Lyme Disease and Multiple Systemic Infectious Disease Syndrome (MSIDS):

Answers for chronic fatiguing/musculoskeletal illness

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Executive Summary

The Lyme disease epidemic is taking its toll on patients, physicians, and the entire health care system.

Many cases go undiagnosed, are misdiagnosed or are diagnosed late. Often, the patients aren’t just dealing with Lyme. Rather, they are chronically ill, multiply co-infected, have Ehrlichia, have Anaplasma, or have Babesia — and, it’s important to note, there is more than one form of Babesia at this point.

In fact, chronic Lyme disease is an inaccurate medical diagnosis; it should correctly be called Lyme MSIDS (Multiple Systemic Infection Disease Syndrome).

According to the CDC, chronic disease accounts for 70% of the deaths and 75% of the health care costs in the United States. Given the high costs, this epidemic is straining the health care system.

We, as health care professionals, need to get better at diagnosing and treating Lyme and its related co-infections. We need to better understand the causes of our patients’ ills and find answers to why they don’t feel better. And we need to do it sooner rather than later, because Lyme MSIDS is the number one spreading vector-borne epidemic worldwide.

This white paper will explain why current measures of Lyme MSIDS are inadequate and what you can do about it. Discover a 16-point model that addresses multiple chronic disease factors as well as a comprehensive questionnaire to be used in performing differential diagnoses. Learn the 3 “I”s that are the key to helping patients feel better and gain insight from 30 years of experience with more than 1,200 patients.

Not Just Lyme: The Challenges of a Growing Epidemic
We have an epidemic on our hands. It’s called Chronic Lyme MSIDS (Multiple Systemic Infectious Disease Syndrome).

The CDC reports that 70% of the deaths in the United States, and 75% of our health care costs, are due to chronic disease. Lyme MSIDS, commonly referred to as “Lyme disease,” is now recognized as the cause of many of those chronic diseases and is the number one spreading vector-borne epidemic in the country.

The latest CDC estimate suggests that the actual total number of people diagnosed with Lyme disease is roughly 10 times higher than the yearly reported number — and that is just the diagnosed cases. Many patients with Lyme disease and co-infections go undiagnosed and suffer for years. It’s not often an obvious diagnosis, because it mimics other diseases including fibromyalgia, early Alzheimer’s, and autoimmune diseases such as Multiple Sclerosis (MS), to name a few.

Adding to the confusion, there are two equally legitimate, but divergent, standards of care for the diagnosis and treatment of Lyme disease: the Infectious Diseases Society of America (IDSA) and the International Lyme and Associated Diseases Society (ILADS) guidelines.


The related co-infections are just as big of a problem, if not more so. Today, people don’t just get sick from a tick bite, they can also die from tick bites.

Cases of Lyme carditis started recently been reported along with reports that people have died from cardiac complications as a result.
Why Lab Tests Are Unreliable

The two-tiered testing that is supposed to be completed with an ELISA and a Western blot is actually meant to be used strictly by health departments. In fact, the CDC has specifically stated on their website that it was never meant to be used in clinical practice. This is a good thing, because these tests are not very accurate.

In 2005, a John’s Hopkins University study found that the CDC two-tiered testing method actually missed as many as 55% of positive Lyme disease cases.

Another study from the NIH that was published in 2008 looked at approximately 3,600 people who were known to have Lyme disease. Only 36 of them met the CDC criteria by an IgG Western blot — this represents just 1 out of 100 cases.

There are a number of reasons for these discrepancies:

1. Sensitivity

Through most of the standard labs, Lyme disease will not be picked up in the blood via PCR because the sensitivity is simply too low. Consider the results in the chart below:

<table>
<thead>
<tr>
<th>Study/Year</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schmitz et al, 1993</td>
<td>66%</td>
<td>100%</td>
</tr>
<tr>
<td>Engstrom et al, 1995</td>
<td>55%</td>
<td>96%</td>
</tr>
<tr>
<td>Ledue et al, 1996</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>Trevejo et al, 1999</td>
<td>29%</td>
<td>100%</td>
</tr>
<tr>
<td>Nowakowski, 2001</td>
<td>66%</td>
<td>99%</td>
</tr>
<tr>
<td>Bacon et al, 2003</td>
<td>68%</td>
<td>99%</td>
</tr>
<tr>
<td><strong>MEAN TOTAL</strong></td>
<td><strong>56%</strong></td>
<td><strong>99%</strong></td>
</tr>
</tbody>
</table>

*Stricker and Johnson BMJ 2007; 335:1008*
To put the above results into perspective, AIDS testing has a sensitivity of 99.5%. This begs the question of whether an AIDS test with a sensitivity of 56% would be considered satisfactory.

