



March 13, 2019

Dr. Dennis Dixon, Chief Bacteriology and Mycology Branch, NIAID

Dr. Tony Fauci, NIH NIAID Director

Dr. Francis Collins, NIH Director

Email: NIHTBDStrategicPlan@nih.gov
U.S. Department of Health and Human Services

RE: Request for Information (RFI): Input on NIH Tickborne Diseases Strategic Plan
(NOT-OD-19-077)

Dear Drs. Dixon, Fauci, and Collins:

I am submitting this response to the Request for Information (RFI) regarding the NIH Tickborne Diseases Strategic Plan on behalf of LymeDisease.org. LymeDisease.org has represented the Lyme disease community for over 30 years and is one of the most highly respected non-profit Lyme disease advocacy organizations in the nation. LymeDisease.org has earned a reputation as one of the most trusted sources of information in the community, with our website drawing over 3 million unique visitors a year. We have also conducted and published patient surveys in peer-reviewed journals for the past ten years. In 2015, we launched the only national Lyme disease patient registry and research platform, MyLymeData, which has to date enrolled over 12,000 patients.

The Centers for Disease Control estimates that over 300,000 people contract Lyme disease in the United States each year. Chronic Lyme patients report significant barriers to accessing care and substantial impairment to their quality of life. (Johnson 2011, Johnson 2014) They also face significant stigma, marginalization, and discrimination as a result of their illness. (Johnson 2019 Privacy and Stigma Survey attached.)

Between February 27 and March 10, 2019, we conducted a survey of over 4,300 Lyme disease patients on the topic of the National Institute of Health Research Strategy for TickBorne Diseases. In the survey, we asked patients to tell us their views on the key strategic focus areas, research gaps not identified in the Strategic Plan framework, resources required or lacking to advance the TBD research priorities, and emerging scientific advances and techniques to accelerate NIH research on TBD. The results of that survey and our additional organizational comments are presented below.

1. Significant research gaps and/or barriers not identified in the framework

The Research Strategy identifies five research areas. We asked participants to rank them in terms of importance. On a scale of 1 to 5 (with 5 being the most important), the most highly ranked were diagnosis and detection (4.31) followed by therapeutics (3.77), and basic research (2.95). Prevention (2.48) and resources (1.56) were ranked the lowest.

1. Diagnosis and Detection (4.31)
2. Therapeutics (3.77)
3. Basic Research (2.95)
4. Prevention (2.48)
5. Resources (1.56)

While there has been a focus on the diagnosis and treatment of acute Lyme disease, LymeDisease.org believes that the NIH Research Strategy needs to dedicate substantial efforts in this arena to both late Lyme disease (where the illness goes untreated for six months after symptom onset) and chronic Lyme disease (previously treated Lyme disease that remains symptomatic for at least six months after treatment). Therefore, we believe the most urgent priorities should be diagnostic and treatment approaches for late/chronic Lyme disease.

In the MyLymeData patient registry (which includes over 12,000 participants), most patients list their current stage of disease as chronic Lyme disease and 70% report that they were not diagnosed until they had late stage Lyme disease. This suggests that most patients were not diagnosed early when treatments are more likely to be effective. To our knowledge there have been no studies on the best treatment approach for patients diagnosed when they have late stage Lyme disease. In addition, there is no diagnostic test that can determine whether treatment has been curative, i.e. eradicated the bacterial infection.

Over 99% of NIH Survey respondents said that the Research Strategy should emphasize improving diagnostic tests for both late and chronic Lyme disease. The same percentage also identified improving treatment approaches for both late and chronic Lyme disease as a key priority as well as developing more effective treatments for early Lyme disease to prevent progression to chronic Lyme disease.

Recommendation: Diagnosis and treatment should be the top priorities in the research strategy and both of these areas should dedicate a significant portion of their efforts toward late and chronic Lyme disease. We also need to develop more effective treatments for early Lyme disease to prevent the development of chronic Lyme disease.

