

Rising Stars and Query Debuts

12:45 PM EST | December 7th, 2022 | 2022 SyS Symposium

Moderator:

- James Muncy, MPH - CSTE

Presenters:

- Deen Gu, MHA – NC DHHS
- Neha Shanker, PhD, MPH – NC DHHS
- Ashley Ryals, MPH – Georgia Department of Public Health
- Rana Bayakly, MPH – Georgia Department of Public Health
- Amy Beeson, MD – Centers for Disease Control and Prevention (CDC)
- Jennifer White, MPH – New York State Department of Health
- Abigail Gates, MSPH – Centers for Disease Control and Prevention (CDC)



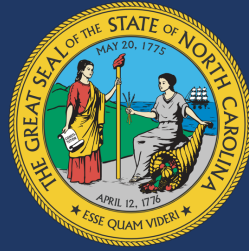
Council of State and Territorial Epidemiologists



Deen Gu, MHA
NC DHHS

Neha Shanker, PhD, MPH
NC DHHS





NC DEPARTMENT OF
**HEALTH AND
HUMAN SERVICES**

Case Finding Using Syndromic Surveillance Data During The 2022 Monkeypox Outbreak In North Carolina

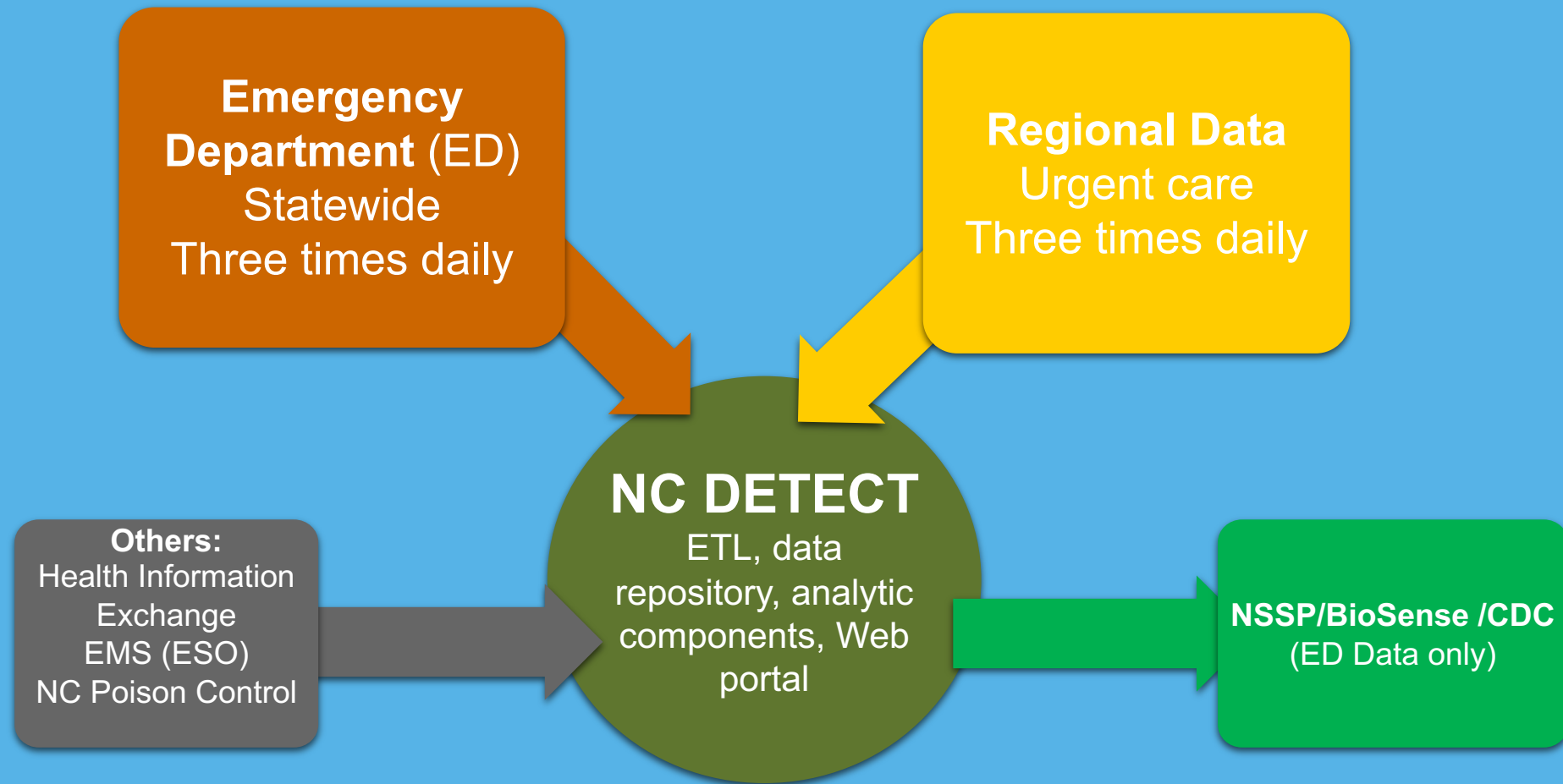


Deen Gu, MHA
Public Health Epidemiologist
NC Division of Public Health

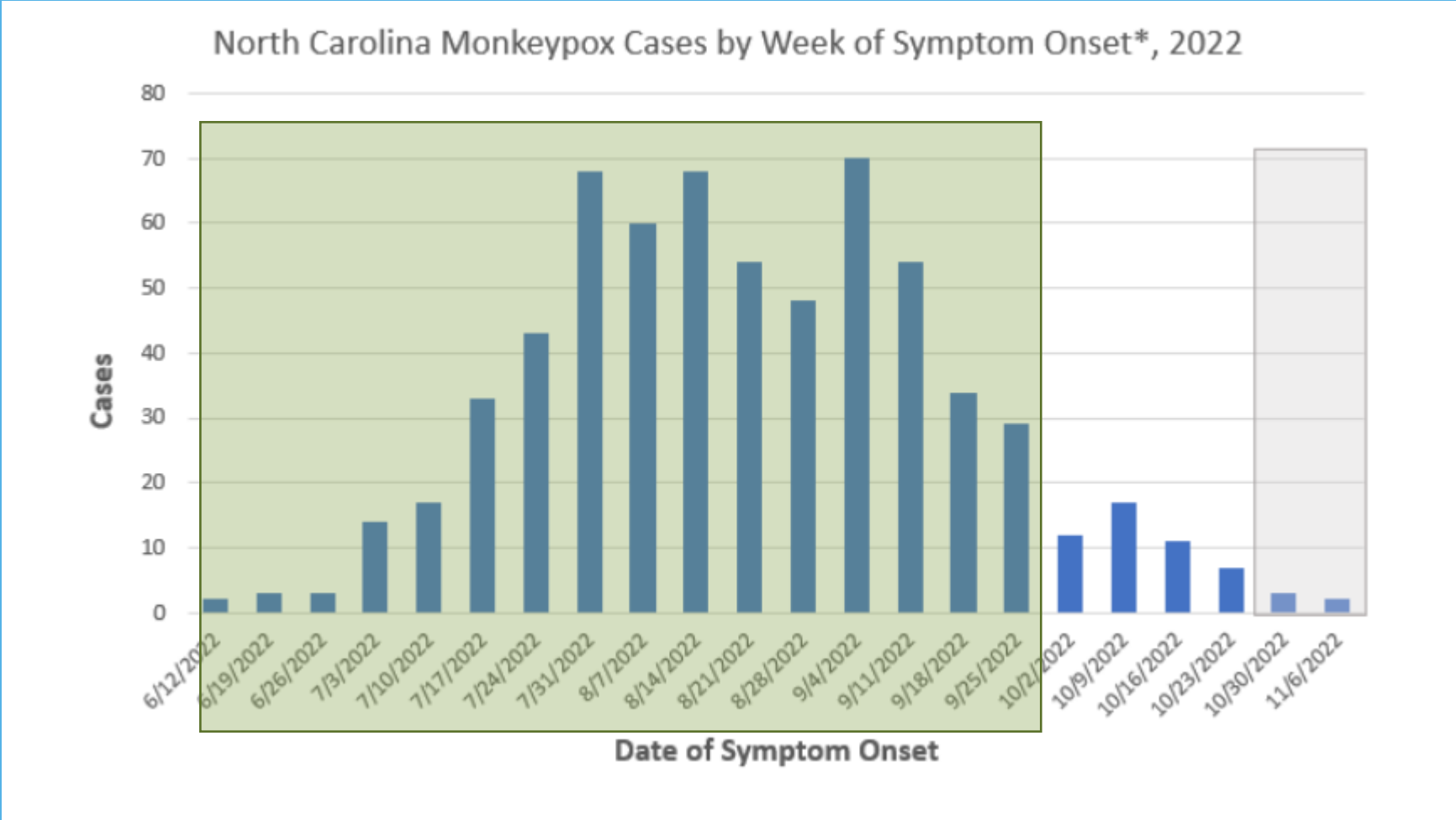


THE UNIVERSITY
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Background



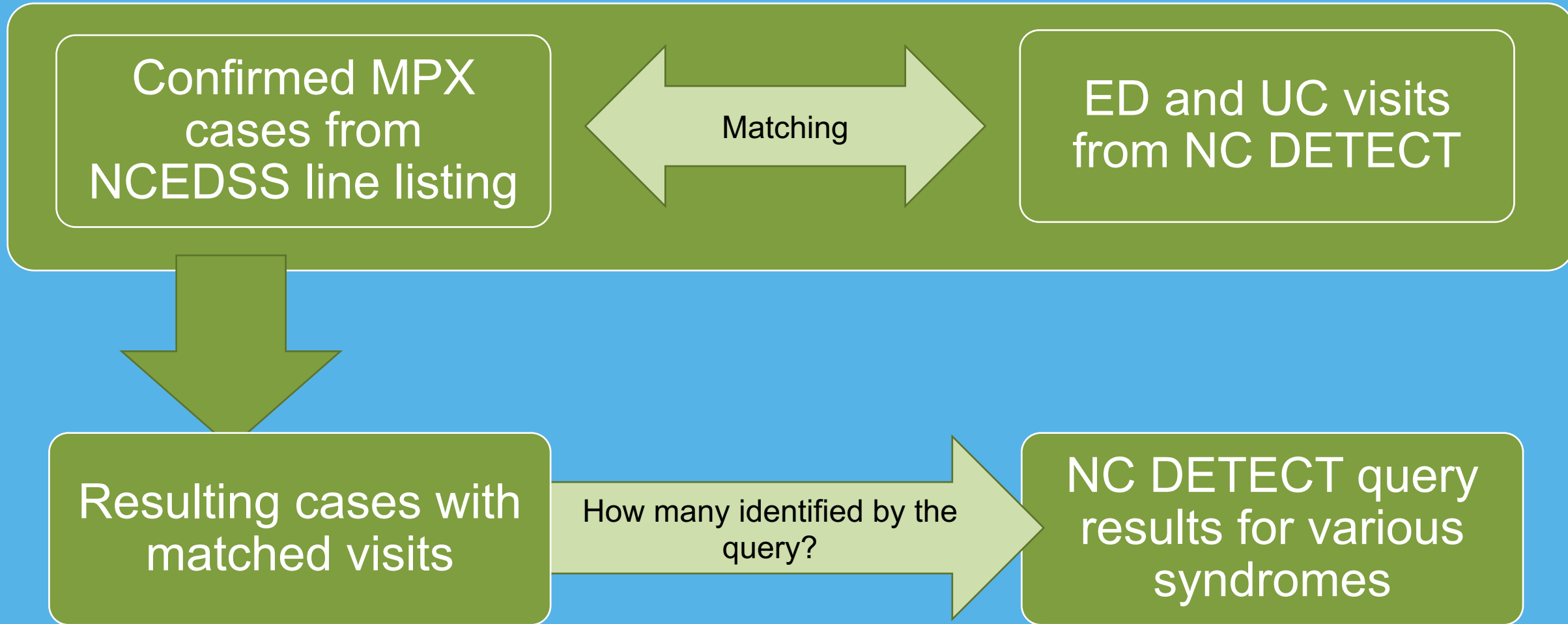
Epidemiologic overview of MPX Outbreak in NC



Goal: Case finding using Monkeypox as a test case

- When there is a need for case finding:
 - What is the ability for NC DETECT to perform case finding for a disease like Monkeypox?
 - How much effort would case finding take? What is the timeline and amount of work required for case finding?

