

Lyme Borreliosis Symptom List

There is no definitive set of symptoms for Lyme borreliosis. The often-cited erythema migrans (EM) rash, often inaccurately described as a bulls-eye rash, has never been studied independent of the assumption that the rash defines the infection. The late-stage symptoms used by the Centers for Disease Control (CDC) to define a surveillance case have similarly never been adequately analyzed.

Lyme borreliosis is a multi-system infection associated with disorders of the central and peripheral nervous systems, musculoskeletal, endocrine, dermatologic, and gastro-intestinal systems. While there is no definitive set of systems, simultaneous or progressive onset of symptoms that are not normally found in combination for other conditions is a strongly indicates *L. borreliosis* infection.

Often, *L. borreliosis* is found with other infections—*Babesia*, *Bartonella*, and *Anaplasma*, among others—further complicating the diagnostic picture.

Particularly informative is recent or past response to antibiotic treatment regardless of why it was prescribed. The sudden resolution of a long-standing symptom or set of symptoms after a course of antibiotics is a strong indicator of a bacterial infection and Lyme borreliosis should definitely be considered. Due to symptoms sometimes appearing or worsening with new or reinitiated courses of antibiotics, appearance, reoccurrence, or increase of symptoms with antibiotic treatment can also indicate *L. borreliosis* and associated infections.

While this symptom list may seem overly inclusive and sometimes contradictory, ignoring or dismissing observed symptoms to promote an appearance of rigid objectivity risks missing a cases of infection. As with any medical issue, judgment and ethical responsibility is essential.

The following chart is based on medical literature, interviews with treating physicians, patient observations, and interviews. Despite the number and scope of the symptoms presented and their overlap with other conditions, certain patterns emerge, particularly to the physician who has observed and treated hundreds or thousands of patients. The list includes an estimate of how often symptoms are observed in Lyme borreliosis patients along with how specific they are to *L. borreliosis*.

While we have noticed a tendency for certain symptoms to be more prevalent in particular geographical areas, the mobility provided by modern transportation, both for humans and animal vectors, makes associating particular symptoms with specific geographies risky, and definitely encourages assumptions fostering misdiagnosis.

In summary, pay particular attention to:

- Combinations of symptoms where the timing and development indicates likely infection
- Symptoms that improve or worsen with antibiotic treatment regardless of whether the treatment was for *L. Borreliosis* or associated infections.

Symptom Description	Major System	Specificity to L. Borreliosis	Prevalence In L. Borreliosis	Possible Associated Infection
Blood Clots/Stroke	Cardiovascular	Low	Low	
Fainting	Cardiovascular	Low	Low	
Frequent, easy bruising	Cardiovascular	Low	Low	
Heart flutter, murmurs	Cardiovascular	Medium	Medium	
Heartbeat thuds (PVCs)	Cardiovascular	Medium	Low	
High blood pressure	Cardiovascular	Low	Low	
Irregular heartbeat	Cardiovascular	Medium	Low	
Pulse races with slight exertion	Cardiovascular	Low	Low	
Slow pulse	Cardiovascular	Low	Low	
Confusion with common mental tasks	Cognitive	Low	High	
Difficulty articulating thoughts	Cognitive	Low	Medium	
Difficulty understanding written material	Cognitive	Low	Medium	
Disorientation, easily gets lost	Cognitive	Medium	Medium	
Easily loses/misplaces objects	Cognitive	Medium	High	
Forgets how to perform routine tasks	Cognitive	Medium	Medium	
Inability to multi-task	Cognitive	Medium	High	
Long term memory loss	Cognitive	Low	Low	
Short term memory loss	Cognitive	Low	High	
Unintended word substitutions	Cognitive	Medium	Medium	
Word reversals	Cognitive	Low	Medium	
Rash on limb not near tick bite	Dematological	Low	Low	
Body rash not near tick bite	Dematological	Low	Medium	Babesia
Bulls-eye rash at site of tick bite	Dematological	High	Low	
Generalized itching	Dematological	Low	High	
Recurrent itching at specific location	Dematological	Low	Medium	
Raised scaly rash	Dematological	High	High	
Rash with stretch mark appearance	Dematological	Low	Low	Bartonella
Scalp rash not near tick bite	Dematological	Medium	Low	
Chills	Endocrine	Medium	Medium	Babesia
Fluid retention	Endocrine	Medium	Low	
Hot Flashes	Endocrine	Medium	Low	Babesia
Inability to retain fluid, dehydration	Endocrine	Medium	Low	
Loss of appetite	Endocrine	Low	Medium	
Loss of appetite	Endocrine	Low	Medium	
Loss of sex drive	Endocrine	Medium	Low	
Night sweats	Endocrine	High	Low	Babesia
Unexplained fevers	Endocrine	Medium	Low	Babesia
Unexplained hair loss	Endocrine	Medium	Medium	
Unexplained increase in sex drive	Endocrine	Low	Low	
Unexplained weight gain	Endocrine	Medium	Medium	
Unexplained weight loss	Endocrine	Medium	Low	

