

# Lymely

## 2024 Congressional App Challenge



Elijah Renner

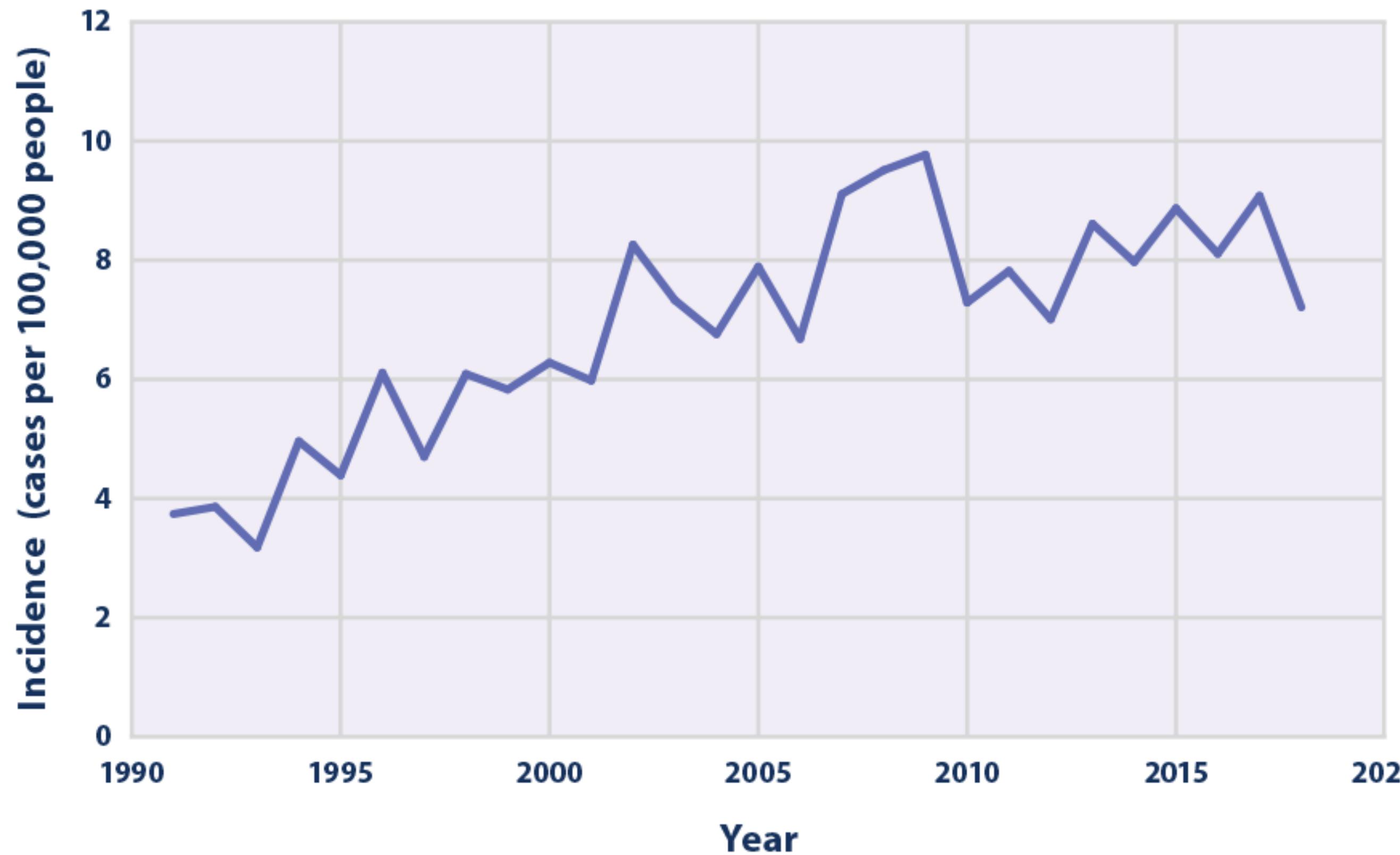
# Motivation

**476,000**

**estimated number of Lyme patients each year in the United States**

**Source: CDC [<https://www.cdc.gov/lyme/data-research/facts-stats/index.html>]**

# United States Lyme Cases Overtime



*"The incidence of Lyme disease in the United States has nearly doubled since 1991, from 3.74 reported cases per 100,000 people to 7.21 reported cases per 100,000 people in 2018."*