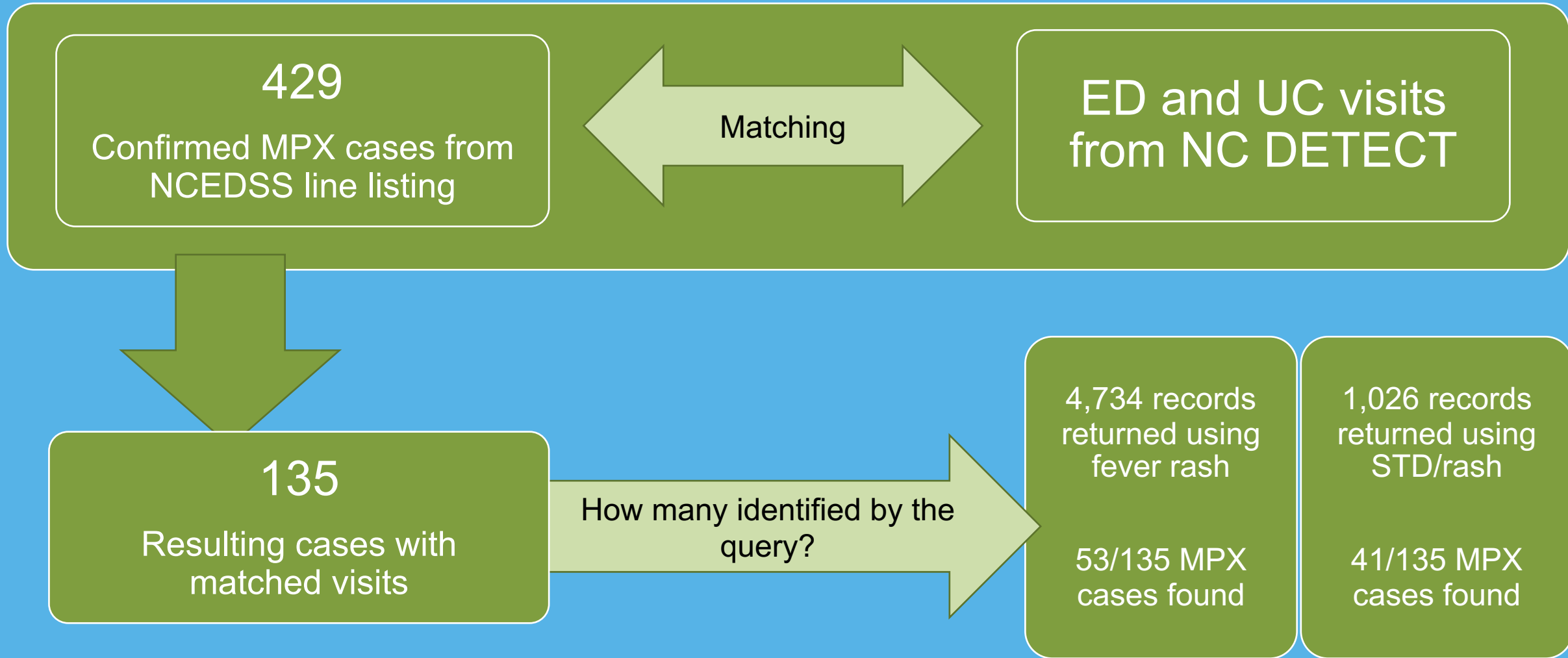
Methods



Methods - Definitions

- **Started with a fever/rash illness definition:**
 - Line listing review prompted the team to add these standalone terms: monkeypox or “monkey pox” or MPX
- **Early evidence suggested many Monkeypox patients were presenting after their fever had subsided**
 - Created a new definition using STD/rash terms, removing the fever component

Results



Results

- Our current definitions only found about 1/3 of confirmed cases
- For each confirmed case, the system pulled 25 times as many records (false positives).

	Number of cases
Number of confirmed MPX cases from June-September 2022 in North Carolina	429
Confirmed cases that matched an ED or UC visit	135
Confirmed and matched cases that were returned by an NC DETECT query using fever/rash	53/135
Confirmed and matched cases that were returned by an NC DETECT query using STD/rash	41/135

Discussion

- Difficulties in case finding using SyS data for Monkeypox
- Success in that no signal for wider community spread was seen
- Conditions that made case finding harder:
 - Unspecific symptoms that also match that of other diseases.
- Confirmed the need for syndrome definitions to be regularly reviewed and updated
- Limitations: matching may not have been exact.

Disclaimers

The North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) is an advanced, statewide public health surveillance system. NC DETECT is supported by the North Carolina Division of Public Health through a federal Public Health Emergency Preparedness Grant and is managed through a collaboration between NC DPH and the University of North Carolina at Chapel Hill Department of Emergency Medicine's Carolina Center for Health Informatics. The findings and conclusions in this [presentation or publication] are those of the author(s) and do not necessarily represent the views of the North Carolina Department of Health and Human Services, Division of Public Health



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Georgia Department of Public Health

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Firearm Syndromic Definition Assessment in Large Metropolitan Trauma Hospital in Georgia

December 07, 2022

Ashley Ryals, MPH
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Elizabeth Blankenship, MPH

Firearm Injury Surveillance through Emergency Room- FASTER

- The FASTER grant is CDC funded project that gives the state the opportunity to improve timeliness of firearm related injury surveillance through emergency rooms.
- Provide surveillance data to partners to facilitate the implementation of evidence-based strategies targeting Georgians at greatest risk of nonfatal firearm injuries.
- Conduct surveillance of nonfatal firearm injuries to assess changes and trends in firearm related injuries.

Definition and Data Gathering

CDC FA Definition Version 2

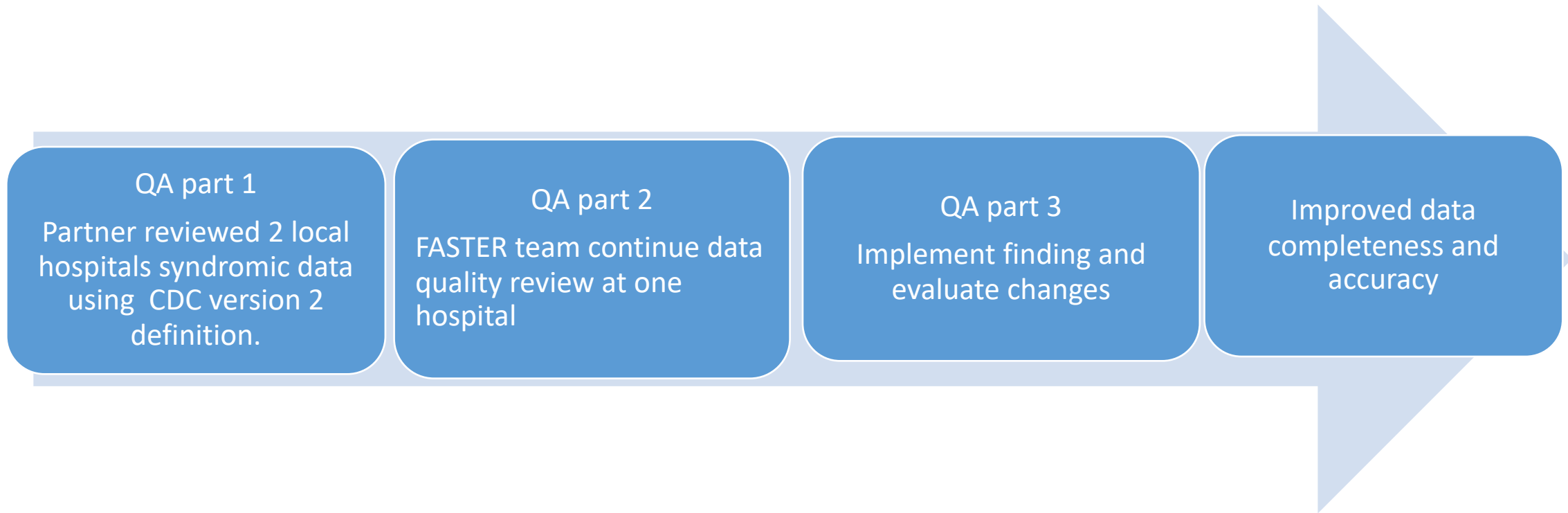
Chief complaint key words	ICD 10 codes
GSW	E922(.0-.3, .8-.9)
Gunshot	E955(.0-.4, .9)
Buckshot	E985(.0-.4)
Revolver	W32(.0-.1)
Rifle	W33(.0-.19)
shotgun	W34(.0-.19)
firearm	X72
pistol	X73(.0-.9)
Been shot, got shot, was shot	X74(.8-.9) X93
Gun wound	X94(.0-.9); X95(.8-.9)

