced during the date range we considered here (2004–2015), the NLCD 2011 data were applied for years 2009–2015, and the NLCD 2006 data were

applied for years 2004–2008. The percentage of each land cover classification within each county was calculated based on the area of each classification within each county.

Ixodes spp. presence in each North Carolina county was determined from data presented in a recent publication (Eisen et al. 2016). This report used literature searches as well as state health department websites and personal contact to assess county-level tick data for the continental United States. Counties were considered to have an *Ixodes* spp. tick “established” if at least six individual ticks, or at least two of the three host-seeking life stages, had been identified in a single year. Counties were considered to have an *Ixodes* spp. tick “reported” if at least one *Ixodes* spp. tick of any life stage was identified within 1 year, or if the records did not specify the number/life stages of ticks collected, and the “established” definition was not met. Tick absence cannot be inferred for counties with no records. Similar classification was performed in 1998, so the status of each county refers to previous status from the 1998 report (Dennis et al. 1998).

Supplementary References

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