Source: EPA [<https://www.epa.gov/climate-indicators/climate-change-indicators-lyme-disease>]

# What is Lyme disease? 🌱 (borreliosis)

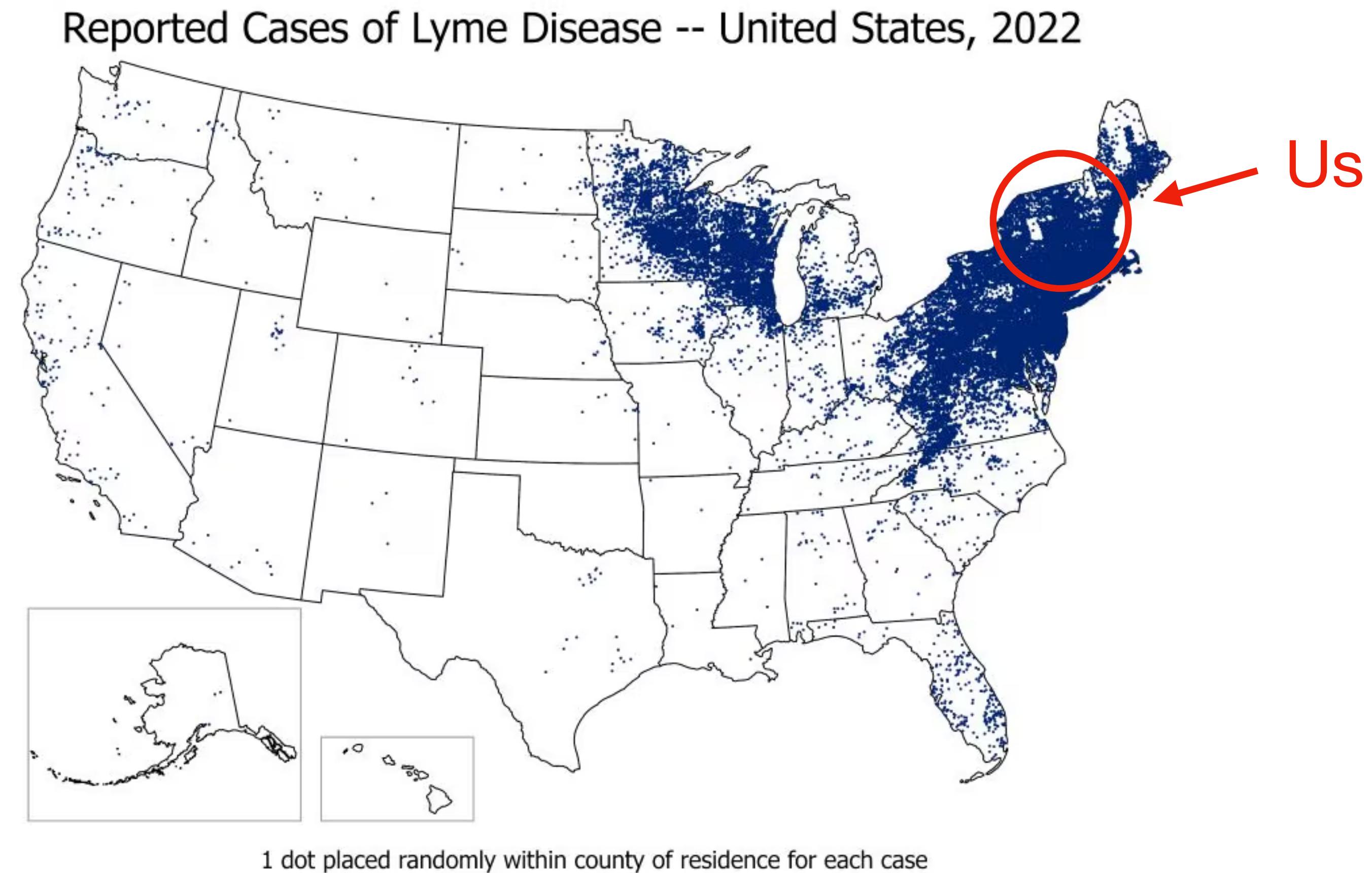
- A bacterial infection caused by the *Borrelia burgdorferi* bacteria transferred by parasitic deer ticks (*I. scapularis*, at top right)
- Early symptoms include a bullseye rash (at bottom right), fever, headache, tiredness, joint stiffness, muscle aches, and swollen lymph nodes
- If untreated, worse symptoms (particularly, arthritis) may develop months or years after a bite