If tested too early, or if antibiotics have been used early in the course of the disease, patients are often seronegative, which may abrogate the immune response and may result in a positive serology in 20% to 50% of early Lyme cases.

PCR testing is an important diagnostic tool for seronegative patients, but many require multiple sets over time using serum, urine and spinal fluid from reliable laboratories.

The IDSA and the European Concerted Action on Lyme Borreliosis both recommend a two-tier testing approach. According to these guidelines, an immunoblot is not to be performed if the ELISA is negative—despite the poor sensitivity of ELISA tests, which range from 34% to 70.5%. As a result, the approach misses roughly half of the people who have Lyme disease.

2. Intra- and Interlaboratory Variation in Testing
Two separate studies have shown just how different results can be from lab-to-lab and test-to-test. According to the first study, a comparative evaluation of three different commercial ELISA tests produced different results. Sensitivity for the same sera ranged from 36.8% to 70.5%. (Marangoni J Med Microbiol 2005). The second study compared fourteen ELISA test kits for the diagnosis of neuroborreliosis. Sensitivity in these tests ranged from 20.9% to 97.7%. (De Marteno Med Mal Infect 2007).

3. Timing of Antibody Synthesis
IgM antibody synthesis is usually not detectable before the first 2-5 weeks and disappears after 2-3 months, occasionally reappearing later in the disease. If the
patient is tested too soon, or too late, following the initial infection, the result will be a false negative.

4. **Other False Negatives**
Antibiotic treatment early in the stages of the disease prevents a humoral immune response. The same problem may exist for co-infections, which helps to explain the rate of low positive IFAs. Additionally, PCRs are necessary to detect some infections.

5. **Failure to Detect Antibodies**
BB antibodies can be bound in circulating immune complexes, which explains the high false negative rate of antibody testing in the spinal fluid of Lyme patients who have significant CNS (central nervous system) disease. The immune complex dissociation assay may also reveal BB specific antibodies in patients with an encephalopathy whose CSF otherwise tests normal.

6. **Biology of the Organism**
In addition to the long replication time, BB antibodies also surround themselves with the body’s lymphocytic proteins, which results in lower immune recognition.

While most of the Borrelia presently in ticks in the Northeastern United States has been identified as Borrelia Burgorferi, the causative agent of Lyme disease, as much as 10% to 20% of the Borrelia are genetically related to Borrelia Miyamotoi, the agent of relapsing fever in Japan. These organisms will not test positive by ELISA, Western Blot, or PCR assays for Lyme disease.

Similarly, standard screening procedures will not provide reliable diagnoses for other tick-borne diseases such as Babesia and Bartonella, which may require more extensive testing.
Why Patients Don’t Feel Better

When dealing with Lyme MSIDS, the outdated one cause for one disease paradigm doesn’t work because the co-infections overlap. For example, a patient can simultaneously present with Lyme disease, leaky gut, food sensitivities, nutritional deficiencies, trouble falling asleep, adrenal dysfunction, and/or low testosterone.

To expand on this idea, imagine a patient presents at a doctor’s office with 16 nails in their foot. Now imagine that the doctor removed one or two nails — the patient will still experience foot pain months later. The first task must be to find all of the nails. Similarly, as doctors, we must find all and properly diagnose each of the co-infections.

