

New Hampshire Tick-Borne Disease Bulletin: 2007 Update

In New Hampshire, there are several diseases that can be transmitted to people by the bite of an infected tick. The most common of these diseases are Lyme disease, babesiosis, and anaplasmosis. All three diseases are transmitted by the bite of the black-legged tick (*Ixodes scapularis*), commonly called the deer tick. Ticks become infected with these diseases when they bite an infected wild rodent. If the tick later bites a person, the tick may transmit the disease to the person.

During recent years, the number of New Hampshire residents diagnosed with Lyme disease, anaplasmosis, and babesiosis has been increasing. Details below provide information on these diseases, the risk of disease in different parts of the State, and the ways to prevent tick bites and disease.

The black-legged tick goes through four stages during its two-year lifecycle (egg→larvae→nymph→adult). During the nymph stage, it is the size of a poppy seed (<2 mm) and likely to bite people during the spring and summer. During the adult stage, it is the size of a sesame seed and likely to bite people during the remaining months of the year. The greatest risk for Lyme, babesiosis, and anaplasmosis is between May and August when the nymph stage of the black-legged tick is active; nymphs are very small and often go unnoticed while attached to people. However, people can be infected any time of the year when ticks are active. Those at greatest risk for disease are those most likely to be bitten by black-legged ticks, including people who spend time in wooded or grassy areas such as those who work or play in their yard or participate in outdoor recreational activities. Domestic animals, such as dogs, can become sick with Lyme disease and anaplasmosis after being bitten by an infected tick, but they cannot transmit the infection to people.

LYME DISEASE is caused by the bacteria *Borrelia burgdorferi*. The bacteria are transmitted to humans by the bite of infected black-legged ticks and cause more than 20,000 infections in the U.S. each year. Early symptoms of disease often, but not always, include a red expanding rash at one or more locations on the body, accompanied by fever, headache, fatigue, stiff neck, and muscle and/or joint pain. Symptoms usually begin within 30 days after being bitten by an infected tick. If not treated, complications such as nervous system signs, heart abnormalities, and intermittent episodes of swelling and joint pain may occur. Typically, antibiotics are effective in treating Lyme disease. Early diagnosis improves the outcome of treatment so it is important for individuals to contact their health care provider if they feel sick or develop a rash. See the 2006 bulletin ([link to bulletin](#)) for additional information on symptoms and risk factors for Lyme disease.

New Hampshire Incidence⁺

The number of New Hampshire residents diagnosed with Lyme disease and reported to the NH Department of Health and Human Services (DHHS) has increased in recent years (see figure and table below). During 2007, 892 cases of Lyme disease were reported in New Hampshire residents; this is an increase of 43% from 2006. The highest rates of disease occurred in Rockingham, Strafford, Hillsborough, Merrimack, and Carroll Counties.

ANAPLASMOSIS (Human granulocytic anaplasmosis [HGA], previously human granulocytic ehrlichiosis) is caused by the bacteria *Anaplasma phagocytophilum*. People get anaplasmosis when they are bitten by an infected black-legged tick. Some people who are infected have no or mild symptoms. When symptoms occur, they often resemble the flu, with fever, chills, headache, fatigue, muscle aches, nausea, and/or vomiting. Some individuals may also have a rash. Some people, particularly elderly persons or those with weakened immune systems, may have a more severe illness. Symptoms typically occur within one to two weeks following the bite of an infected tick. People can be successfully treated with antibiotics.

New Hampshire Incidence⁺

Over the last several years, between one and four residents each year have been diagnosed with anaplasmosis and reported to NH DHHS. Given the mild illness often present in those infected with the disease, it is likely that more individuals are infected but never diagnosed.

BABESIOSIS is caused by the parasite *Babesia microti*. People get babesiosis when they are bitten by an infected black-legged tick. Symptoms of babesiosis vary. Most people infected with *Babesia* never feel ill, while others may have flu-like symptoms such as fatigue, fever, sweats, and muscle aches. Symptoms of nausea, vomiting, headache, and bloody urine can also occur. Severe and fatal cases most often occur in patients who are older or have a weakened immune system, such as those without a spleen. Symptoms typically occur within one to four weeks following the bite of an infected tick. People can be successfully treated with antiparasitic medications.

New Hampshire Incidence⁺

Over the last several years, two to three residents each year have been diagnosed with babesiosis and reported to NH DHHS. Given the mild illness often present in those infected with the disease, it is likely that more individuals are infected but never diagnosed.

