



The Horowitz MSIDS Questionnaire (HMQ)

Answer the following questions as honestly as possible. Think about how you have been feeling over the **previous month** and how often you have been bothered by any of the following problems. Score the occurrence and **frequency** of each symptom on the following scale: never, sometimes, most of the time, all of the time or not applicable.

SECTION 1: SYMPTOM FREQUENCY SCORE

0 Never/NA **1** Sometimes **2** Most of the time **3** All the time

1. Unexplained fevers, sweats, chills, or flushing
2. Unexplained weight change; loss or gain
3. Fatigue, tiredness
4. Unexplained hair loss
5. Swollen glands
6. Sore throat
7. Testicular or pelvic pain
8. Unexplained menstrual irregularity
9. Unexplained breast milk production; breast pain
10. Irritable bladder or bladder dysfunction
11. Sexual dysfunction or loss of libido
12. Upset stomach
13. Change in bowel function (constipation or diarrhea)

14. Chest pain or rib soreness
15. Shortness of breath or cough
16. Heart palpitations, pulse skips, heart block
17. History of a heart murmur or valve prolapse
18. Joint pain or swelling
19. Stiffness of the neck or back
20. Muscle pain or cramps
21. Twitching of the face or other muscles
22. Headaches
23. Neck cracks or neck stiffness
24. Tingling, numbness, burning, or stabbing sensations
25. Facial paralysis (Bell's palsy)
26. Eyes/vision: double, blurry
27. Ears/hearing: buzzing, ringing, ear pain
28. Increased motion sickness, vertigo
29. Lightheadedness, poor balance, difficulty walking
30. Tremors
31. Confusion, difficulty thinking
32. Difficulty with concentration or reading
33. Forgetfulness, poor short-term memory
34. Disorientation: getting lost; going to wrong places
35. Difficulty with speech or writing
36. Mood swings, irritability, depression
37. Disturbed sleep: too much, too little, early awakening

38. Exaggerated symptoms or worse hangover from alcohol

Add up your totals from each of the four columns. This is your first score. Score:

SECTION 2: MOST COMMON LYME SYMPTOMS SCORE If you rated a 3 for ALL of the following in section 1, give yourself five additional total points:

- Fatigue
- Forgetfulness, poor short-term memory
- Joint pain or swelling
- Tingling, numbness, burning, or stabbing sensations
- Disturbed sleep: too much, too little, early awakening

Score: _____

SECTION 3: LYME INCIDENCE SCORE Now please circle the points for each of the following statements you can agree with:

1. You have had a tick bite with no rash or flulike symptoms. *3 points*
2. You have had a tick bite, an *erythema migrans*, or an undefined rash, followed by flulike symptoms. *5 points*
3. You live in what is considered a Lyme-endemic area. *2 points*
4. You have a family member who has been diagnosed with Lyme and/or other tick-borne infections. *1 point*
5. You experience migratory muscle pain. *4 points*
6. You experience migratory joint pain. *4 points*
7. You experience tingling/burning/numbness that migrates and/or comes and goes. *4 points*
8. You have received a prior diagnosis of chronic fatigue syndrome or fibromyalgia. *3 points*
9. You have received a prior diagnosis of a specific autoimmune disorder (lupus, MS, or rheumatoid arthritis), or of a nonspecific autoimmune disorder. *3 points*
10. You have had a positive Lyme test, such as an immunofluorescent assay (IFA), ELISA, Western blot, PCR, lymphocyte transformation tests (LTT and/ or ELISPOT) and/or

Borrelia culture). 5 points

Score: _____

SECTION 4: OVERALL HEALTH SCORE1. Thinking about your overall physical health, for how many of the past thirty days was your physical health not good? _____Days

Award yourself the following points based on the total number of days:0–5 days = 1 point6–12 days = 2 points13–20 days = 3 points21–30 days = 4 points

2. Thinking about your overall mental health, for how many days during the past thirty days was your mental health not good? _____Days

Award yourself the following points based on the total number of days:0–5 days = 1 point

6–12 days = 2 points 13–20 days = 3 points 21–30 days = 4 points Score:

Record your total scores for each section below and add them together to achieve your

Section 1: _____

Section 2: _____

Section 3: _____

Section 4: _____

FINAL SCORE: _____

If you scored: Below 25 Not Likely to Have Tick-Borne illness

If you scored: 25-44 Possible Tick-borne Illness

If you scored: 45-62 Likely to have Tick-borne Illness

If you scored: Above 63 Highly Likely to have Tick-born Illness

Call me today to discuss your Score and the next steps you should take -

Dr. Alice Bell

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Empirical Validation of the Horowitz Multiple Systemic Infectious Disease Syndrome Questionnaire for Suspected Lyme Disease

Citera, Freeman, & Horowitz (under Review at PLoS One)

ABSTRACT

Lyme disease is spreading worldwide, with multiple *Borrelia* species causing a broad range of clinical symptoms mimicking other illnesses. Serological laboratory tests for Lyme are known to be insensitive and unreliable, due to the bacteria's ability to avoid immune recognition. A validated screening questionnaire would be clinically useful for both providers and patients. Three studies evaluated the Horowitz Multiple Systemic Infectious Disease Syndrome (MSIDS) Questionnaire (HMQ). Study 1, examined factor analysis and the psychometric properties of the questionnaire (reliability, construct, divergent and predictive validity) among 537 individuals being treated for Lyme disease. Study 2 involved an online sample of 1142 participants, who self-identified as either healthy (N=360) or suffering from Lyme now (N=782) and who completed the HMQ along with an outdoor activity survey. We examined convergent validity among the components of the scale and evaluated discriminant validity with the Big 5 personality characteristics. The third study compared the patient sample from Study 1 with an online sample of 637 healthy individuals. The purpose was to see if the questionnaire could accurately distinguish between Lyme patients and healthy individuals. Factor analysis results identified six underlying latent dimensions; four of these overlapped with critical symptoms identified by Horowitz—Neuropathy, Cognitive Dysfunction, Muscular/Skeletal Pain, and Fatigue. The HMQ showed acceptable levels of internal reliability using Cronbach's Coefficient alpha. HMQ scores exhibited evidence of convergent and divergent validity. Components of the HMQ correlated more highly with each other than with unrelated traits. The results consistently demonstrated that the HMQ accurately differentiated those with Lyme disease from healthy individuals. The results support the use of the HMQ as a valid, efficient screening tool for medical practitioners and as an aid to individuals that may need to seek treatment.