This is one of the reasons treatments are often ineffective in the long term. The following clinical pearls indicate that a patient has been exposed to Lyme, Borrelia burgdorferi, or other tick-borne infections:

- They’ve been to multiple doctors who can’t tell the patient what’s wrong with them
- They have a diagnosis of chronic fatigue syndrome, fibromyalgia, an autoimmune disease like seronegative rheumatoid arthritis, lupus, multiple sclerosis or even ALS
- The symptoms come and go, with good and bad days
- Symptoms are influenced by hormonal cycles and Antibiotic use may decrease or increase symptoms
- Pain migrates and may be resistant to standard treatment modalities (NSAIDS, SSRI’s, Neuroleptic medication, Narcotics)

The Roadmap to Feeling Better

When an epidemic exists without reliable blood tests, it is important to understand how to effectively take a clinical history and conduct a differential diagnosis.
Given a situation in which a patient has presented with chronic fatigue and musculoskeletal complaints and been diagnosed with chronic fatigue syndrome, fibromyalgia, early Alzheimer’s, or other autoimmune diseases including Multiple Sclerosis (MS), how should one conduct a differential diagnosis? How can you be certain that it is Lyme disease or another tick-borne co-infection?

The biggest challenge to performing a differential diagnosis is often time. They cannot be rushed, but other patients require time as well and cannot be left waiting. It is important to have to have a map in place to guide the process and its timeframe when seeing chronically complex patients.

That is the basis of the 16-point MSIDS map below:

1) Infections:  
   a. *Bacterial*: Lyme disease, Ehrlichiosis, Bartonella, Mycoplasma, Chlamydia, RMSF, Typhus, Tularemia, Q-Fever, Tick paralysis  
   b. *Parasites*: Babesiosis and other piroplasms, filariasis, amebiasis, giardiasis  
   c. *Viruses*: EBV, HHV-6, CMV, W Nile, Heartland v., Powassan encephalitis and other viral encephalopathies  
   d. Candida and other fungi  

2) Immune dysfunction: ANA+, RF+↑  
   HLA DR-4  

3) Inflammation: ↑IL-1, IL-6, TNF-α→  
   “Sickness syndrome”  

4) Toxicity: Multiple Chemical Sensitivity, Environmental Illness, Heavy Metals, Mold, and Neurotoxins  

5) Allergies: foods, drugs, environmental  

6) Nutritional & Enzyme Deficiencies / functional medicine abnormalities in biochemical pathways  

7) Mitochondrial dysfunction  

8) Psychological disorders  

9) Neurological dysfunction  

10) Endocrine disorders  

11) Sleep disorders  

12) ANS dysfunction +/- POTS  

13) G.I. disorders  

14) Elevated LFT’s  

15) Pain syndromes  

16) Deconditioning
The MSIDS model takes simultaneous, overlapping etiologies that cause the same symptoms into account. For example, fatigue, infections (bacterial, viral, parasitic, fungal), immune dysfunction, inflammation with cytokines (sickness syndrome), exposure to environmental toxins (heavy metals), detoxification problems with lack of adequate GSH, hormonal problems, vitamin deficiencies (B12, MMA), mineral deficiencies (zinc), sleep disorders, and mitochondrial dysfunction can all contribute to persistent symptoms.

Inflammation is the number one, fundamental common denominator to these etiologies that lead to chronic fatigue and musculoskeletal pain.

Mitigating these effects requires treating the 3 “I”s: Infection, Immune issues, and Inflammation. At the same time, it is important to address the other factors in the MSIDS map, all of which may also result in increased inflammation.

**Infections:**
There are four types of infections that a patient may present with: bacterial infections, parasitic infections, viral infections, and fungal infections, or Candida.

The following represent some of the most common infections in Lyme MSIDS cases:

**Bacterial Infections:**
If a patient presents in the summertime with a high fever, headache and fatigue with musculoskeletal pain, they may have been exposed to Ehrlichia and/or Anaplasma, which requires a CBC and a biochem profile.

If the test results show leukopenia (low white cell count), thrombocytopenia (low platelet count) or elevated liver functions (transaminitis) in a young person or an elderly person, it is most likely Ehrlichia or Anaplasma.
However, there are other organisms, such as Rickettsia, that have been shown produce the same results. The three common Rickettsia infections include typhus, Q-fever, and Rickettsia infections such as Rocky Mountain spotted fever. These infections each present with hematological abnormalities similar to Ehrlichia or Anaplasma.

Another common infection is Bartonella (cat scratch fever), of which there are several strains, but Bartonella Henselae is the most common. Additional forms include Bartonella Bacilliformis, Bartonella Quintana (trench fever), as well as several others.