Symptom Description	Major System	Specificity to L. Borreliosis	Prevalence In L. Borreliosis	Possible Associated Infection
Unusual fatigue after eating	Endocrine	Low	Medium	
Unusual food craving	Endocrine	Medium	Medium	
Abdominal cramps	Gastrointestinal	Low	Low	
Backwash/reflux	Gastrointestinal	Low	Low	
Bloating	Gastrointestinal	Low	Low	
Constipation	Gastrointestinal	Low	High	
Diarrhea	Gastrointestinal	Low	High	
Upset stomach	Gastrointestinal	Low	Medium	
Vomiting	Gastrointestinal	Low	Low	
Extreme fatigue	General	Medium	High	
Flu-like illness outside of normal season	General	High	High	
Flu-like illness within two weeks of tick bite	General	High	Medium	
Frequent respiratory congestion	General	Low	High	
Frequent urination	General	Low	Low	
Increased allergies	General	Medium	High	
Irregular menstrual cycle	General	Low	Medium	
Painful urination	General	Low	Low	
Poor resistance to bacterial infections	General	Medium	Medium	
Poor resistance to fungal infections	General	Medium	Medium	
Poor resistance to viral infections	General	Medium	Medium	
Repeated or continual sore throat	General	Low	Low	
Repeated sinus infection	General	Medium	High	
Repeated urinary infection	General	Medium	Low	
Shortness of breath	General	Medium	Low	Babesia
Swollen glands in armpit	General	Medium	Low	
Swollen glands in groin	General	Medium	Low	
Swollen glands in neck	General	Medium	Low	
Unexplained menstrual pain	General	Medium	Low	
Unusual response to alcohol	General	High	Medium	
Unusual response to exercise	General	Medium	High	
Body-wide muscle pain	Musculoskeletal	Medium	High	
Chest pain	Musculoskeletal	Low	Low	
Creaking, crackling joints	Musculoskeletal	Medium	Medium	
Foot or Heel pain	Musculoskeletal	Medium	Low	Babesia
Joint pain	Musculoskeletal	Low	High	
Migrating joint pain	Musculoskeletal	High	Medium	
Muscle cramps	Musculoskeletal	Medium	Medium	
Spinal Column Sensitivity	Musculoskeletal	High	Low	
Stiff neck	Musculoskeletal	Medium	High	
Stiffness in single joint	Musculoskeletal	Medium	Medium	
Testicular pain	Neurologic	Medium	Low	
Burning mouth	Neurological	Medium	Medium	
Decreased hearing	Neurological	Medium	Low	

