

Printable Fact Sheet for Nurses about Lyme and Tick-borne Diseases in Vermont

From the Centers for Disease Control and Prevention (CDC), the Children's Lyme Network, and the Vermont Department of Health



Lyme disease is the fastest growing vector borne disease in the U.S. **Vermont often has the highest per-capita incidence of Lyme disease in the nation**, and is considered to be an "endemic state" by the CDC.

School age children are among the highest at risk for contracting Tick-borne disease. This is especially true for children who reside in endemic areas (most of Vermont), and who participate in outdoor activities or athletics.

Other tick-borne diseases are present in Vermont, including Babesia, Anaplasmosis, Powassan virus, Erlichiosis. Some of these infections are treated with different medications than Lyme disease.

Pediatric Lyme disease may have cognitive and psychiatric symptoms. It may mimic Attention Deficit Disorder or OCD, and trigger Depression, impulsivity, violence, or suicidality.

Lyme disease in Vermont is often present without the rash typically associated with the disease. In 2014 Vermont Department of Health data showed less than half of CDC confirmed cases of Lyme disease in children presented with an erythema migrans (bull's-eye) rash. Recent data shows the number of EM rashes in confirmed cases of Lyme disease in Vermont is steadily decreasing.

Lyme Infections in Vermont can occur 12 months of the year. The highest rates on infection on Vermont are in the spring and summer. According to the Vermont Department of Health symptoms of Lyme disease may occur days to months after the initial infection.

The onset of a child's tick-borne disease may be gradual, with increasing fatigue, subtle neurologic and cognitive deficits, peer difficulties, and deteriorating academic performance.

Studies show that anywhere from 5% to 20% of patients experience ongoing symptoms of Lyme disease after standard treatment. The CDC calls this PTLDS, or Post Treatment Lyme Disease Syndrome. Some children may have complications for an extended period of time, including cognitive difficulties that can affect behavior and school performance. These symptoms can wax and wane.

Table 2. Presenting sequelae documented for Lyme disease	Reference
flu-like illness — fever and chills	CDC, 1997
gastrointestinal manifestations — chronic gastritis, duodenitis, and complications	Fried et al., 1999
cardiac complications — irregular rhythm and heart block	Karadag et al., 2004; Lo et al., 2003
ocular defects — optic neuritis, neuropathy, conjunctivitis, uveitis, keratitis, ocular pain, and decreased vision or loss	Mikkila et al., 2000; Rothermel et al., 2001
rheumatologic symptoms — arthritis, myalgias, arthralgias, and musculoskeletal pain	Shadick et al., 1999

Tables sourced from *Lyme Disease: Etiology, Neuropsychological Sequelae, and Education Impact*, by R.A. Hamlen & D.S. Kliman

Table 1. Neurological and cognitive symptoms in children with undiagnosed Lyme disease¹

Headaches and neck stiffness
Paresthesia (tingling sensation, often in legs and hands), facial paralysis (Bell's palsy), tinnitus, and sensory hyperacusis (unusual sensitivity to sound or light)
Decreased reading comprehension and handwriting skills
Impaired speech fluency — stuttering and slurred speech
Inability to accurately perform previously mastered mathematical calculations
Vision problems — difficulty in the classroom in seeing and following visually presented material, and frequent blinking or tics, inability to coordinate eye movement — targeting difficulties, and distorted visual images
Musculoskeletal (movement) and coordination impairment, balance problems (clumsiness or vertigo)
Executive function impairment — inability to activate or sustain effort and attention, and manage frustration; confusion, and thinking sluggishness in expressing thoughts
Frequent errors in speaking, writing, spelling, or dyslexic-like behaviors (errors in letter and number reversals).
Severe and chronic fatigue unrelieved by rest — falling asleep in class, missing class due to tiredness, and sleep disturbance
Emotional and uncharacteristic behavioral presentation — withdrawal from peers or shift to a lower functioning group, depersonalization (loss of a sense of physical existence), cessation of involvement in sports or other extra-curricular activities, inattentiveness, attention deficit behavior, obsessive-compulsiveness, depression, anxiety, panic, aggression, defiance, explosive outbursts, mood swings, irritability, hyperactivity, nightmares, and sudden suicidal thoughts
Inability to perform at grade level — inconsistency or sloppy school work, late assignments, decline in grades, being overwhelmed by schoolwork, missed school days, and school phobia

¹ Adams et al, 1994; Berenbaum, 2004; Coyle 2002; Fallon et al., 1998; Gordon, 2000; Halperin, 2004; Juchnowicz et al., 2002; Pietrucha, 2001; Peltomaa et al., 1998; Rachman & Garfield, 1998; Sherr, 2000, 2002; Shotland et al., 2003; Tager & Fallon, 2001; Tager et al., 2001.

"Any of the symptoms in Tables 1 and 2 can indicate undiagnosed Lyme disease and it should be considered when unusual changes in behavior or academic performance are noted. Frequently, symptoms develop in a child who previously performed well within the school environment" (Hamlen & Kliman, 2014).

Lyme disease will have a unique presentation in each child. A child's symptoms can vary significantly during the process of infection, and some children may not appear to be "sick" in the traditional sense. (Berenbaum, 2004)