

Deer/Lyme Disease/Ticks

There has been great discussion regarding the relationship between deer, ticks and Lyme disease. There has been a belief by many that the presence of deer results in the increase in Lyme disease. Deer are one vector that the black-legged tick feeds; however, it is not the only vector for ticks to feed. The deer do not carry Lyme disease. The tick is infected by the white-footed mouse, which is prevalent in this area as well as many areas of the country. (CDC) Reducing deer population does not lead to long-term reductions in Lyme disease (Dr. Tamara Awerbach, Harvard). It was successful on Monhegan Island because all deer were killed and no other animals were there to take over the empty niche left by the deer to support the adult tick. Ipswich, Massachusetts did not see a decrease in Lyme disease over an eight year period as the white-footed mice infect the ticks, not the deer. White-tailed deer are not reservoirs for Lyme disease but are preferred hosts for ticks in the adult stage only. Dr. Awerbach was unable to identify a linear link between deer and Lyme disease. Only the adult tick takes a blood meal on the deer. It is important to kill the tick before they reach the adult stage. The reduction in the deer herd will not lead to a significant reduction in Lyme disease. Studies have demonstrated that a reduction in deer density results only in a small reduction of deer ticks. In order to dramatically reduce tick numbers, deer have to be almost eliminated from the landscape, which is impractical in free-ranging environments. (Bloomington.in.gov Monroe County deer management plans) (DeNicola, White Buffalo Deer Management)

Richard Osfeldt, in his book, *THE ECOLOGY OF A COMPLEX SYSTEM*, 2011, Oxford Press, studies the complex relationship between ticks, mice, deer and other factors over a twenty-year period. He also states that if deer are not present, ticks will feed on other vectors, such as raccoons, squirrels, birds, coyotes, dogs and humans. He was unable to identify a linear relationship between deer and Lyme disease. He is not opposed to culls, but Lyme disease is not a reason to cull deer. He also states that by reducing a deer herd by 70 percent will do nothing to reduce Lyme disease.

Dr. Taal Levi (University of California, Santa Cruz and Cary Institute) in 2012 published reports states that the scientific evidence has indicated that deer probably are not the significant transmitters of Lyme disease. A study of deer and Lyme disease in Wisconsin, Minnesota, Pennsylvania and New York in which the model found no significant relationship between the numbers of deer and Lyme disease cases. Studies are being conducted regarding the lack of predators for rodents such as the white-footed mice, which infect ticks is a factor in the increase in Lyme disease. Analysis of data regarding the cases of Lyme disease and the population of the red-tailed fox in Minnesota, Wisconsin, Pennsylvania and Virginia found

higher numbers of cases of Lyme disease when there were smaller populations of the red fox (predator) by Dr. Levi . Dr. Levi et al found that increase in coyote populations, which often replace red fox population may be a factor in the spread of Lyme disease (May 2012). the review of data has shown poor spatial correlation between deer abundance and Lyme disease incidence in the Midwest and northeastern United States in most instances, but an increase in areas with coyote increase and fox rarity predict the spatial distribution of Lyme disease in New York. (May 2012) The conclusion of the researchers are that the increase in Lyme disease over the last 20 years is more likely related to the increase in small rodents due to the lack of predators rather than the deer population as was previously believed.

Dr. Andrew Spielman (Harvard of Public Health) changed the name of the “deer tick” or the blacklegged-tick to its scientific name *Ixodes dammini*. The name deer tick has been changed due to the scientific evidence that is more accurate and not misleading as to the cause of Lyme disease. He discovered that this is a vector of the disease. The State of Maine’s deer population has decreased to approximately 4 per square mile in many parts of the state and still has the fifth highest rate of Lyme disease based on 2010 data. They are planning to increase their deer population to an optimal of 50 per square mile, which begs the question, if deer the population is the reason for high numbers of Lyme disease, why plan to increase the population to a rate of approximately 50 per square mile.

White-tailed deer are found throughout Minnesota; however, the black-legged tick is not found everywhere that deer live. Ticks not only look for hosts, but also water supplies. Without water, they will dry up and die. (Minnesota Department of Natural Resources) The ticks are found in hardwood forests, as well as wooded and brushy areas I Minnesota

The numbers of less than 10 deer per square mile to decrease Lyme disease by Kirby Stafford are an assumption on his part rather than a proven fact that the reduction in the deer population will lead to a significant reduction in the rate of Lyme disease. Studies have not been presented to support this statement. DeNicola, of White Buffalo Deer Management also states that this number is almost impossible to maintain without multi-year professional sharpshooters used to kill the deer with few restrictions. He also reports that the rebound effect also occurs when the population is substantially reduced.

The relationship between deer populations and Lyme disease has continued to be challenged by researchers as more data and studies are conducted. There have been more studies that cannot make the linear link to an increase or decrease in the deer population that result in a significant change in the rate of Lyme disease. The one factor that is agreed upon is that the tick is infected by rodents, primarily the white-footed mouse. Birds and lizards may also be carriers of the disease that infects the ticks. Deer do not carry the disease and cannot transmit

it to others. There is more evidence being presented currently that the decrease in predators of the rodents may be a factor in the continuing increase in Lyme disease. Ogden Dunes has experienced an increase in coyotes and a decrease in fox. Fox tend to not make dens in areas with coyotes and may even be eaten by coyotes. Coyotes do not eat small rodents on the same level as fox. These facts are being studied currently to account for the increase in Lyme in areas that the deer population has declined.