2. Resources required or lacking to advance the TBD research priorities

Increasing Research Funding for Lyme Disease. Lyme disease is the number one reported vector-borne disease in the United States. According to CDC surveillance data, 36,429 cases were reported in 2016 compared to 96,075 total cases of vector-borne disease. (CDC MMWR 2018) But while Lyme disease accounts for 38% of the total case counts for vector-borne diseases, it receives only 4% of the funding allotted to vector-borne diseases: \$21 million compared to \$534 for vector-borne diseases. (NIH Funding Estimates 2018)

Recommendation: Lyme disease funding needs to be increased to 38% of total vector-borne disease funding, to be commensurate with the magnitude of the disease burden.

Research Funding Grant Panel. To ensure that research priorities are patient-centered and reflect the needs of patients with chronic Lyme disease and the physicians who treat them, decision-making groups should include representation of both patients and physicians to select and prioritize research funding decisions. NIH Survey respondents regarded the need for patient (96%) and physician representation (98%) on such research funding groups as either extremely or very important.

Respondents regarded having lived experience with chronic Lyme disease (either as a patient or caregiver) as a fundamental requisite to be able to provide meaningful representation. A majority also believed that representatives who were nominated, vetted, or supported by widely recognized patient advocacy groups deemed trustworthy by the community (Trusted PAGs) would provide meaningful representation. In contrast, respondents regarded as token representatives people who have no lived experience with chronic Lyme disease, applicants objected to by the community, or those who only had experience with acute disease. LymeDisease.org also believes it is extremely important that there be two or more representatives to guard against tokenism.

Recommendation: Grant selection and funding groups should include representatives of both chronic Lyme patients and the physicians who treat them. Patient representation should be meaningful, not token. Representatives should have lived experience with chronic Lyme disease and should be nominated, vetted, or receive a letter of support from Trusted PAGs.

3. Emerging scientific advances or techniques in basic, diagnostic, prevention, or therapeutic research that may accelerate NIH research priorities

The Promise of Big Data, Real World Research, and Precision Medicine. There is a growing recognition that the traditional clinical trial research model is inefficient. The few NIH funded clinical trials in chronic Lyme disease utilized very small samples (ranging from 37 to 129), took 2.5 to 5 years to complete recruitment alone, and excluded 89-99% of the applicants. Trials this exclusionary are not generalizable to the population seen in clinical care. Moreover, they do not address the goals of precision medicine, which seek to identify the specific treatments most likely to improve the health outcome for the individual patient, given his/her unique circumstances and presentation.

Today, innovative research approaches, including our MyLymeData patient registry and research platform (which has enrolled over 12,000 patients), seek to accelerate the pace of research, make it more patient-centered, and develop a learning system of healthcare where research findings are informed by and implemented into real world clinical practice rapidly.

MyLymeData is part of the patient-centered research movement that aims to transform the traditional research hierarchy in which studies are conducted on passive patients into a partnership model between patients and researchers. Unlike traditional trials, patient registries are uniquely suited to:

- Evaluate care as it is actually provided in real-world practice,
- Assess complex treatment patterns and treatment combinations, and
- Evaluate patient outcomes when clinical trials are not practical or are difficult to conduct (for example, when long-term outcomes are important).

This approach is attractive because it advances co-creation of research, promotes patient-centered methods, and develops research capacity. Over 90% of respondents to our NIH Survey believe the NIH Research Strategy should include real world patients, big data techniques, and patient registries like MyLymeData.

Recommendation: The NIH Research Strategy should include innovative research approaches, such as big data, real world research, precision medicine and patient-driven registries like MyLymeData.

Community Based Participatory Research. Almost all NIH Survey respondents stated that it was important to increase patient engagement in determining research priorities, research funding and research design and implementation. Community Based Participatory Research (CBPR) approaches seek to provide partnerships between the community and researchers that can strengthen academic–community relationships; ensure relevancy of research questions; increase data collection capacity, analysis, and interpretation; minimize the negative or stigmatizing effects of research on the partners, and enhance program recruitment, sustainability and extension. (Macaulay 2016, CDC 2013, NIH 2018) This approach could help avoid the community stigma and discrimination experienced by chronic Lyme patients. (Johnson 2019 Privacy and Stigma Survey attached.) Some NIH funded research studies have been used to dismiss or diminish patient concerns. (e.g. Klempner 2001) They also have harmed the community by further stigmatizing or marginalizing its members and making it more difficult for patients to obtain care. CBPR promotes the establishment of long-term research

relationships to pursue on-going studies and accelerate the research enterprise. When combined with big data and precision medicine, this approach is the most promising to accelerate research in Lyme disease.

