



EVERSANA  
INTOUCH<sup>®</sup>

**DHC Webinar:  
Lyme Bomb Detector**

April 2024

# The Situation: Changing Infection Landscape

The screenshot shows the CDC Emerging Infectious Diseases journal website. At the top left is the CDC logo and the text "Centers for Disease Control and Prevention" and "CDC 24/7: Saving Lives. Protecting People™". The main header reads "EMERGING INFECTIOUS DISEASES®" with the ISSN "1080-6059" on the right. Below the header, it indicates "Volume 25, Number 6—June 2019". The article title is "Enhancement of Risk for Lyme Disease by Landscape Connectivity, New York, New York, USA" by Meredith C. VanAcker, Eliza A.H. Little, Goudarz Molaei, Waheed I. Bajwa, and Maria A. Diuk-Wasser. The abstract states: "Most tickborne disease studies in the United States are conducted in low-intensity residential development and forested areas, leaving much unknown about urban infection risks. To understand Lyme disease risk in New York, New York, USA, we conducted tick surveys in 24 parks throughout all 5 boroughs and assessed how park connectivity and landscape composition contribute to *Ixodes scapularis* tick nymphal densities and *Borrelia burgdorferi* infection. We used circuit theory models to determine how parks differentially maintain landscape connectivity for white-tailed deer, the reproductive host for *I. scapularis* ticks. We found forested parks with vegetated buffers and increased connectivity had higher nymph densities, and the degree of park connectivity strongly determined *B. burgdorferi* nymphal infection prevalence. Our study challenges the perspective that tickborne disease risk is restricted to suburban and natural settings and emphasizes the need to understand how green space design affects vector and host communities in areas of emerging urban tickborne disease." The right sidebar contains navigation links for "On This Page" (Materials and Methods, Results, Discussion, Cite This Article), "Figures" (Figure 1, Figure 2, Figure 3), "Tables" (Table 1, Table 2, Table 3), and "Podcast".

## The Challenge:

- Educate people living in cities that ticks are making a home in urban areas, representing a heightened risk of Lyme disease
- Increase diagnosis and treatment by making it easier for city dwellers, including people of color, to get diagnosed and find treatment



GLOBAL  
LYME  
ALLIANCE





# Ticking Lyme Bomb

## Disease Awareness

A gritty, cringe-inducing campaign for the Global Lyme Alliance featuring a Mothra-sized tick covering a large swath of New York's Central Park.

The message? Lyme disease, which can be contracted from the bite of a deer tick, isn't just a rural or suburban problem anymore.

TICK  
TICK  
TICK

Our cities are full of ticking Lyme bombs. You might think of Lyme disease as a rural problem in the spring, but the truth is, ticks are active year-round when temperatures are above freezing, and they are here in your city. Once detonated, Lyme disease can bring lasting devastation, particularly to underserved urban communities.

Join us in defusing the ticking Lyme bombs at [GLA.org](http://GLA.org).



GLOBAL  
LYME  
ALLIANCE



## The Results:

The initial campaign launch drove awareness in key urban markets including New York City.

We generated buzz with local news media coverage and garnering writeups in numerous publications.

We gained attention in a variety of creative award shows.

But there was one fact along the way we just couldn't shake...



CLIO  
HEALTH



## Insight

Even with increased awareness and a highly educated public, diagnosis remains elusive in those with tick bite rashes for many.

That's because even for trained professionals, Lyme disease is difficult to detect on Black and brown skin.



# Dr. Crystal F. Barnwell

*Lyme Disease Specialist*

***“Black and brown urban communities are most at risk because the tell-tale sign of a tick bite—the red rash—is harder to spot on dark skin. So that population often ends up misdiagnosed and with untreated, severe Lyme disease.”***