Abundance of Black-Legged Ticks and Proportion Infected

The risk of becoming sick with Lyme disease, babesiosis, or anaplasmosis is related to the abundance of infected ticks in the region. During the fall of 2007, NH DHHS conducted surveillance for black-legged ticks. Equal attempts were made to collect ticks at 24 sites throughout the State, with at least one site in each county. All collected ticks were tested for the pathogens causing Lyme disease (*Borrelia burgdorferi*), babesiosis (*Babesia microti*), and anaplasmosis (*Anaplasma phagocytophilum*). Over 500 adult black-legged ticks were collected and tested. Results from this study suggest the following:

Tick numbers:

- Black-legged ticks are common in southeastern New Hampshire (Strafford, Rockingham, Hillsborough, Merrimack Counties); large numbers of ticks were collected in these locations.
- Black-legged ticks are less common in southwestern and mid-central New Hampshire (Cheshire, Belknap, Carroll Counties); few ticks were able to be collected in these locations.
- Black-legged ticks are rare in northern and mid-western New Hampshire (Sullivan, Coos, Grafton Counties); no ticks were able to be collected in these locations.

Proportion of ticks infected with disease (see map below):

- Over 50% of the ticks tested in Strafford, Rockingham, and Hillsborough Counties were infected with the bacteria causing Lyme disease.
- Between 20% and 50% of ticks tested in Merrimack County were infected with the bacteria causing Lyme disease.
- Ticks tested from Belknap, Carroll, and Cheshire Counties were infected with the bacteria causing Lyme disease; however, given the low number of ticks collected, it was not possible to accurately determine a percentage infected.
- The pathogen causing babesiosis was detected in ticks collected from southeastern and mid-central New Hampshire.
- The pathogen causing anaplasmosis was detected in ticks collected from southeastern New Hampshire.

These results suggest that the risk of becoming ill with Lyme disease, babesiosis, and/or anaplasmosis is greatest in southeastern and mid-central NH, with a lower risk in other parts of the State. All individuals spending time outdoors in New Hampshire in possible tick habitat, such as wooded or grassy areas, should take precautions to limit tick bites (see below), especially those in the higher risk regions of the State.

Tick collecting and testing will continue during 2008. Tick numbers and presence of disease can change between years and locations; therefore these estimates may change with additional surveillance.

METHODS TO PREVENT TICK-BORNE DISEASES

Lyme disease, anaplasmosis, and babesiosis are all preventable. The following guidelines will aid in preventing tick bites and the transmission of these diseases. Since ticks in the immature stage (nymphs) are very small and often go unnoticed while attached to people, NH DHHS recommends the simultaneous use of multiple prevention methods:

- Avoid tick-infested areas. If in tick-infested areas, walk in the center of trails to avoid contact with overgrown grass, brush, and leaf litter at trail edges.
- Use insect repellent. Apply insect repellent containing 20% to 50% DEET on clothes and exposed skin. Clothes (especially pants, socks, and shoes) may be treated with permethrin, which kills ticks on contact. Permethrin can also be used on tents and some camping gear. Do not use permethrin directly on skin. *Always follow the manufacturer's instructions when applying any repellents.*
- Wear protective clothing. Long pants and long sleeves help keep ticks off of skin. Light-colored clothing will make it easier to spot ticks. Pant legs may be tucked into socks or boots and shirts into pants to keep ticks on the outside of clothing. Tape the area where pants and socks meet so that ticks cannot crawl under clothing. After being outdoors, wash and dry clothing at a high temperature to kill any ticks that may remain on clothing.

- Perform tick checks after being outdoors. Early removal of ticks can reduce the risk of infection. Inspect all body surfaces carefully, and remove attached ticks with tweezers. Grasp the tick firmly and as close to the skin as possible. With a steady motion, pull the tick's body away from the skin. Avoid crushing the tick's body. **DO NOT** use petroleum jelly, a hot match, nail polish, or other products. Cleanse the area with an antiseptic after removing the tick.
- If a tick is attached to your skin for less than 24 hours, your chance of getting Lyme disease, anaplasmosis, or babesiosis is extremely small. However, you should monitor your health closely after a tick bite and be alert for signs and symptoms of illness. Contact your physician for recommendations on testing and treatment.

For specific concerns or questions about tick-borne diseases, call the New Hampshire Department of Health and Human Services, Bureau of Communicable Disease Control at 603-271-4496 or 800-852-3345 x4496.