Recommendation: Future clinical trials should adopt a Community Based Participatory Research approach to ensure research is patient-centered, foster community trust, and develop a research learning system.

Other Comments. We refer those reviewing these comments to our letter attached which provides background information about our NIH Survey, references, and our recent Lyme Disease Stigma and Privacy Survey. We also encourage the NIH to make public all comments submitted under this RFI to ensure process transparency and foster community trust in its findings. We also wish to point to one further comment of great interest to the Lyme disease community—namely the use of nomenclature to describe chronic Lyme disease.

Nomenclature. Approximately 60% of respondents to our NIH Survey disapproved of the terminology “Post Treatment Lyme Disease Syndrome” (PTLDS) to characterize patients who do not improve with short-term treatment protocols. The term PTLDS was first proposed in Table 5 of the 2006 Infectious Disease Society of America (IDSA) guidelines and we believe this definition reflects the fact that the guideline panel consisted exclusively of researchers. (Wormser 2006) PTLDS is a narrow, exclusive research definition that has been misapplied to clinical care under the IDSA treatment guidelines, and has resulted in many patients being denied care. Prior to the introduction of the term PTLDS in the IDSA guidelines, a 2006 CDC study used the term “late/chronic Lyme disease” to describe this subset of patients. (Zhang 2006) Research definitions used to recruit patients for NIH clinical treatment trials for chronic Lyme disease excluded between 89–99% of those who applied. Research definitions this exclusionary should not be applied to clinical care.

We asked patients to rank four terms that are commonly used to describe this subset of patients. The results are below, with chronic Lyme disease receiving top billing on a scale of 1-4.

1. Chronic Lyme disease (3.20)
2. Persistent Lyme disease (2.85)
3. Treatment-resistant Lyme disease (2.27)
4. Post-Treatment Lyme Disease Syndrome (1.72)

Survey takers were also given an option to suggest an alternative to these terms and many suggested the term “late Lyme disease,” which is reminiscent of the prior CDC nomenclature.

Recommendation: The term PTLDS should be abandoned because it harms patients’ ability to receive clinical care. Patients with symptoms persisting six months following a brief antibiotic course should be referred to as having “chronic Lyme disease,” “late Lyme disease,” or “late/chronic Lyme disease” to avoid clinical harm caused to patients when research disease definitions are conflated with clinical care criteria.

To summarize, we recommend that the NIH Strategic Plan reflect the following:

- Diagnosis and treatment should be the top priorities in the research strategy, and both of these areas should dedicate a significant portion of their efforts toward late and chronic Lyme disease. We also need to develop more effective treatments for early Lyme disease to prevent the development of chronic Lyme disease.
- Lyme disease funding should be increased so that it constitutes 38% of total vector-borne disease funding, to be commensurate with the magnitude of the disease burden.

- Grant selection and funding groups should include representatives of both chronic Lyme patients and the physicians who treat them. Patient representation should be meaningful, not token. Representatives should have lived experience with chronic Lyme disease and should be nominated, vetted, or receive a letter of support from Trusted PAGs.
- The NIH Research Strategy should include innovative research approaches, such as big data, real world research, precision medicine and patient-driven registries like MyLymeData.
- Future clinical trials should adopt a Community Based Participatory Research approach to ensure research is patient-centered, foster community trust, and develop a research learning system.
- The term PTLDs should be abandoned because it harms patients' ability to receive clinical care. Patients with symptoms persisting six months following a brief antibiotic course should be referred to as having "chronic Lyme disease," "late Lyme disease," or "late/chronic Lyme disease" to avoid clinical harm caused to patients when research disease definitions are conflated with clinical care criteria.

We appreciate the opportunity to submit these comments in response to the Request for Information and would be happy to respond to any questions you may have at lbjohnson@lymedisease.org.