Resistant pain syndromes in your patients should be a primary indicator of Lyme and Bartonella. These are the patients who report symptoms including ongoing encephalopathy or horrific brain fog with no signs of improvement and no benefit from the use of narcotics.

The good news is that doxycycline and tetracyclines have been proven to effectively treat these bacterial infections, which is an important clinical clue to examine when seeing patients who present with Ehrlichia and Anaplasmosis.

**Parasitic Infections:**
Babesia is the parasite that causes many of the symptoms that will be seen in patients who are not showing signs of improvement.

Clinical symptoms that point to Babesia include day sweats; night sweats; chills; air hunger, where patients can’t catch their breath; and a cough that cannot be explained. It is still important, however, to conduct a differential diagnosis.

A clinical clue that exists particularly in women who experience symptoms that are worse just before, during or immediately following their menstrual cycle is the
historical presence of migratory neuropathy along with tingling, numbness and burning sensations that come and go and that move around the body.

Another clinical clue is the existence of a Herxheimer reaction, which presents when a patient begins taking antibiotics for an infection and their fatigue, joint pain and muscle pain get better or worse.

Babesia suppresses the immune system and is, therefore, not one parasite, but rather many different parasites. In these cases, it is possible to find toxoplasmosis and FL-1953 Rheumatica as well as different strains of Babesia, including Babesia Microti and Babesia WA-1 (Babesia Duncani). Babesia will likely be missed if the test is for Babesia Microti, but not for Babesia WA-1 (Babesia Duncani).

Additionally, intestinal parasites have been found when a CDSA is conducted on the intestine. When these intestinal parasites are treated using classic drug treatments such as Biltricide, Ivermectin, Albendazole, Alinia, some patients with Lyme-MSIDS report significant improvement because it was one of these parasites that was causing them to feel sick.

**Viral Infections:**
Reactivation of Epstein-Barr and herpesvirus 6 does occur, however, there are also a number of tick-borne viruses that have appeared over the last several years. The Heartland virus, for example, presents like Ehrlichia and Anaplasma, but does not respond to doxycycline because it’s a virus.

Another example is the Powassan virus, which is one of the largest problems that will soon be facing the United States. Over a period of four years in New York, the presence of this virus rose from an average of 1%-2% of ticks in the state to nearly 5%-6% of ticks in the state. The virus can enter the body within 15 minutes of a tick bite and can result in death via viral encephalitis. The standard mortality rates of this
infection are between 10% and 15%, but some clinical studies indicate that it could be as high as 30%.

**Immune Dysfunction:**
With immune dysfunction, a positive anti-nuclear antibody alone does not clearly identify a diagnosis of lupus. This is because Lyme disease can also cause an overstimulated immune system. To know which is the appropriate diagnosis, it is important perform a differential diagnosis. A double-stranded DNA will indicate the possibility of a true autoimmune disease.

Patients often develop rheumatoid factors with Lyme as a result of an overstimulated immune system with rheumatoid factors. Therefore, the mere presence of rheumatoid factors in Lyme disease patients does not immediately indicate the presence of rheumatoid arthritis. Cyclic Citrullinated Peptide (CCP) is a very specific marker for rheumatoid that can determine a true diagnosis of rheumatoid arthritis.

Imagine a patient who presents with complaints of migratory joint pain that comes and goes with tingling and numbness that moves around their body as well as memory/concentration problems. After checking for B-12 and folic acid deficiency, conducting a methylmalonic acid and a homocystine to look for occult B-12 deficiency, and testing for mercury and other reasons why their memory is not working, if rheumatoid factors or ANAs exist, the likely cause is Lyme disease with an overstimulated immune system rather than rheumatoid arthritis or true lupus.

**Inflammation:**
Lyme patients get an overstimulated immune system, which produces tumor necrosis factor alpha, interleukin-1 and interleukin-6, causing what’s called the “sickness syndrome.” They get tired and experience muscle, joint and head aches. They often don’t want to get out of bed and their memory and concentration don’t work efficiently because of the inflammatory cytokines.
Many of the 16 points drive inflammatory processes. The key to treating these afflictions is to shut down this inflammatory cytokine production. It is not necessary to eradicate every last Borrelia in the body, but it is critical that the load of the bacteria, parasites, and viruses is reduced; that the immune system balanced; that the production of cytokines is shut off; and that the number of overlapping factors that are causing inflammation in your patients is determined based on the MSIDS map.

