Lyme and other infectious diseases remain a concern in Dutchess County

This graphic shows the parts of the country with the highest incidences of Lyme disease. / Illustration courtesy of the Centers for Disease C

Written by
Vicky Kelly

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The Dutchess County Environmental Management Council recently completed a State of the Environment report for Dutchess County. This is the sixth in a series of articles from the report. The entire report can be found online at http://dutchessemc.files.wordpress.com/2012/04/dcsoereport2012.pdf.

Lyme disease is an illness caused by an infection of the bacteria Borrelia burdorferi, which are transmitted to humans by the bite of black-legged ticks, ixodes scapularis — formerly and mistakenly thought to be Ixodes damini, the deer tick.

Black-legged ticks have three life stages: larvae, nymphs and adults, each of which needs one blood meal to survive. The tick's life cycle takes two years to complete.

Wild animals are important hosts for the ticks. Small mammals, such as the white-footed mouse and the eastern chipmunk are important hosts for larvae and nymphs, while larger mammals such as deer are important hosts for adult ticks.

Ticks of all life stages can be found on large and small mammals.

Ticks in the nymphal stage are responsible for transmitting the vast majority of Lyme disease cases largely because they are small and difficult to see.

The symptoms of Lyme disease include joint inflammation, flu symptoms, aches and fever. The site of the tick bite may have a telltale circular rash.

Research done on Lyme disease has provided us with a better understanding of it now than in 1975, when it was first described. Unfortunately, no silver bullet has been identified as the

ultimate means of controlling the disease, and it remains a critical environmental health concern.

Continued research is necessary to develop control measures to reduce the incidence of the disease. However, it is important to recognize that it is unlikely we will ever be able to eradicate Lyme disease from Dutchess County.

A good understanding of what controls the local distribution and abundance of the organisms responsible for transmitting Lyme disease is critical to understanding the disease. Ecological food web dynamics are extremely important as determinants of Lyme disease risk.

In Dutchess County, oaks are common trees in our forests. Mast years of acorn production, in which large numbers of acorns are produced, result in an abundance of hosts for ticks, including hosts that transmit the disease well. Acorn masts result in increased Lyme disease risk two years later.

Knowledge of acorn production and food web dynamics can be used to develop preventive measures and to alert the public of a potential increase in Lyme disease risk from year to year.

Fragmented forests increase suitable habitat for the tick's host species. This includes fragmentation of forests to fields as well as to urban/suburban development. Fragmentation provides allows the host animals to escape from predators in woodland lots while also providing ready access to fields and plantings for forage.

Fragmentation also reduces the prevalence of predators. Many predators require large tracts of contiguous forest for survival.

Lastly, forest fragmentation reduces the diversity of host species. The prevalence of Lyme disease is greater when diversity of hosts is low. This is sometimes called "the dilution effect." Increased diversity of hosts for ticks dilutes the presence of the Lyme disease bacteria because some hosts are poor vectors of the disease and/or poor hosts for ticks.

Currently, the best defense against Lyme disease is diligence on the part of the public and health care professionals. Protection and avoidance of the ticks and awareness of the symptoms of the illness and early treatment if they arise are critical. Continued education by public officials will go a long way toward protecting people from this serious disease.

Vicky Kelly is a member of the Dutchess County Environmental Management Council and a program manager at the Cary Institute of Ecosystem Studies.

Vicky Kelly / Courtesy photo