- DPH Syndromic Surveillance team added the CDC Firearm Injury definition to the Georgia's Syndromic Surveillance.
- Majority of Georgia hospitals submitting Syndromic data use Chief Complaint for data submission out of these, 56% use ICD codes in addition to the Chief Complaint.
- CDC Version 2 definition (originally added) identified many erroneous cases such as old bullet wounds, history of gun shot wounds, injections etc....
- Quickly DPH team updated the existing definition to CDC Version 2 definition.

Definition Version 2

- Working from the CDC-version 2 definition, FASTER-GA team identified discrepancy between the programmatic script format and the table format of the definition.
- FASTER-GA team worked with the Syndromic Surveillance team to consolidate and update the definition as well as added exclusions based on data review.
 - ✓ Exclusions: injection, nail gun, allergy shot, past gun shot wound (any iteration of this i.e. hx of gsw, old gsw, old bullet), follow up, pain, swelling, and fever.

Quality Process



Quality Analysis Part 1

- Contracted with (Injury Prevention Research Center at Emory-IPRCE) to randomly select and review submitted firearm related-injury data for completeness and accuracy through Syndromic Surveillance
 - ✓ Grady Memorial, large metropolitan hospital in Atlanta
 - ✓ Children's Healthcare of Atlanta (CHOA).
- Using CDC's Ver 2 definition, Our Partner independently pulled cases from both hospitals.
- Hospital-based pulled data were compared to data pulled through the DPH Syndromic Surveillance System--SENDSS (State Electronic Notifiable Surveillance System).
- CHOA data completeness and accuracy issues were minimal. CHOA submitted syndromic data included chief complaint, ICD-codes and triage notes. Data review was easy as CHOA pull all firearm related injury into their hospital-based trauma registry.
- Grady hospital—Approximately 20% of all Grady cases were missing comparing DPH Syndromic Surveillance vs Grady based data pull.

Quality Analysis Part 2

- Focus Review on Grady hospital data
- Based on DPH Syndromic Surveillance lead request—FASTER-GA team verified that DPH definition implemented is similar to the contractor definition.
- Discussion with Grady's Informatic team (Business Intelligence and Syndromic Team) to discuss findings.
- New 2-week time frame agreed on to pull data from DPH and Grady. As Grady's syndromic data were saved for 3 days only; Grady expanded saving of syndromic file from 3 days to 90 days.
 - 48 Firearm related injuries were identified by Grady, while 32 cases were identified from DPH.
 - 19 of the 48 Grady cases were missing in the DPH Syndromic Surveillance file
 - 5 of the 32 cases in DPH Syndromic Surveillance file were missing from Grady's file

	DPH	Grady	% Agreement
Grady	27	48	56.2%
DPH	32	29	90.6%

Findings of Grady Data

FASTER-GA team and Grady team Second Discussion and findings review

- Missed cases identified as STAT-PACK cases--Grady assigns temporary IDs (STAT-PACK) to patients that are unconscious or incoherent so that they can receive treatment.
 - 5-cases were duplicative and not missed.
- Grady only submits chief complaint, ICD-10 codes are missing 100% of the time, thus limits the full use of the CDC Firearm Syndromic Definition. (ICD-10 Add accuracy to chief complaint)
- Needed additional time to review Grady's submitted file to Georgia Syndromic Surveillance.
- Grady team requested DPH Syndromic Surveillance team to be involved in the discussion as DPH requested the submission of STAT-PACK cases.

Findings of Grady Data

DPH Syndromic Surveillance Representative, FASTER-GA team and Grady BI team 3rd discussion and findings review:

- Grady Informatic team added HL7-ADT segment "A03" which includes ICD-10 discharge codes and "A04" preliminary diagnosis and discharge notes to improve accuracy.
 - FASTER-GA team expect to receive more cases –cases admitted and discharged from ER.
 - FASTER-GA team expect to improve on data accuracy-triage/discharge notes and ICD codes.
- Maintained the expanded time to save syndromic file for review.
- Agreed to review a new 2-week period April 25 to May 9, 2022.
- FASTER-GA team and Grady Medical Record team suspect this change still missing those who were admitted through ER but discharged to in-patient care or (ADT segment A08 for ER).
- DPH Syndromic Surveillance and Grady Syndromic teams are cautious
 - Suspect too many cases might be transmitted and might crash the system
- DPH Syndromic Surveillance team added Ethnicity variable to be viewed by FASTER-GA team.

Quality Analysis Part 3-Evaluation

Round three of data review--To evaluate changes implemented by Grady Business Intelligence Team and DPH Informatic team

- Took place from April 25 to May 9, 2022.
- Less STAT-PACK cases due to increased time to update demographics
- DPH and Grady had more matches by adding ICD-10 code and triage notes to chief complaint
- Increased from 80% match to 93% match



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Abigail Gates, MSPH - CDC
Jennifer White, MPH – New York State
Department of Health



Validation of a Syndromic Surveillance Definition for Lyme Carditis — New York, 2017–2021