**Toxicity:**
Heavy metals cause both inflammation and free-radical oxidative stress. Studies show that every symptom of Lyme disease in a patient could also be driven by heavy metals. A certain group of these patients will start feeling better when the toxins are removed. Low-dose chelation with DMSA or natural chelators, chlorella, alpha lipoic acid, and citrus pectin, may prove the resistant symptoms that had previously been attributed to Lyme disease were actually, in part, driven by inflammation from heavy metals.

Mold could also be contributing to brain fog, but a differential diagnosis must be performed to confirm. Standard tests should be completed, including B-12, folic acid, methylmalonic and homocysteine. Additionally, it is important to check a patients’ thyroid for heavy metals.

Neurotoxins such as BB Tox1 and quinolinic acid also affect cognitive function as it affects one’s ability to think clearly if there is too much present.

We find that many patients’ memory and concentration improve with a detox of antioxidants such as glutathione. This is due to the fact that treatment does not consist solely of antibiotics or herbs, but rather it is more focused on the overall detoxing of the patient. If Lyme patients are not properly detoxed and these inflammatory cytokines are not lowered, their symptoms will not improve regardless of the quantity of antibiotics and herbs that are administered.
**Allergies:**
Food allergens trigger cellular activation of sensitized T-cells, eosinophils and basophils and higher cytokines, which manifests as fatigue, HA, irritability, concentration problems, rhinitis, eczema, and/or asthma.

Food allergies and sensitivities that are frequently seen in the general population, may present as an immediate hypersensitivity reaction (IgE) or a delayed hypersensitivity reaction (IgG). Allergies are also a common complaint of individuals with Chronic Fatigue Syndrome and fibromyalgia and are frequently seen in E.I. Syndrome. Symptoms may be related to gluten sensitivity, Candidiasis and/or leaky gut, and should prompt investigation into these 3 diagnoses.

**Nutritional & Enzyme Deficiencies:**
Zinc deficiency can cause a problem in phase one liver pathways when it becomes backed up, alcohols oxidize into aldehydes, and chlorohydrate is produced, which results in patients feeling spacey and dizzy. This phase one liver problem can be reversed and memory and concentration will start to improve with the administration of zinc.

B. Reactive hypoglycemia is common among the US population and is occasionally a manifestation of metabolic syndrome. A trial of a hypoglycemic diet is warranted, especially in patients with resistant fatigue, HA’s, dizziness, palpitations, mood swings and insomnia, as these symptoms overlap those of Chronic Lyme disease/MSIDS. A 6-hour GTT is warranted in patients who are not compliant with diet.

**Mitochondrial Dysfunction:**
While we are all exposed to free-radical oxidative stress, many Lyme patients have been sick for so long that their mitochondria might not be working. Often, there will be a group of patients who will improve using treatments such as glycosylated phospholipids, NT factors and CoQ10, and acetyl L-carnitine.
**Psychological Disorders:**
Psychological disorders represent a big factor that is often overlooked because many people don't realize how it affects the immune system. After hearing from multiple doctors that there is no clinical issue, a patient will likely start to believe that the issue is psychological vs. physical. In reality, however, in many cases the problems stem from some form of abuse (physical, emotional or sexual). Men and women who have been abused often don’t feel that they deserve to be well, and so deep healing work needs to take place first in order to help these patients improve.

**Neurological Dysfunction:**
Lyme mimics every psychiatric disorder known to mankind, including Bell’s palsy and optic neuritis. In fact, Lyme could be the underlying issue in young children who have been diagnosed with ADHD, who can’t concentrate in school, or who have a whole host of other psychiatric problems.

There have even been cases of schizophrenic patients who were able to go off their psychiatric medication when treated with doxycycline, however, their symptoms of schizophrenia or psychosis return once they stop the doxycycline.