RIGHT RESERVED.

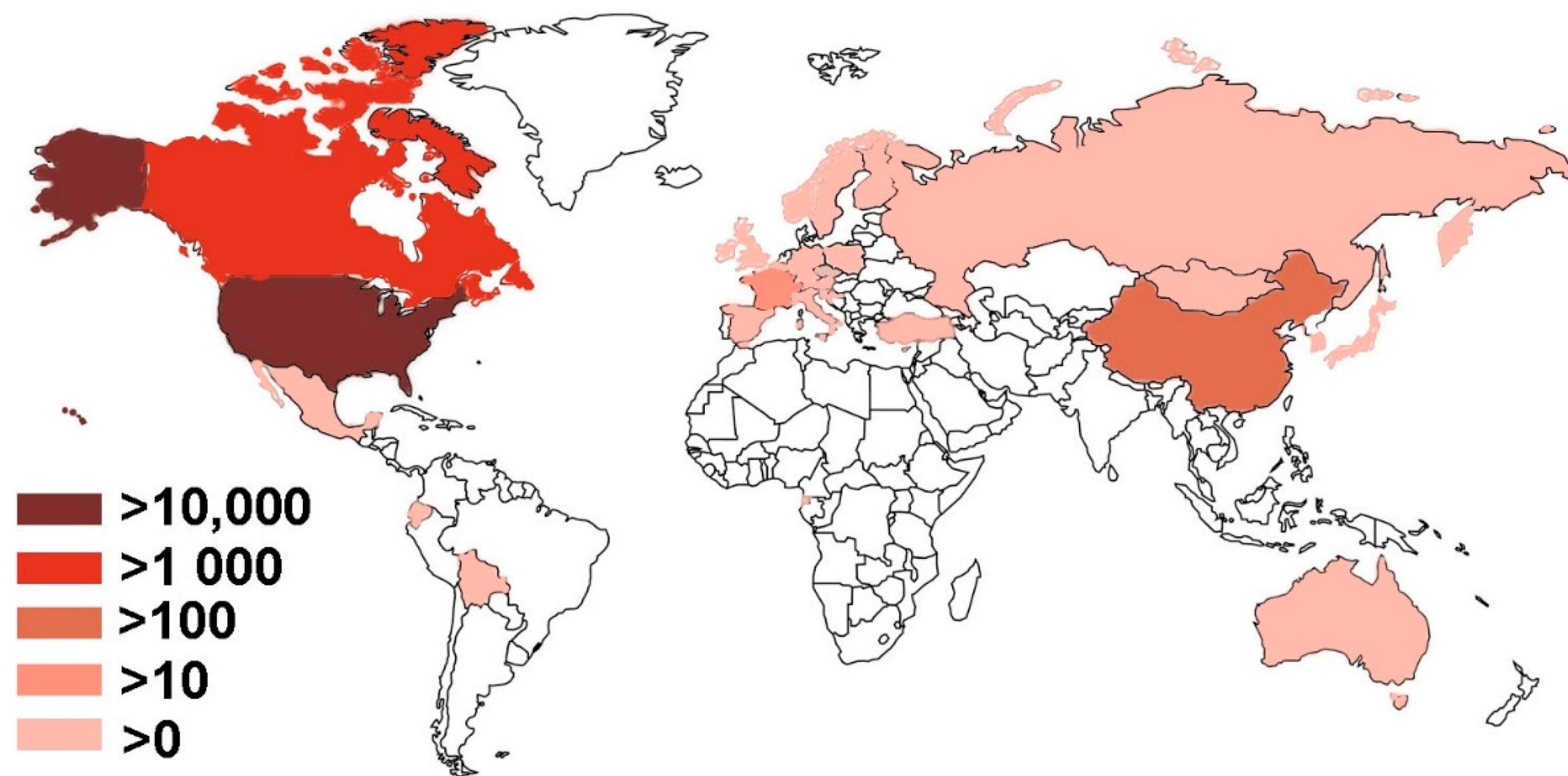
Source: Mayo Clinic [<https://www.mayoclinic.org/diseases-conditions/lyme-disease/symptoms-causes/syc-20374651>]