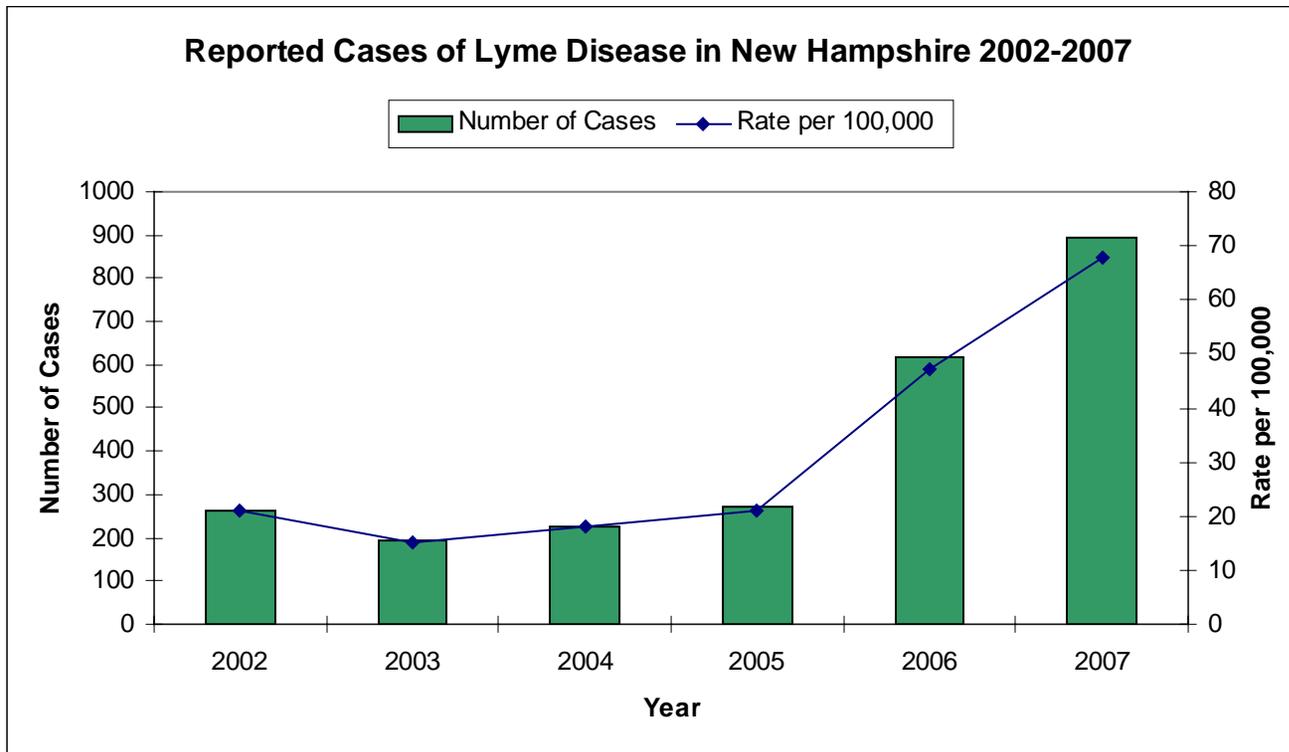
+Note: All the data in this report are based upon information provided to the New Hampshire Department of Health and Human Services under specific legislative authority. Data are complete as of March 28, 2008. The numbers reported may represent an underestimate of the true absolute number and incidence rate of cases in the State. County is based upon residence at diagnosis and may not reflect location of exposure. Any release of personal identifying information is conditioned upon such information remaining confidential. The unauthorized disclosure of any confidential medical or scientific data is a misdemeanor under New Hampshire law. The Department is not responsible for any duplication or misrepresentation of surveillance data released in this report. Rates are calculated using U.S. Census Bureau population estimates.

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NH Department of Health and Human Services
Bureau of Communicable Disease Control

Reported Cases of Lyme Disease in New Hampshire, 2002-2007

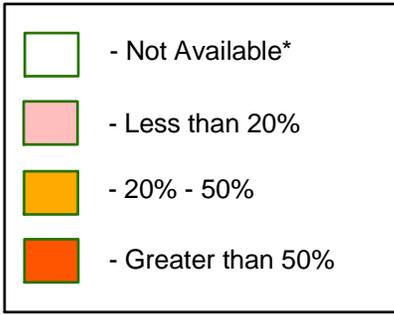
County		2002	2003	2004	2005	2006	2007
Belknap	Number of Cases	6	6	11	2	10	6
	Rate per 100,000	10	10	18	3	16	10
Carroll	Number of Cases	9	2	9	4	5	19
	Rate per 100,000	20	4	19	8	11	40
Cheshire	Number of Cases	5	7	3	6	12	13
	Rate per 100,000	7	9	4	8	15	17
Coos	Number of Cases	1	1	2	4	4	3
	Rate per 100,000	3	3	6	12	12	9
Grafton	Number of Cases	2	10	7	5	7	14
	Rate per 100,000	2	12	8	6	8	16
Hillsborough	Number of Cases	37	37	39	77	150	216
	Rate per 100,000	9	9	10	19	37	54
Merrimack	Number of Cases	13	10	16	9	29	47
	Rate per 100,000	9	7	11	6	20	32
Rockingham	Number of Cases	115	78	103	133	312	389
	Rate per 100,000	40	27	35	45	106	131
Strafford	Number of Cases	73	37	37	31	88	182
	Rate per 100,000	63	32	31	26	73	150
Sullivan	Number of Cases	1	4	1	0	2	3
	Rate per 100,000	2	10	2	0	5	7
Total	Number of Cases	262	192	228	271	619	892
	Rate per 100,000	21	15	18	21	47	68



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Prepared By: Jane S. Manning, MPH, NH DHHS Communicable Disease Control Section on 03/31/2008

Estimated Proportion of Adult Black-legged Ticks Infected with *Borrelia burgdorferi* (Lyme disease) Fall 2007 Sampling



*Not available due to low number of ticks collected in the region

Tick numbers and percentage of ticks infected can change between years and locations, therefore estimates may change with additional surveillance.