**Endocrine Disorders:**
Lyme affects the HPA axis, often causing low testosterone in men and blocking FSH and LH in women to the point where they don’t menstruate for a year or more.

Low TSH doesn’t necessary indicate hyperthyroidism in a patient; it may also be that the thyroid-stimulating hormone is not coming out of the pituitary gland because the inflammatory cytokines in Lyme is changing the whole process of how this works in the body.

**Sleep Disorders:**
Lack of sleep leads to increased production of Interleukin 6 (IL-6). IL-6 from abdominal fat is where most of the inflammatory cytokines are coming from. High
CRP is a marker for high IL-6, which ultimately drives fatigue and musculoskeletal illness.

**ANS Dysfunction +/- POTS:**
The Autonomic Nervous System (ANS) plays an important part in the MSIDS map, and warrants taking both sitting and standing blood pressures.

An easy dysautonomia test can be performed on patients in the office by checking their blood pressure and pulse after sitting for a couple of minutes, and again after standing up. Note whether their blood pressure starts to decrease and their pulse rate starts to increase at three, six, or nine minutes.

**G.I. Disorders:**
Leaky gut is becoming more and more common while, at the same time, parasites are also being found in patients when it was not initially suspected. Leaky gut is an important consideration in these patients because it does play a big role in driving cytokine production.

**Elevated Liver Functions:**
Lyme disease causes elevated liver functions early on, but is not the only tick-borne infection that will cause elevated liver functions. Rocky Mountain spotted fever and Rickettsia infections will also cause these elevated liver functions.

It is not unusual for patients with tick-borne infections to present with elevated AST and ALTs with a transaminitis. A differential diagnosis is needed in order to know whether it is Hepatitis B, Hepatitis C, Hemochromatosis with an iron overload, or Wilson’s disease. It is also important to check ferritin, iron TIBC, ceruloplasmin levels and alpha-1 antitrypsin.
If a patient presents with a transaminitis, it is important to assume that it could be a tick-borne infection. If that proves to be the case, liver functions will normalize once the ticks have been properly treated.

**Pain Syndromes:**
Lyme disease and tick-borne illness should be suspected in any patient who presents with persistent ongoing pain while taking 480 mg of morphine sulphate, Dilaudid, and/or multiple neuropathic drugs.

Resistant pain syndromes in patients who are not responding to classic drug treatments should be suspected of having Lyme and/or other tick-borne co-infections such as Babesia and Bartonella. These are the causes behind the eight points on the MSIDS map which drive inflammation.

**Deconditioning:**
People who have been ill for an extended period of time—as is the case with many Lyme MSIDS patients—often lose muscle tone. Additionally, starting an exercise program can be difficult for people who continually suffer from chronic fatigue, dizziness, muscle pain, joint pain and weakness. However, physical therapy and progressive reconditioning are often essential in a Lyme patient’s recovery.

**Evaluate all of the Sources of Inflammation**

*Multiple overlapping etiologies on the MSIDS map contribute to the sickness syndrome:*

1. Chronic infections: ↑ inflammation and ↑ immune dysregulation (the 3 I’s), also adversely affecting mitochondrial function
3. Sleep disorders (↑ IL-6)
4. GI Disorders: Food sensitivities (IgG) & leaky gut, ↑ cytokines
5. Heavy metals with detoxification problems
6. Nutritional deficiencies (vitamins, minerals, ie Zinc, Mag, Cu),
7. Hormonal imbalances (low T, low adrenal function..)
8. Autonomic Nervous System Dysfunction/POTS

**Solving the Time Crunch**
While the MSIDs map can help you find all of the co-infections that may be keeping your patients from feeling better, the problem of the time constraints of the current health care system still remains.

When doctors routinely have only 15 minutes with speak to a patient, dealing with chronic, complex diseases is nearly impossible. It is critical to find a way to have the biggest impact in the time allotted. The solution to this is the MSIDS 38 Point Symptom Checklist/Questionnaire.

If patients are able to complete this questionnaire in the waiting room before they are seen, it will help to provide a clearer picture of their symptoms and how best to proceed with a treatment protocol. If, for instance, the patient indicates 26 out of 38 symptoms, they very likely have a multi-systemic illness.

