

Medical Director's Report Board of Health February 2013

Lyme Disease and Tick Surveillance

The NYSDOH routinely does surveillance work on ticks and their infection with the Lyme disease pathogen *Borrelia burgdorferi*.

The following is a synopsis of tick surveillance in the county over the last four years.

The following general observations can be made:

- The ixodes ticks in the spring of the year are in the nymph stage and tend to be infected at a lower rate for the *Borrelia burgdorferi* than do the adult ticks in the fall of the year.
- In spite of the tick infection rate, the majority of human infections with the *Borrelia burgdorferi* tend to occur from exposures in the spring or early summer of the year due to the fact that a nymphal tick is harder to see and therefore removed within the 36 hour time frame required to transmit the bacterium. Because the nymphal tick is harder to see it remains attached to the body and has a higher predilection for infecting the host human with the bacterium and therefore potentially causing Lyme disease.
- Not all ticks carry the bacterium in any stage.
- Not all ticks attached to a human will transmit the bacterium in spite of the tick being infected with it.
- Not all humans into whom the bacterium is transferred from the tick will come down with Lyme disease.
- Treatment decisions rest on making a judgment about the probability of disease being contracted by the human.

In the fall of the year the infection rate of adult ticks with the *Borrelia burgdorferi* is in the range of about 40-50%.

In the spring of the year the infection rate typically is in the range of 10-18% in nymphal ticks.

The adult tick primarily feeds on deer and larger mammals, but they will attach to humans when they have the opportunity. Typically the adults are detected more easily due to their size and are more likely to be removed within the 36 hours time period required to transmit *Borrelia burgdorferi* into a human. The adult ticks are typically active from mid-October until the temperatures fall consistently below freezing. They also are present in late winter and early spring from April through June.

The adult female deer tick that successfully blood feeds will use that blood to form eggs and then the female dies. The male deer tick dies after mating and feeds minimally. The passage of *Borrelia burgdorferi* from an infected female deer tick to her eggs is rare and is considered to occur less than 2% of the time. Therefore, hatched larvae from July through October will rarely be infected with *Borrelia burgdorferi*. However, those animals that larval ixodes ticks feed upon may retain *Borrelia burgdorferi* and infect eating larvae. Larvae retain the infection during the molting process as they transform into nymphs.

The nymphal stage of the deer tick will feed on humans. Although the nymph does have a lower infection rate than the adult tick from the same geographic area, this is the life stage most likely to transmit the *Borrelia burgdorferi* due to the difficulty in detecting these ticks by humans. They may remain attached to humans for more than the 36 hours needed to transmit the bacteria. Nymphal ticks are active from mid-May through July.

Additional note: Ticks are also checked for two other bacteria, anaplasma, phagocyte phylum, and *Babesia microti* (the cause of babesiosis). These bacteria may cause disease in humans. Typically in our area the infection rate for anaplasma phagocyte phylum is about 5%. The infection rate for babesiosis is typically 0%.

End note: These data are composite data collected from 2008 through 2011. They are reported by the Vector Surveillance Unit at the NYSDOH. For further questions or comments regarding this data please contact Dr. William Klepack, Medical Director, Tompkins County Health Department.

Area practitioners are advised to use these data in their clinical decision making and treatment of patients who have tick exposures.