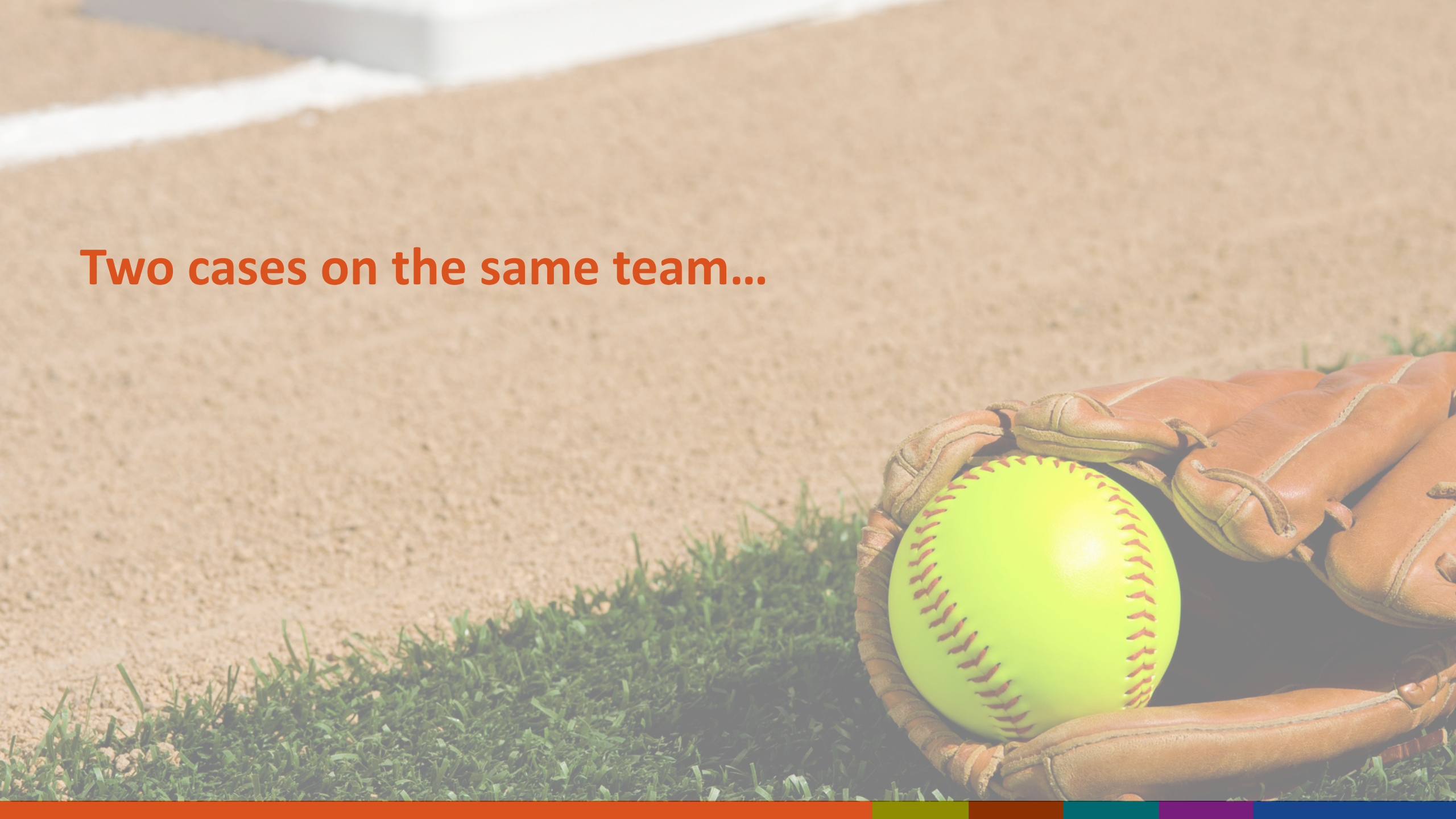
Amy Beeson, Jennifer White, and Abigail Gates

CSTE 2022 Syndromic Surveillance Symposium

7 December 2022

A decorative horizontal bar at the bottom of the slide, composed of several colored rectangular segments in orange, olive green, brown, purple, and blue.

Two cases on the same team...



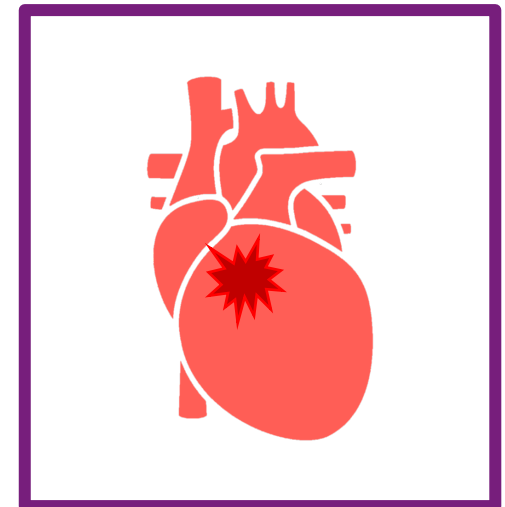
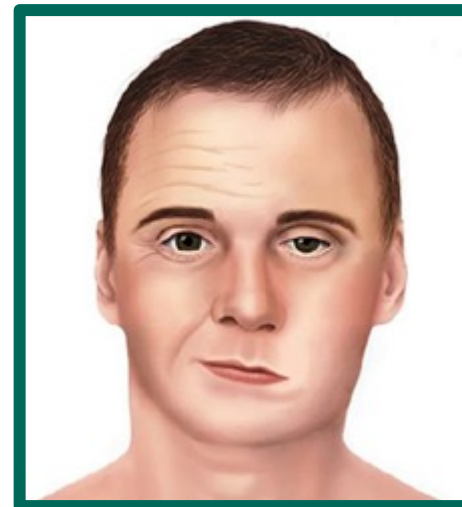
Lyme carditis is a rare but severe form of Lyme disease (LD).

- Disseminated manifestation
- Potentially fatal
- Surveillance is challenging, as data on specific LD manifestations are not routinely collected



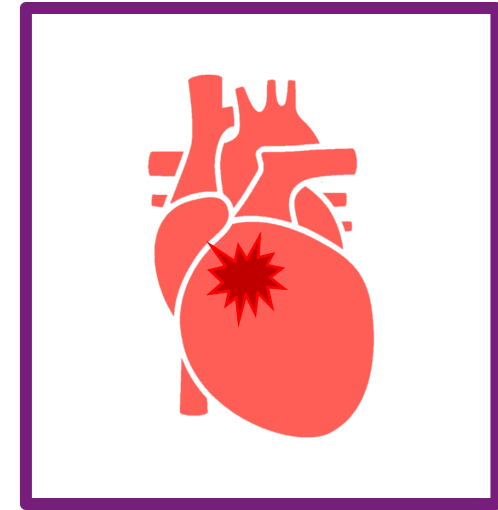
LD surveillance does not capture Lyme carditis cases.

- Estimated 476,000 cases diagnosed and treated annually; 35,000 reported cases in 2019
- Surveillance does not differentiate between clinical manifestations of LD



We looked for a Lyme carditis cluster.