The multi-systemic nature of the epidemic makes this an important cross-specialty screening tool as well. For example, an OB/GYN who is seeing pregnant women will likely not take the time to 38 questions to find out whether the patient has Lyme disease before they give birth. In fact, many doctors don’t even think about Lyme in those situations. This can help to mitigate those situations.
Horowit/MSIDS 38 Point Symptom Checklist
This is a questionnaire to determine the probability of your having Lyme disease and other tick borne disorders.

Think about how you have been feeling over the previous month and how often you have been bothered by the following:

<table>
<thead>
<tr>
<th>Symptom</th>
<th>never</th>
<th>sometimes</th>
<th>Frequency most of the time</th>
<th>Frequency all of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unexplained fevers, sweats, chills, or flushing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Unexplained weight change...Loss or Gain</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Fatigue, tiredness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Unexplained hair loss</td>
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<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Swollen glands</td>
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<td>1</td>
<td>2</td>
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</tr>
<tr>
<td>Sore throat</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Testicular pain / Pelvic Pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Unexplained menstrual irregularity</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Unexplained breast milk production, breast pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Irritable bladder or bladder dysfunction</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sexual dysfunction / loss of libido</td>
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<td>1</td>
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<td>3</td>
</tr>
<tr>
<td>Upset stomach</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Change in bowel function (Constipation or Diarrhea)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Chest pain or Rib soreness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Shortness of Breath / Cough</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Heart palpitations, pulse skips, heart block</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>History of Heart Murmur or Valve Prolapse</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Joint pain or Swelling</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Stiffness of the neck or back</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Muscle pain or cramps</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Twitching of the face or other muscles</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Headaches</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Neck cracks or Neck Stiffness</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Tingling, numbness, burning or stabbing sensations</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Facial Paralysis (Bells Palsy)</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Eyes/Vision – Double, Blurry</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Ears/Hearing – Buzzing, Ringing, Ear Pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Increased motion sickness, vertigo</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Lightheadedness, poor balance, difficulty walking</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Tremors</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Confusion, difficulty thinking</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty with concentration or reading</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Forgetfulness, poor short term memory</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Disorientation; getting lost, going to wrong places</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Difficulty with speech or writing</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Mood swings, irritability, depression</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Disturbed sleep – Too Much, Too Little, Early Awake</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Exaggerated symptoms or worse hangover from alcohol</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Please add up your totals from each column, then add up the 4 column totals: ________ This is your first score.

Score from Page 1: ________

Section 2
Now, please check off each incident you can answer yes to with the following questions:
1. You have had a tick bite with no rash or flu-like symptoms. 3 points
2. You have had a tick bite, an Erythema migrans or undefined rash, followed by flu-like symptoms. 5 points
3. You live in what is considered a Lyme endemic area. 2 points
4. You have a family member diagnosed with Lyme and/or 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 non specific autoimmune disorder (Lupus, MS, Rheumatoid Arthritis). 3 points
10. You have had a positive Lyme test (ELISA, Western Blot, PCR). 5 points

Please add your points from Section 2 ___ + Score from Page 1 ___ = ___ (This is your Ongoing Score)

Section 3
1. Thinking about your overall physical health, for how many days during the past 30 days was your physical health not good? _________ days
2. Thinking about your overall mental health, for how many days during the past 30 days was your mental health not good? _________ days

Compare to the following cutoffs and add points from these 2 questions to your Ongoing Score.
0 – 5 days = 1 point
6 – 12 days = 2 points
13 – 20 days = 3 points
21 – 30 days = 4 points

Please add your points from Section 3 ___ + Ongoing Score ___ = ___

Section 4
Lastly, if on the first page you rated a '3' for ALL of the following:
Fatigue
Forgetfulness, poor short term memory
Joint pain or Swelling
Tingling, numbness, burning or stabbing sensations
Disturbed sleep – Too Much, Too Little, Early Awake
Please give yourself a 5 and add it to the final score after Section 3 = ____ (This is your FINAL SCORE)

ONLY GIVE YOURSELF THESE 5 POINTS IF YOU RATED "3" FOR ALL OF THESE SYMPTOMS.