Symptom Description	Major System	Specificity to L. Borreliosis	Prevalence In L. Borreliosis	Possible Associated Infection
Difficulty chewing	Neurological	Medium	Low	
Difficulty starting/stopping urination	Neurological	Low	Low	
Difficulty swallowing	Neurological	Medium	Low	
Diminished reflexes	Neurological	Low	Low	
Facial paralysis	Neurological	High	Medium	
Facial twitches	Neurological	Medium	Low	
Feeling of impending blackout	Neurological	Medium	Low	
General tension-type headache	Neurological	Low	High	
Gum pain	Neurological	Medium	Low	
Headache	Neurological	Low	High	
Hypersensitive reflexes	Neurological	Low	Low	
Increased motion sickness	Neurological	Medium	Low	
Jaw pain	Neurological	Medium	Low	
Migraine (one-sided) headache	Neurological	Low	High	Babesia
Migrating tooth root pain	Neurological	Medium	Low	
Numbness or tingling	Neurological	Medium	High	
Overly sensitive to sound	Neurological	Medium	Low	
Poor balance, dizziness	Neurological	Medium	Low	
Pressure in head	Neurological	Medium	Low	
Random burning or stabbing pains	Neurological	High	Medium	
Restless legs	Neurological	Medium	Low	
Ringing or buzzing in ears	Neurological	Medium	High	
Seizures	Neurological	Medium	Low	
Skin pain	Neurological	Medium	Medium	
Slurred or slow speech	Neurological	Medium	Low	
Stammer or stutter	Neurological	Medium	High	
Tremors or shaking	Neurological	Medium	Low	
Unexplained gagging	Neurological	High	Medium	
Weakness or partial paralysis	Neurological	Medium	High	
Blindness/optic neuritis	Ophthalmological	Low	Low	
Blurry vision	Ophthalmological	Medium	Low	
Decreased peripheral vision	Ophthalmological	Medium	Low	
Double vision	Ophthalmological	Medium	Low	
Drooping eyelid	Ophthalmological	High	Low	
Dry eye	Ophthalmological	Low	Medium	
Eye pain	Ophthalmological	Low	Low	
Flashing lights in vision field	Ophthalmological	High	Low	
Floaters in vision field	Ophthalmological	Low	Medium	
Fluttering eye movement	Ophthalmological	Low	Low	
Red eyes	Ophthalmological	Low	Medium	
Sensitive to light	Ophthalmological	Low	Medium	
Teary eye	Ophthalmological	Low	Low	
Temporary blindness	Ophthalmological	Medium	Low	

Symptom Description	Major System	Specificity to L. Borreliosis	Prevalence In L. Borreliosis	Possible Associated Infection
Absence of dreams	Psychological	Low	Medium	
Aggression	Psychological	Medium	Medium	
Difficulty falling asleep	Psychological	Medium	High	
Difficulty staying asleep	Psychological	Medium	High	
Hears things not present	Psychological	High	Low	
Irritable	Psychological	Low	Low	
Mood swings	Psychological	Low	Medium	
Obsessive/compulsive behavior	Psychological	Low	Medium	
Overly sensitive, cries easily	Psychological	Medium	Medium	
Panic/anxiety attacks	Psychological	Medium	Medium	
Paranoia	Psychological	Medium	Low	
Senses someone near when not present	Psychological	High	Low	
Sleeps unusually long	Psychological	Medium	Low	
Smells things not present	Psychological	High	Low	
Suicidal thoughts	Psychological	Medium	Low	
Unusual depression	Psychological	Medium	Medium	
Vivid dreams or nightmares	Psychological	Low	Low	

References

[\[Borreliosis--simultaneous Lyme carditis and psychiatric disorders--case report\]](#); Legatowicz-Koprowska M, Gziut AI, Walczak E, Gil RJ, Wagner T.; Pol Merkur Lekarski. 2008 May;24(143):433-5. Polish. ; PMID: 18634389;

[Postmortem confirmation of Lyme carditis with polymerase chain reaction.](#); Tavora F, Burke A, Li L, Franks TJ, Virmani R.; Cardiovasc Pathol. 2008 Mar-Apr;17(2):103-7. Epub 2007 May 11.; PMID: 18329555 ;

[Lyme disease presenting with persistent headache.](#); Moses JM, Riseberg RS, Mansbach JM.; Pediatrics. 2003 Dec;112(6 Pt 1):e477-9.; PMID: 14654649;

[Unilateral blindness caused by infection with the Lyme disease spirochete, Borrelia burgdorferi.](#); Steere AC, Duray PH, Kauffmann DJ, Wormser GP.; Ann Intern Med. 1985 Sep;103(3):382-4. No abstract available. ; PMID: 4026085 ;