- New York's regional health information exchange system to examine cases known to NYSDOH
- Syndromic surveillance to determine if there were additional cases



We collaborated with NYDOH and across CDC.



Department
of Health



Division of Vector-
Borne Diseases /
Bacterial Diseases
Branch

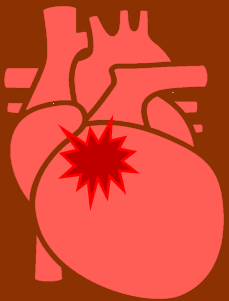


We developed and tested a syndromic surveillance definition in NSSP's ESSENCE platform.



Lyme disease in:

- Discharge diagnoses (ICD 9/10, SNOMED), or
- Chief complaint text



Myopericarditis/heart block in:

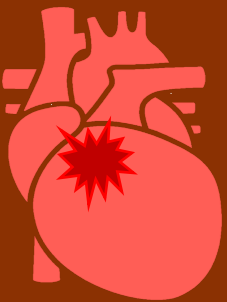
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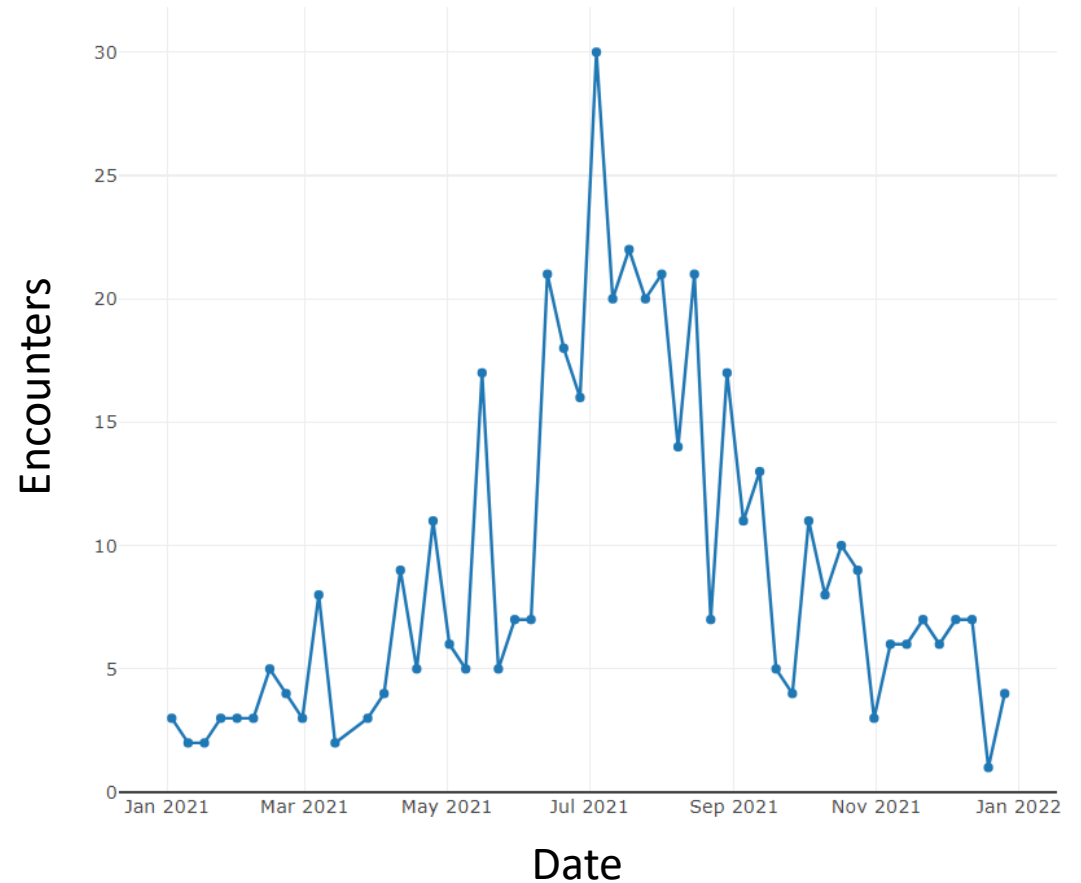
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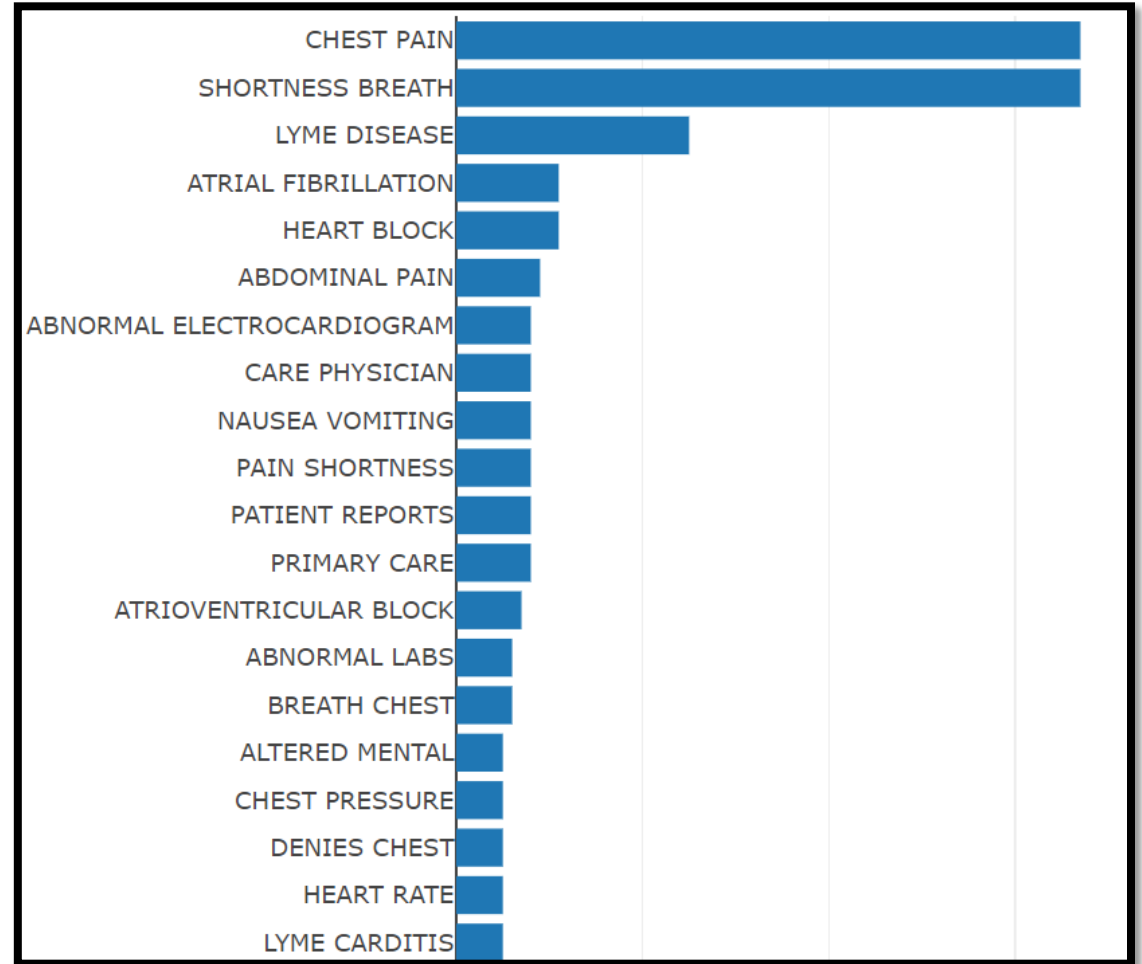
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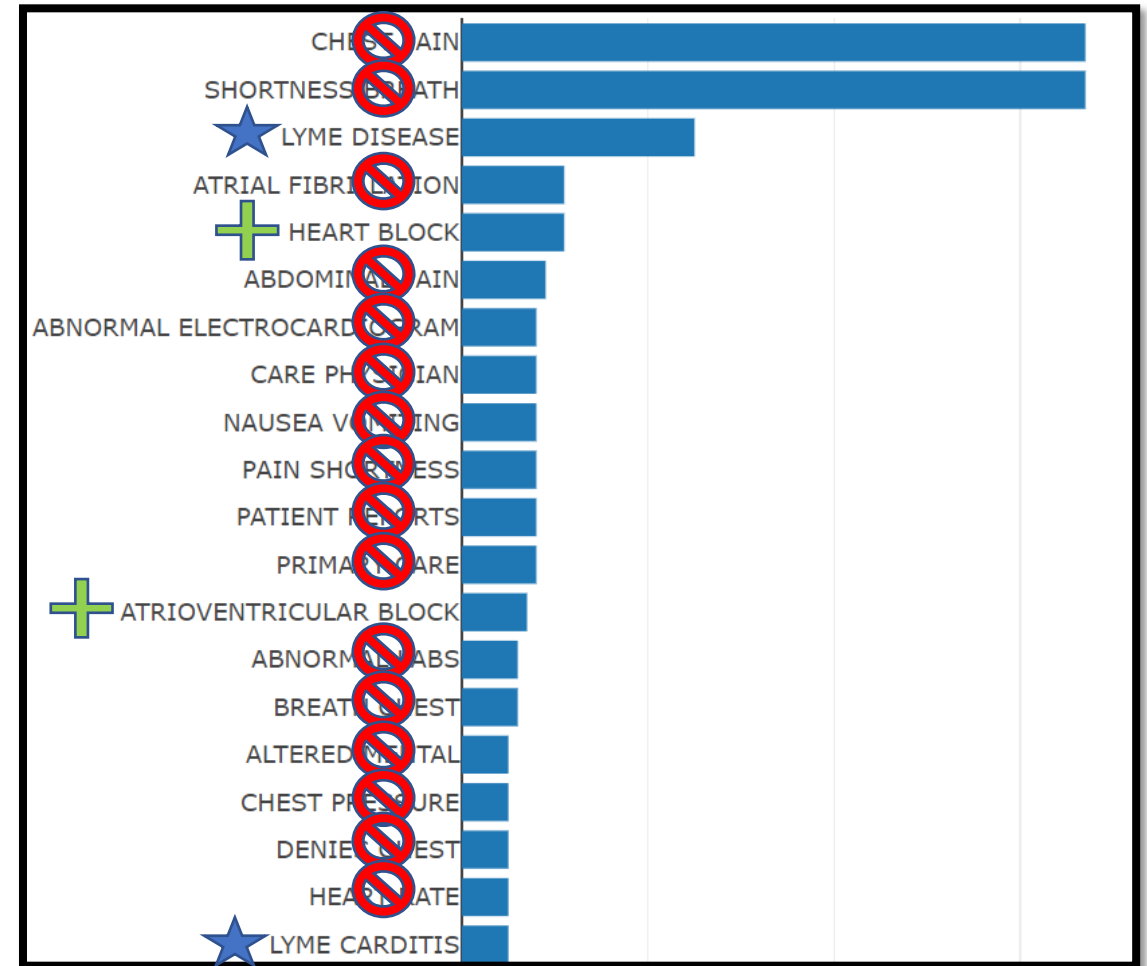
We refined the definition...