# Lyme in the United States 😬



Source: CDC [<https://www.cdc.gov/lyme/data-research/facts-stats/lyme-disease-case-map.html>]

# Lyme Worldwide



Geographical distribution of human babesiosis. The darker the color, the more numerous cases there are. There are no reported cases in unfilled countries or regions.

Source: Yi, et al., 2021 [<https://doi.org/10.3390/microorganisms9020440>]

# How Can We Make Early Detection Easier?

## Lymely addresses this question.

Symptom and Activity Reporting with History



Interactive Tick Territory Heat Map



Lyme Education Resources



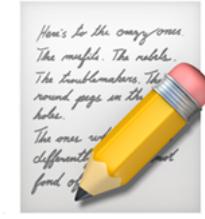
Rash Analysis Computer Vision Model\*



Risk Assessment with GPT-4o Agent Fine-Tuned to Assess Lyme Risk\* !

\*AI predictions may be inaccurate, and Lymely does not diagnose users. Users should always see a doctor about symptoms regardless of whether or not Lymely believes they may due to Lyme.

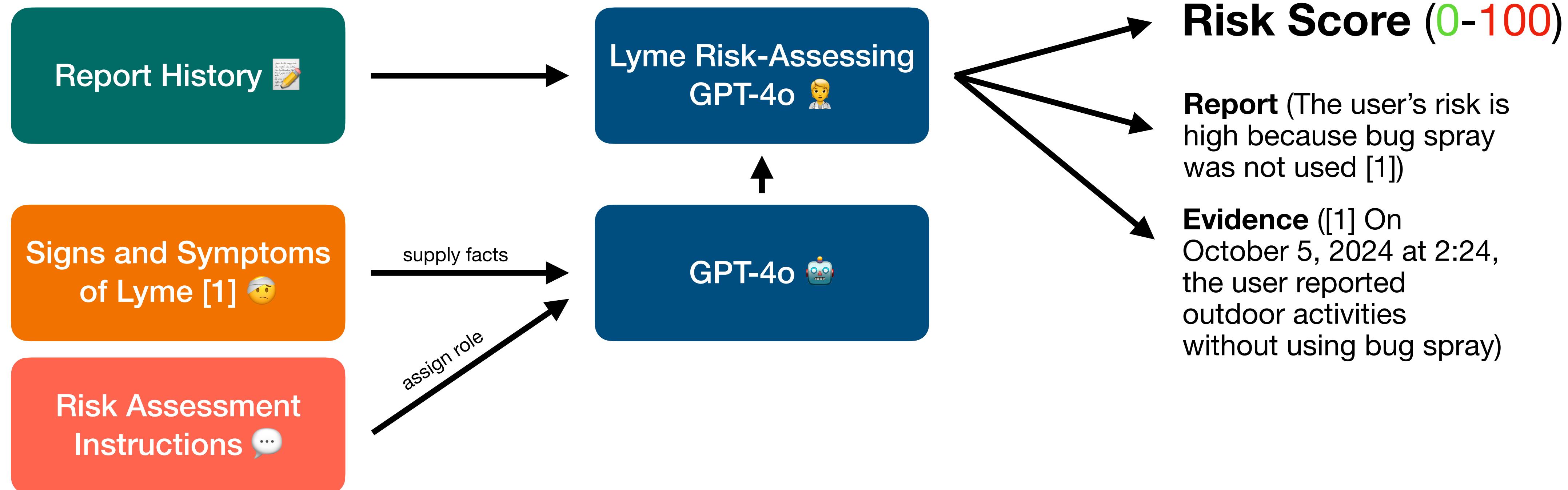
# Symptom and Activity Reporting



## Each day, users answer:

- 🌳 Did you spend time outdoors in grassy or wooded areas today?
- 🐞 Did you use bug spray or tick repellent today?
- 🔎 Did you check for ticks on yourself or others today?
- 🪸 Did you find any ticks on yourself, others, or your pets today?
- 😷 Do you have any of the following symptoms today?
  - Fatigue, fever or chills, headache, muscle or joint pain, rash
  - 💬 Additional information

# Risk Assessment with Generative AI !



Source: [1] CDC [<https://www.cdc.gov/lyme/signs-symptoms/index.html>]