[Optic neuropathy in children with Lyme disease.](#); Rothermel H, Hedges TR 3rd, Steere AC.; Pediatrics. 2001 Aug;108(2):477-81.; PMID: 11483820;

[Gastrointestinal and hepatic manifestations of tickborne diseases in the United States.](#); Zaidi SA, Singer C.; Clin Infect Dis. 2002 May 1;34(9):1206-12. Epub 2002 Apr 2. Review. ; PMID: 11941547;

[Lyme-associated parkinsonism: a neuropathologic case study and review of the literature.](#); Cassarino DS, Quezado MM, Ghatak NR, Duray PH.; Arch Pathol Lab Med. 2003 Sep;127(9):1204-6. Review.; PMID: 12946221;

[Complete heart block due to lyme carditis.](#); Lo R, Menzies DJ, Archer H, Cohen TJ.; J Invasive Cardiol. 2003 Jun;15(6):367-9.; PMID: 12777681;

[Inflammatory brain changes in Lyme borreliosis. A report on three patients and review of literature.](#); Oksi J, Kalimo H, Marttila RJ, Marjamäki M, Sonninen P, Nikoskelainen J, Viljanen MK.; Brain. 1996 Dec;119 (Pt 6):2143-54.; PMID: 9010017;

[Rapidly progressive frontal-type dementia associated with Lyme disease.](#); Waniek C, Prohovnik I, Kaufman MA, Dwork AJ.; J Neuropsychiatry Clin Neurosci. 1995 Summer;7(3):345-7.; PMID: 7580195;

[Fatal adult respiratory distress syndrome in a patient with Lyme disease.](#); Kirsch M, Ruben FL, Steere AC, Duray PH, Norden CW, Winkelstein A.; JAMA. 1988 May 13;259(18):2737-9.; PMID: 3357244;

[Fatal pancarditis in a patient with coexistent Lyme disease and babesiosis. Demonstration of spirochetes in the myocardium.](#); Marcus LC, Steere AC, Duray PH, Anderson AE, Mahoney EB.; Ann Intern Med. 1985 Sep;103(3):374-6.; PMID: 4040723;

[Borrelia burgdorferi persists in the brain in chronic lyme neuroborreliosis and may be associated with Alzheimer disease.](#); Miklossy J, Khalili K, Gern L, Ericson RL, Darekar P, Bolle L, Hurlimann J, Paster BJ.; J Alzheimers Dis. 2004 Dec;6(6):639-49; discussion 673-81.; PMID: 15665404;

[Spontaneous brain hemorrhage associated with Lyme neuroborreliosis.](#); Seijo Martínez M, Grandes Ibáñez J, Sánchez Herrero J, García-Moncó JC.; Neurologia. 2001 Jan;16(1):43-5.; PMID: 11234662;

[Panic attacks may reveal previously unsuspected chronic disseminated lyme disease.](#); Sherr VT.; J Psychiatr Pract. 2000 Nov;6(6):352-6.; PMID: 15990495;

[Neuropathy and cognitive impairment following vaccination with the OspA protein of Borrelia burgdorferi.](#); Latov N, Wu AT, Chin RL, Sander HW, Alaedini A, Brannagan TH 3rd.; J Peripher Nerv Syst. 2004 Sep;9(3):165-7.; PMID: 15363064;

[Regional cerebral blood flow and cognitive deficits in chronic lyme disease.](#); Fallon BA, Keilp J, Prohovnik I, Heertum RV, Mann JJ.; J Neuropsychiatry Clin Neurosci. 2003 Summer;15(3):326-32.; PMID: 12928508 ;

[A controlled study of cognitive deficits in children with chronic Lyme disease.](#); Tager FA, Fallon BA, Keilp J, Rissenberg M, Jones CR, Liebowitz MR.; J Neuropsychiatry Clin Neurosci. 2001 Fall;13(4):500-7.; PMID: 11748319;

[Constipation heralding neuroborreliosis: an atypical tale of 2 patients.](#); Shamim EA, Shamim SA, Liss G, Nysten E, Pincus JH, Yepes M.; Arch Neurol. 2005 Apr;62(4):671-3.; PMID: 15824271;