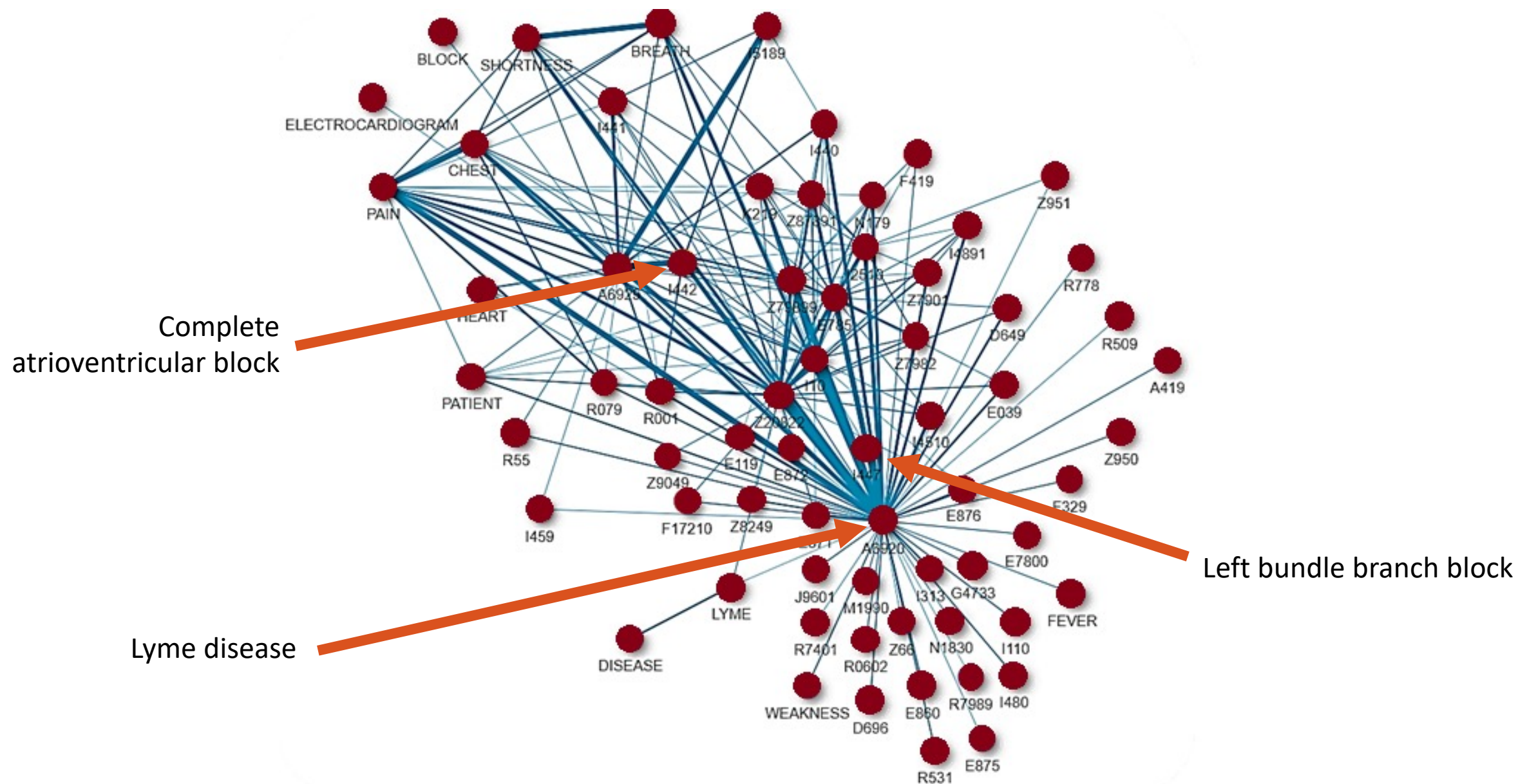
- Reviewed text mining report including “n-grams”
- Added chief complaint terms that were specific to a compatible cardiac syndrome
- Did not include terms that were not specific, e.g. “chest pain” and “heart rate”



