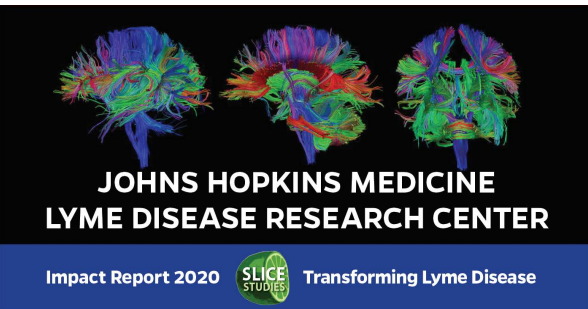





CONNECTING THE DOTS IN LYME DISEASE

Despite the challenges of the COVID-19 pandemic, we continue to make significant advances in our Lyme disease clinical research program. Our well characterized biorepository serves as the hub of over 30 cutting-edge collaborations that are providing insights into the complexities of Lyme disease biology. As we identify disease mechanisms and connect these important dots, pathways to improved diagnostics and treatments for patients are coming into sharper focus.

2020 IMPACT REPORT



**JOHNS HOPKINS MEDICINE
LYME DISEASE RESEARCH CENTER**

Impact Report 2020  Transforming Lyme Disease

We are pleased to share with you the Center's 2020 Impact Report. The report highlights the tremendous progress we are making at our Center.

Topics include:

- COVID-19 Impact
- Telemedicine
- Distinguishing Lyme Disease from COVID-19
- Education Highlights
- Joint Ultrasound Research
- Functional MRI Research

[CLICK ON THE IMAGE ABOVE TO READ THE REPORT](#)

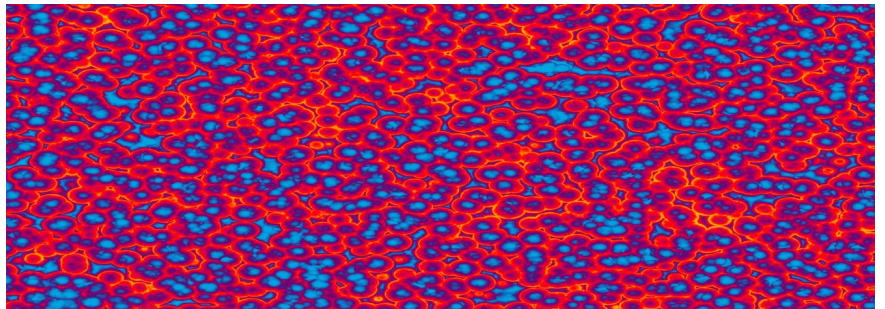
RESEARCH INSIGHTS IMPORTANT DOTS BEING CONNECTED

Research shows that Lyme disease infections have multiple deleterious impacts on individuals, including disrupting immune function, the gut microbiome, and metabolic processes. These insights are important to understanding the disease's complex biologic mechanisms and are enabling more targeted novel approaches to developing improved diagnostics and treatments.

Immune Dysfunction

The interaction of a person's immune system and *Borrelia burgdorferi* infection is complex and has the potential for favorable as well as possibly harmful outcomes. Our *in vitro* research using human immune cells finds that *Borrelia burgdorferi* infection can affect immune cell function in a way that could be involved in infection-induced autoimmune illness.

[LEARN MORE](#)



Gut Microbiome

A person's gut microbiome is comprised of the genetic material of all the microorganisms, bacteria, viruses, protozoa, and fungi present in the gastrointestinal tract. In this study, a distinct microbiome signature is discovered in Lyme disease patients and represents a potential new avenue for direct diagnostics and therapeutics.

[LEARN MORE](#)

Metabolic Response

Metabolites are small molecules within cells, biofluids, and tissues that are important for healthy functioning biological systems. This study measured metabolites circulating in the blood and identified significant metabolic differences between Lyme disease patients that develop persistent symptoms following antibiotic treatment and those that are clinically cured. These metabolic insights are useful in better understanding alterations in the underlying metabolic pathways of patients with persistent symptoms in Lyme disease.

[LEARN MORE](#)

NEWS

A recent [STUDY](#) by the CDC shows average clinician diagnosed cases of Lyme Disease in the US during 2010-2018 were 476,000 per year and as high as 547,000 per year. This incidence is substantially higher than prior CDC estimates of ~300,000 and underscores the magnitude of the public health crisis we are working to help mitigate.