Very truly yours,



Lorraine Johnson, JD/MBA
CEO LymeDisease.org

References

CDC, https://www.cdc.gov/pcd/issues/2013/12_0205.htm

CDC MMWR 2018, <https://www.cdc.gov/mmwr/volumes/67/wr/pdfs/mm6717e1-H.pdf>

Fallon, B.A.; Keilp, J.G.; Corbera, K.M.; Petkova, E.; Britton, C.B.; Dwyer, E.; Slavov, I.; Cheng, J.; Dobkin, J.; Nelson, D.R.; et al. A randomized, placebo-controlled trial of repeated iv antibiotic therapy for Lyme encephalopathy. *Neurology* 2008, 70, 992–1003.

Johnson L, Aylward A, Stricker RB. Healthcare access and burden of care for patients with Lyme disease: a large United States survey. *Health Policy*. 2011 Sep;102(1):64-71. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21676482>.

Johnson L, Wilcox S, Mankoff J, Stricker RB. Severity of chronic Lyme disease compared to other chronic conditions: a quality of life survey. *PeerJ*. 2014; 2. Available from: <http://dx.doi.org/10.7717/peerj.322>.

Johnson L, Shapiro M, Mankoff J. Removing the Mask of Average Treatment Effects in Chronic Lyme Disease Research Using Big Data and Subgroup Analysis. *Healthcare*. 2018;6(4):124. Available from: <http://www.mdpi.com/2227-9032/6/4/124>.

Johnson, Lorraine (2019): MyLymeData Stigma and Privacy in Lyme Disease Data: A project of LymeDisease.org 2.11.19.xlsx. figshare. Dataset. <https://doi.org/10.6084/m9.figshare.7704167>.

Klempner, M.; Hu, L.; Evans, J.; Schmid, C.; Johnson, G.; Trevino, R.; Norton, D.; Levy, L.; Wall, D.; McCall, J.; et al. Two controlled trials of antibiotic treatment in patients with persistent symptoms and a history of Lyme disease. *N. Engl. J. Med.* 2001, 345, 85–92.

Krupp, L.B.; Hyman, L.G.; Grimson, R.; Coyle, P.K.; Melville, P.; Ahnn, S.; Dattwyler, R.; Chandler, B. Study and treatment of post Lyme disease (Stop-LD): A randomized double masked clinical trial. *Neurology* 2003, 60, 1923–1930.

NIH, <https://www.nimhd.nih.gov/programs/extramural/community-based-participatory.html#program-description>

NIH Funding Estimates 2018, https://report.nih.gov/categorical_spending.aspx

Macaulay AC. Participatory research: What is the history? Has the purpose changed? *Family Practice*. 2016;34(3):256-8. Available from: <https://dx.doi.org/10.1093/fampra/cmw117>.

Wormser GP, Dattwyler RJ, Shapiro ED, Halperin JJ, Steere AC, Klempner MS, et al. The clinical assessment, treatment, and prevention of Lyme disease, human granulocytic anaplasmosis, and babesiosis: clinical practice guidelines by the Infectious Diseases Society of America. *Clin Infect Dis*. 2006 Nov 1;43(9):1089-134.

Zhang, X., et al., Economic impact of Lyme disease. *Emerg Infect Dis*, 2006. 12(4): p. 653-60.

Johnson, Lorraine (2019): Stigma and Privacy in Lyme Disease [Preprint]. <https://doi.org/10.6084/m9.figshare.7704167>

Stigma and Privacy in Lyme disease

MyLymeData Privacy Survey 2019

According to the Centers for Disease Control, over 300,000 patients annually contract Lyme disease, which is transmitted primarily through the bite of a tick. (CDC 2015) Patients report significant barriers to accessing care and substantial impairment to their quality of life. (Johnson 2011, Johnson 2014) Privacy, stigma, and discrimination are major concerns for the Lyme disease community, particularly for those with chronic Lyme disease.