# Tick Territory Map



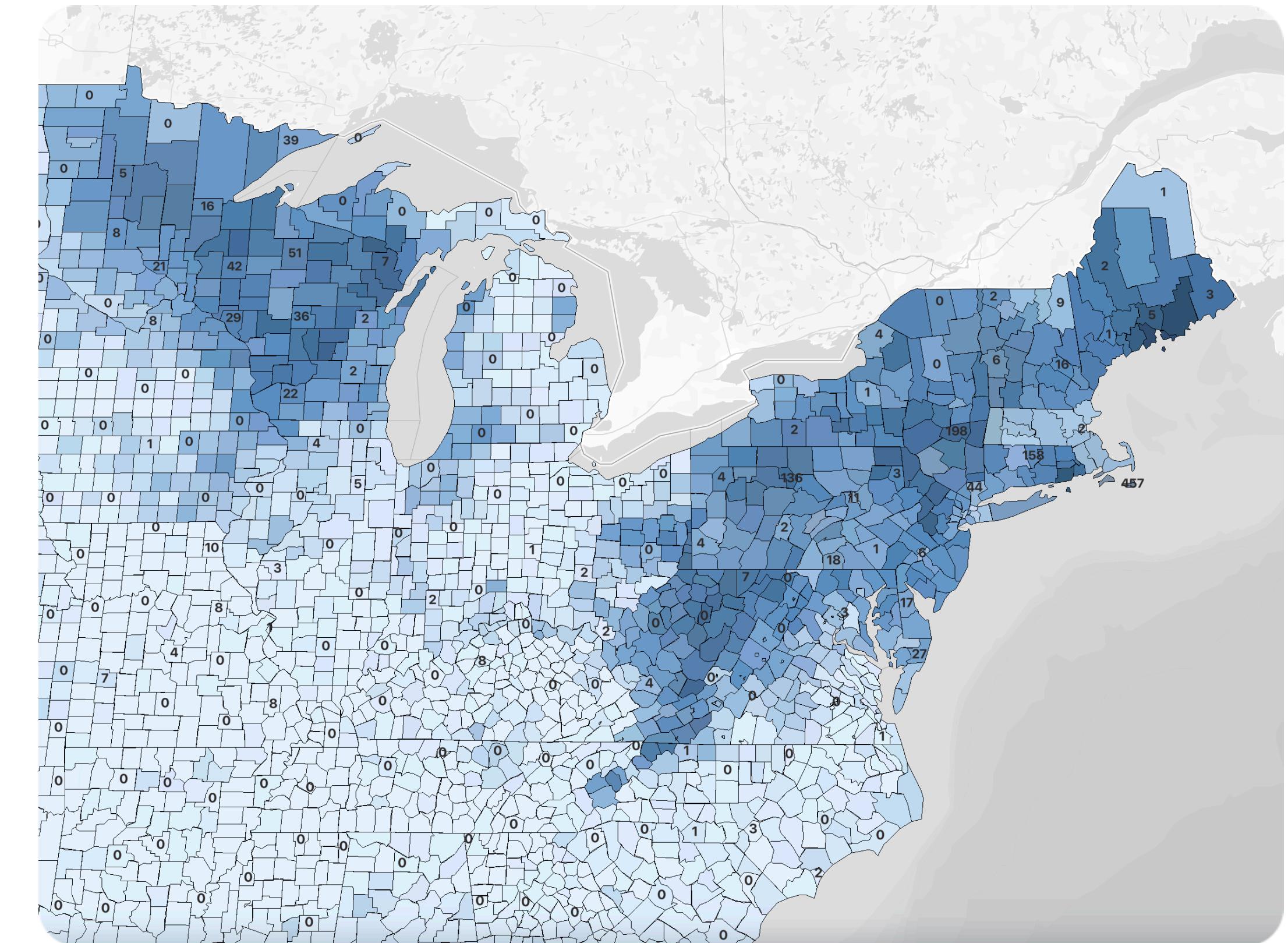
Data sourced from Hopkins' Lyme Tracker



Displays cases per 100,000 people for each US county

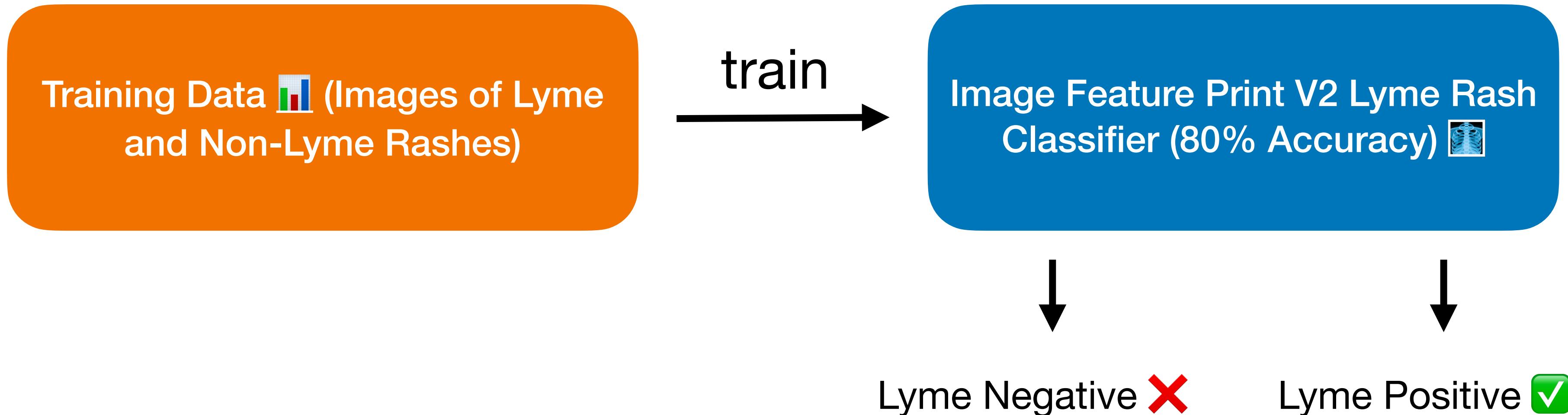


Automatic Location Updates



Source: Hopkins Lyme Tracker [<https://www.hopkinslymetracker.org/explorer>]

# Rash Analysis



Source: [1] Kaggle [<https://www.kaggle.com/datasets/sshikamaru/lyme-disease-rashes>]