[Musical hallucinations in patients with Lyme disease.](#); Stricker RB, Winger EE.; South Med J. 2003 Jul;96(7):711-5.; PMID: 12940329;

[Episcleritis, conjunctivitis, and keratitis as ocular manifestations of Lyme disease.](#); Flach AJ, Lavoie PE.; Ophthalmology. 1990 Aug;97(8):973-5.; PMID: 2205817;

[Borrelia burgdorferi intercepts host hormonal signals to regulate expression of outer surface protein A.](#); Scheckelhoff MR, Telford SR, Wesley M, Hu LT.; Proc Natl Acad Sci U S A. 2007 Apr 24;104(17):7247-52. Epub 2007 Apr 16.; PMID: 17438273;

[Acrodermatitis chronica atrophicans in association with lichen sclerosus et atrophicans: tubulo-interstitial nephritis and urinary excretion of spirochete-like organisms.](#); Aberer E, Neumann R, Lubec G.; Acta Derm Venereol. 1987;67(1):62-5.; PMID: 2436416

[Lyme neuroborreliosis presenting as the syndrome of inappropriate antidiuretic hormone secretion.](#); Perkins MP, Shumway N, Jackson WL Jr.; MedGenMed. 2006 Sep 19;8(3):71; PMID: 17406193

[Oedema of the metatarsal heads II-IV and forefoot pain as an unusual manifestation of Lyme disease: a case report.](#); Endres S, Quante M.; J Med Case Reports. 2007 Jul 9;1:44.; PMID: 17620125

[Temporomandibular joint involvement caused by *Borrelia burgdorferi*.](#); Lesnicar G, Zerdoner D.; J Craniomaxillofac Surg. 2007 Dec;35(8):397-400. Epub 2007 Oct 17.; PMID: 17942315

[Differentiation of orofacial pain related to Lyme disease from other dental and facial pain disorders.](#); Heir GM.; Dent Clin North Am. 1997 Apr;41(2):243-58. Review.; PMID: 9142482;

[Chronic fatigue syndrome in patients with Lyme borreliosis.](#); Treib J, Grauer MT, Haass A, Langenbach J, Holzer G, Woessner R.; Eur Neurol. 2000;43(2):107-9.; PMID: 10686469;

[Neurocognitive abnormalities in children after classic manifestations of Lyme disease.](#); Bloom BJ, Wyckoff PM, Meissner HC, Steere AC.; Pediatr Infect Dis J. 1998 Mar;17(3):189-96.; PMID: 9535244;

[Sleep quality in Lyme disease.](#); Greenberg HE, Ney G, Scharf SM, Ravdin L, Hilton E.; Sleep. 1995 Dec;18(10):912-6.; PMID: 8746401;

[Early Lyme disease: a flu-like illness without erythema migrans.](#); Feder HM Jr, Gerber MA, Krause PJ, Ryan R, Shapiro ED.; Pediatrics. 1993 Feb;91(2):456-9. Review.; PMID: 8424027;

[Chronic neurologic manifestations of Lyme disease.](#); Logigian EL, Kaplan RF, Steere AC.; N Engl J Med. 1990 Nov 22;323(21):1438-44. ; PMID: 2172819;

[\[Pain and neuroborreliosis: significance, diagnosis and treatment\]](#); Rupprecht TA, Birnbaum T, Pfister HW.; Schmerz. 2008 Oct;22(5):615-23. German. ; PMID: 18688658;

[Invasion of human neuronal and glial cells by an infectious strain of *Borrelia burgdorferi*.](#); Livengood JA, Gilmore RD Jr.; Microbes Infect. 2006 Nov-Dec;8(14-15):2832-40. Epub 2006 Sep 22.; PMID: 17045505;

[\[Reversible complete heart block by re-infection with *Borrelia burgdorferi* with negative IgM-antibodies\]](#);Guenther F, Bode C, Faber T.; Dtsch Med Wochenschr. 2009 Jan;134(1-2):23-6. Epub 2008 Dec 17. German.; PMID: 19090448