Between November 5, 2018 and February 2, 2019, we conducted a survey of over 1,900 patients enrolled in the MyLymeData registry on the topic of privacy, data use, trust, discrimination and stigma (Privacy Survey). The results of that survey are presented here. The data underlying this fact sheet are publicly available on Figshare. (Johnson 2019)

Most patients (78%) are concerned about privacy in Lyme disease. Survey participants say they face disrespect and discrimination both within and outside the healthcare system and worry that healthcare data might be used to discriminate against them by employers and insurers. While the majority of patients tell their family (57%) or close friends (59%) about their illness, it is far less common to tell co-workers (26%) or casual friends (28%).

| STIGMA | TRUST | DATA USE |
|--|---|---|
| <p>Lyme disease patients face challenges obtaining care:</p> <ul style="list-style-type: none"> » 74% treated disrespectfully by clinician » 67% postponed care due to stigma or barriers to care » 86% have difficulty obtaining treatment <p>Patient worry that their data may be misused by:</p> <ul style="list-style-type: none"> » Insurers to deny coverage as pre-existing condition (83%) » Employers to limit career opportunities (48%) | <p>Patients worry about data use by:</p> <ul style="list-style-type: none"> » Government (56%) » Pharmacies (49%) » Drug companies (60%) <p>Clinician trust depends on role:</p> <ul style="list-style-type: none"> » 75% trust clinician treating their Lyme disease » 41% trust other clinicians providing care » 18% trust clinicians not involved with care | <ul style="list-style-type: none"> » 78% are concerned about healthcare data privacy generally <p>Patients care about who is using their data and for what purpose.</p> <ul style="list-style-type: none"> » 84% believe it is important to vet researchers and data use <p>Patients want data use to be:</p> <ul style="list-style-type: none"> » Solely for the benefit of patients (82%) » Protected against researcher bias (66%) |

MyLymeData: My Data, My Trust

Unfortunately, like HIV/AIDS, mental health, and hepatitis C, patients with Lyme disease have been medically stigmatized and marginalized. Because of

this, many share legitimate concerns about patient data being used to further stigmatize, diminish, and dismiss their concerns. Some big data projects sell

Stigma and Privacy in Lyme Disease

data to pharma or insurers or otherwise allow data to be used for purposes that don't benefit patients. We do not do this.

“I think people are leery to share personal information because of how it is used by their job, insurance or government, which can all be untrustworthy. Sadly, people in our position have been discriminated against in one way or another.”

— Survey Respondent

MyLymeData requires that patient data be used only for interests that align with the patient community. We call this “patient-centered” open data. Accordingly, we vet researchers and restrict data use and re-use so that it is for the benefit of Lyme disease patients. We also protect patients by providing researchers with access to de-identified data only, by prohibiting re-identification, and by requiring that, like us, researchers limit access to the data, encrypt the data and maintain it securely.

We believe that patients need to be partners in research to ensure that research addresses their interests. Our commitment is to make sure that patient data is used for the benefit of patients—period.



74% have been treated disrespectfully by a clinician



78% worry about healthcare data privacy

References

Centers for Disease Control and Prevention. How many people get Lyme disease? (2015). Available from: <http://www.cdc.gov/lyme/stats/humancases.html>

Johnson L, Aylward A, Stricker RB. Healthcare access and burden of care for patients with Lyme disease: a large United States survey. *Health Policy*. 2011 Sep;102(1):64-71. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21676482>.

Johnson L, Wilcox S, Mankoff J, Stricker RB. Severity of chronic Lyme disease compared to other chronic conditions: a quality of life survey. *PeerJ*. 2014; 2. Available from: <http://dx.doi.org/10.7717/peerj.322>.

Johnson L, Shapiro M, Mankoff J. Removing the Mask of Average Treatment Effects in Chronic Lyme Disease Research Using Big Data and Subgroup Analysis. *Healthcare*. 2018;6(4):124. Available from: <http://www.mdpi.com/2227-9032/6/4/124>

Johnson, Lorraine (2019): MyLymeData Stigma and Privacy in Lyme Disease Data: A project of LymeDisease.org 2.11.19.xlsx. figshare. Dataset. <https://doi.org/10.6084/m9.figshare.7704167>

Lyme Patients Worry About Use Of Their Data By:

| | |
|-------------------|------------|
| Insurers | 83% |
| Pharma | 60% |
| Government | 56% |
| Employers* | 48% |

*Includes only those employed or looking for work.



MyLymeData Patient Registry

MyLymeData is a patient-powered Lyme disease research project developed by LymeDisease.org. It was conceived by patients, is run by patients, and addresses the issues that patients care about. It is the largest research project of Lyme disease conducted and has enrolled over 12,000 patients. To join MyLymeData visit MyLymeData.org.