# DEFUSING THE TICKING LYME BOMB

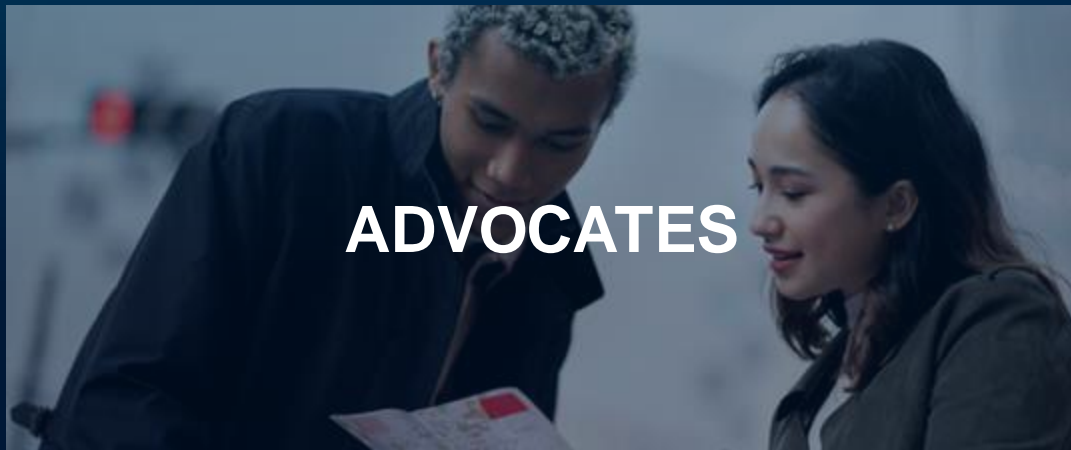


**This was a health equity  
issue we could not ignore.**

**So, we set out to solve it.**



# We Utilized Co-Creation, Seeking to Speed Diagnosis Through Innovation





# The Co-creation Process is Built on a Foundation of Respect, Lateral Thinking and Scientific Rigor

## *Understand Dermatologists*

Map physician experiences, challenges, values, unmet needs, diagnostic styles and approaches



## *Understand Diagnostics*

Use lateral-thinking exercises to build on the current diagnosis approach—and successful diagnostic approaches with similar challenges in the dermatology space



## *Create an MVP*

Through months of ideation and development, create a minimum viable prototype (MPV)



## *Finalize Diagnostic and Build Use*

Finalize go-to-market app. Rollout app to high-touch dermatologists in urban markets. Employ thought leadership influencers to proliferate awareness and use.



**Co-Creation Working Session**



## The Outcome

We created the first smartphone tool enabling earlier detection of Lyme rashes on Black and brown skin and more accurate identification of the disease overall.



# Step 1: Data Collection

TICK-NOLOGY



TRAINING DATA

~50% LYME

~50% NON-LYME

THOUSANDS OF IMAGES



# Step 2: Data Pre-processing

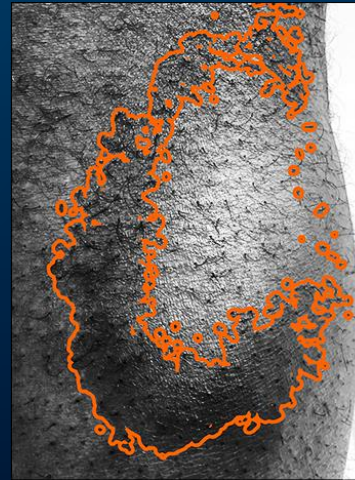
CONTRAST-LIMITING ADAPTIVE HISTOGRAM EVALUATION (CLAHE)