FINAL SCORE: ___
Now please take your final score and compare it to the scale used by Dr. Horowitz
0 – 20 \hspace{1cm} \text{Tick Borne Illness not likely}
21-45 \hspace{1cm} \text{Tick Borne Illness possible}
46 and above \hspace{1cm} \text{Tick Borne Illness highly likely}

YOUR NAME: ___
TODAY’S DATE: ___
The first section of the questionnaire lists the common symptoms to which the patient assigns points depending on the frequency or severity.

For example, a patient may indicate they have “fevers, sweats and chills” “sometimes, most of the time, or all of the time.” When you see this, you should immediately plan for a differential diagnosis of fever, sweats and chills.

The next section is constellation of symptoms that was published in *The New England Journal of Medicine* that is very specific for Lyme disease.

Section 3 accounts for other factors that may indicate a higher probability of Lyme. These indications include whether the patient has had a tick bite, lives in a Lyme-endemic area, or has had an EM rash, all of which have specific point values assigned.

The final section comes from the CDC Healthy Days Questionnaire, which aims to determine the number of days per month an individual has experienced physical or mental symptoms.

**How to Use the Questionnaire to Complete a Differential Diagnosis**

Given fevers, sweats and chills as an example, Tuberculosis and non-Hodgkin’s lymphoma patients also experience have night sweats. In this example, it would be prudent to ask the patient whether they also have a cough or hemoptysis. If they don’t, a check x-ray will rule out TB.

If they present with mediastinal lymph nodes, palpate the patient to determine whether they have non-Hodgkin’s lymphoma. If they have hyperthyroidism, complete a thyroid panel. If they are menopausal, determine whether they gone into early hormone failure and check an FSH and an LH with estradiol and progesterone.
If they’ve traveled outside the US, they could have malaria or even Brucella, but Babesia is the most likely. For patients with fever, sweats and chills, Babesia will be found almost as often as Lyme disease.

The key takeaway is that it’s a clinical diagnosis and the lab only helps to support that clinical diagnosis.

**Lyme MSIDS Map in Action**

It is important to keep going back to differentials. Lyme disease may not be the sole cause of memory/concentration problems or any other wide-ranging list of symptoms. It is important to pay attention to the co-infections and these overlapping factors on the map to determine the root cause of the illness.

Once she was given Florinef and some salt and fluids, brought her blood pressure up, treated for Babesia, and started detoxing, she went from around 20% of normal to 80% of normal. POTS, Babesia and treating the mold toxins were the clues.

**Conclusion**

As clinicians and healthcare practitioners, we need to go beyond the politics and do our best to treat patients and make them well.

Look for the clinical clues, including good and bad days, symptoms that come and go, migrating pain, symptoms that are influenced by hormonal cycles, improvements as a result of antibiotic use, and pain that is resistant to standard treatment modalities.

Always think differential diagnosis. Any time a patient presents with an unexplained symptom, there should be at least five or six or seven differential diagnoses.

Every patient will be different — some may have three 'nails in their foot' on the MSIDS model, some may have two, and some may have 12. The job of the
practitioner is to figure out how many of the factors on this MSIDS map are causing chronic illness in a patient.
Biography

Dr. Richard Horowitz is a board certified internist in private practice in Hyde Park, N.Y. He is medical director of the Hudson Valley Healing Arts Center, an integrative medical center which combines both classical and complementary approaches in the treatment of Chronic Lyme disease and other tick-borne disorders. He has treated over 12,000 Chronic Lyme disease patients in the last 20 years, with patients coming from all over the US, Canada, and Europe to his clinic. He is former Assistant Director of Medicine of Vassar Brothers Hospital in Poughkeepsie, N.Y., and is the former president elect of ILADS, the International Lyme and Associated Diseases Society. He now serves as president of the International Lyme and Associated Diseases Educational Foundation (ILADEF), a non-profit educational foundation whose mission is to educate health professionals in the diagnosis and treatment of tick-borne disorders.

Dr. Horowitz has presented at numerous local, national, and international scientific conferences on Lyme disease, and has published on the role of co-infections and toxins in Chronic Lyme Borreliosis. He was recently awarded Humanitarian of the Year award by the Turn the Corner Foundation for his treatment of Lyme disease, and has dedicated his life to helping those stricken with this devastating illness.