Our mission is to understand and urgently address the varied manifestations of Lyme disease and translate our pioneering multidisciplinary research into improved patient care, education, and health outcomes

NEW IDSA GUIDELINES CONTINUE TO CREATE CONFUSION

In November 2020, new clinical practice guidelines were published for the prevention, diagnosis, and treatment of Lyme disease by the Infectious Diseases Society of America (IDSA), American Academy of Neurology (AAN), and American College of Rheumatology (ACR).



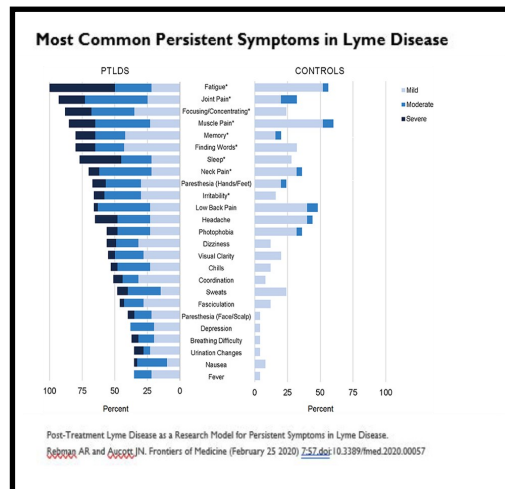
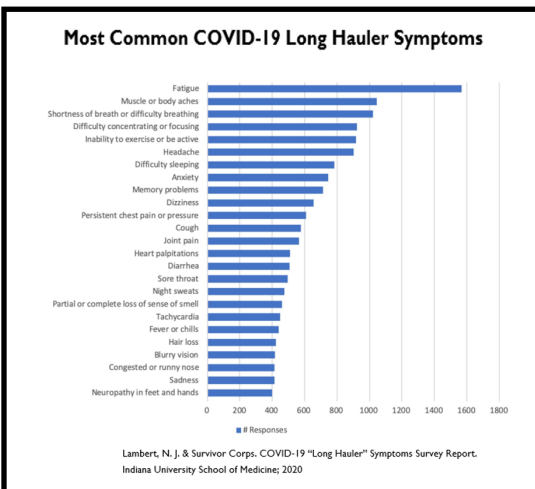
Unfortunately, these guidelines do not help clarify the confusion about how to diagnose and adequately treat persistent symptoms in Lyme disease or how to constructively approach the varied distinct subsets of chronic Lyme disease (CLD). The 2020 IDSA guidelines fail to inform clinicians of the extensive peer-reviewed evidence-based research, led by our SLICE studies, that elucidate [clinically significant persistent symptoms](#) and reveal measurable biologic differences in patients with post treatment Lyme Disease (PTLD), a clearly defined and diagnosable subgroup of CLD patients. A growing body of peer-reviewed research shows causes of persistent symptoms in Lyme disease can be multifactorial and potentially involve inflammation, immune dysfunction, neural network alterations, and/or responses to persistent infection or bacterial remnants. The clinical guidelines convey neither the significance of persistent symptoms nor the clinical importance of PTLD.

Clearer and more comprehensive clinical guidance is needed to avoid compounding the uncertainty and suffering experienced by patients with this complex condition.

[READ 2020 IDSA GUIDELINES](#)

COMMON COVID-19 LONG HAULER SYMPTOMS ARE SIMILAR TO MANY PERSISTENT SYMPTOMS IN LYME DISEASE

The COVID-19 pandemic is providing another example of how infections can be associated with long term symptoms. As seen in patients suffering with persistent symptoms in Lyme disease, COVID-19 long haulers also experience a characteristic group of persisting symptoms including severe fatigue, cognitive symptoms, and pain. The similarity and severity of COVID-19 long haul symptoms and persistent symptoms in Lyme disease suggests potential common mechanisms of illness, such as infection-induced changes in the autonomic nervous system and immune system.



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SUPPORT THE CENTER

Thank you for your continued interest and support. Together we are bringing critical knowledge and hope to the Lyme disease community.

HOW TO GIVE

The Center is grateful for the support of the Steven and Alexandra Cohen Foundation, the Brennan Family, Global Lyme Alliance, Bay Area Lyme Foundation, Department of Defense, individual donors, foundations, and collaborators.

This newsletter is made possible thanks to the support of Lyme disease education and outreach provided by the Kenney Family Foundation.

EDUCATION FOR HEALTH CARE PRACTITIONERS

SAVE THE DATE!

Fifth Annual LYME DISEASE TOPICS

Continuing Medical Education
at Johns Hopkins Medicine
Offered via Live Stream to Health Care Practitioners

Friday, June 4, 2021
9 am - 5:30 pm