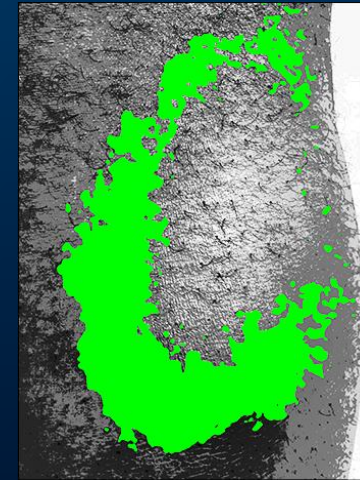
SCALING, ROTATING,  
CROPPING



GREYSCALE



CONTRAST,  
DETECT EDGES



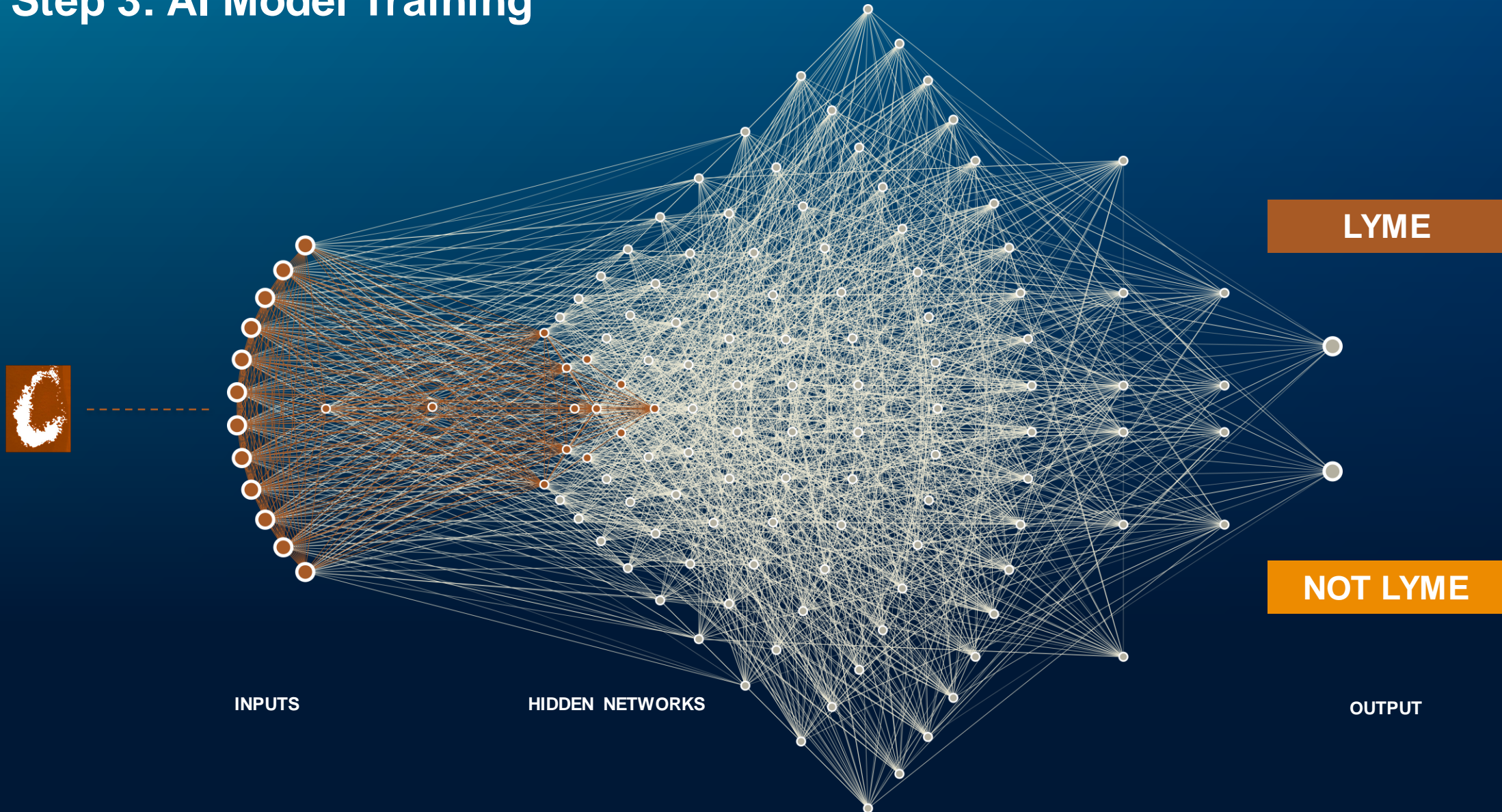
FILL  
SPECIFICITY



FINAL




# Step 3: AI Model Training



Before user self-reporting, our system achieves **79.6% accuracy** in detecting Lyme rashes from smartphone pictures.



←  ⋮

# EARLY LYME SYMPTOMS QUIZ

Select the symptoms and conditions that apply to you

HEAD, FACE, NECK ▾

SORE THROAT, SWOLLEN GLANDS

HEADACHES JAW PAIN / STIFFNESS

TINGLING SENSATIONS NECK STIFFNESS

HEIGHTENED ALLERGIC SENSITIVITIES


TWITCHING OF FACIAL/OTHER MUSCLES

FACIAL NERVE (BELL'S) PALSY  
(FACIAL MUSCLE WEAKNESS OR PARALYSIS)

DIGESTIVE SYSTEM >

RESPIRATORY / CIRCULATORY >

GET REPORT

←  ⋮

## YOUR REPORT

0 1 /

### RASH ANALYZER 06%

It is **very unlikely** you have a Lyme rash.


0 2 /


### EARLY LYME SYMPTOMS QUIZ STAGE 2

Our quiz indicates you have symptoms of **Early disseminated Lyme disease, also known as stage 2**. You are encouraged to speak to a doctor as soon as possible.

DOWNLOAD REPORT


FIND A DOCTOR

 GLOBAL LYME ALLIANCE



←  ⋮

## FIND A DOCTOR

Lyme specialists near you



Dr John Smith, MD  
5.0 ★★★★★ (8)  
Infectious disease physician  
(718) 613-1702 1.6 mi


## Innovative Thinking Can Start by Asking:

- What are the problems we could solve for the patient populations our brands serve?
- How can we revolutionize the patient experience?
- How could AI, innovation, and technology expedite the end-to-end journey by accelerating testing, diagnosis, and treatment initiation?
- How could we shift to designing experiences above audience across HCP and patient audiences?





QUESTIONS?