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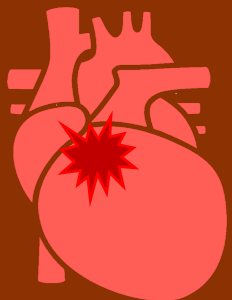


We finalized the definition...



Lyme disease in:

- Discharge diagnoses (ICD 9/10, SNOMED), or
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Myopericarditis/heart block in:

- Discharge diagnoses (ICD 9/10, SNOMED), or
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(, ^lyme^, or, (, (, ^lime
^, or, ^lime, or, lime^,), AND, ^disease^,), or, (, ^Bull^,
AND, ^Eye^, AND, ^Rash^,), or, ^[:/]A69.2^, or, ^[:/
]A692^,), ANDNOT, (, ^history l[iy]me^, or, ^history
of l[iy]me^, or, ^lyment^,) ^, or, ^[:/]088.81^, or, ^[:/
]08881[:/]^

^[ICD-9, ICD-10, or SNOMED codes for
myocarditis, pericarditis, or heart block]^, or, ^AV
block^, or, ^atrioventricular block^, or, ^heart
block^, or, ^heartblock^, or, ^complete
heart^, or, ^degree block^, or, ^degree
heart^, or, ^carditis^

We applied the definition to New York state's syndromic surveillance platform.

- 2017–2021
- NYC excluded
- 70% of New York emergency departments contribute data

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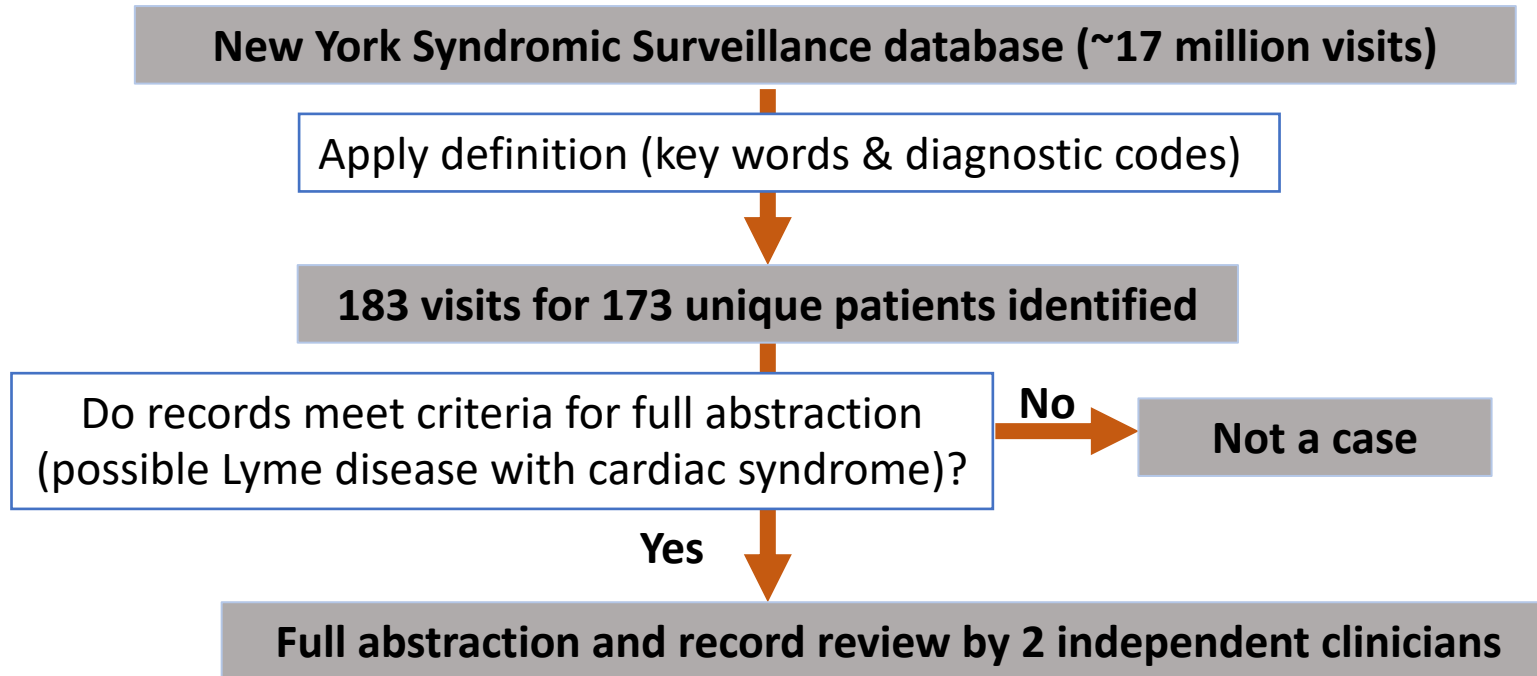
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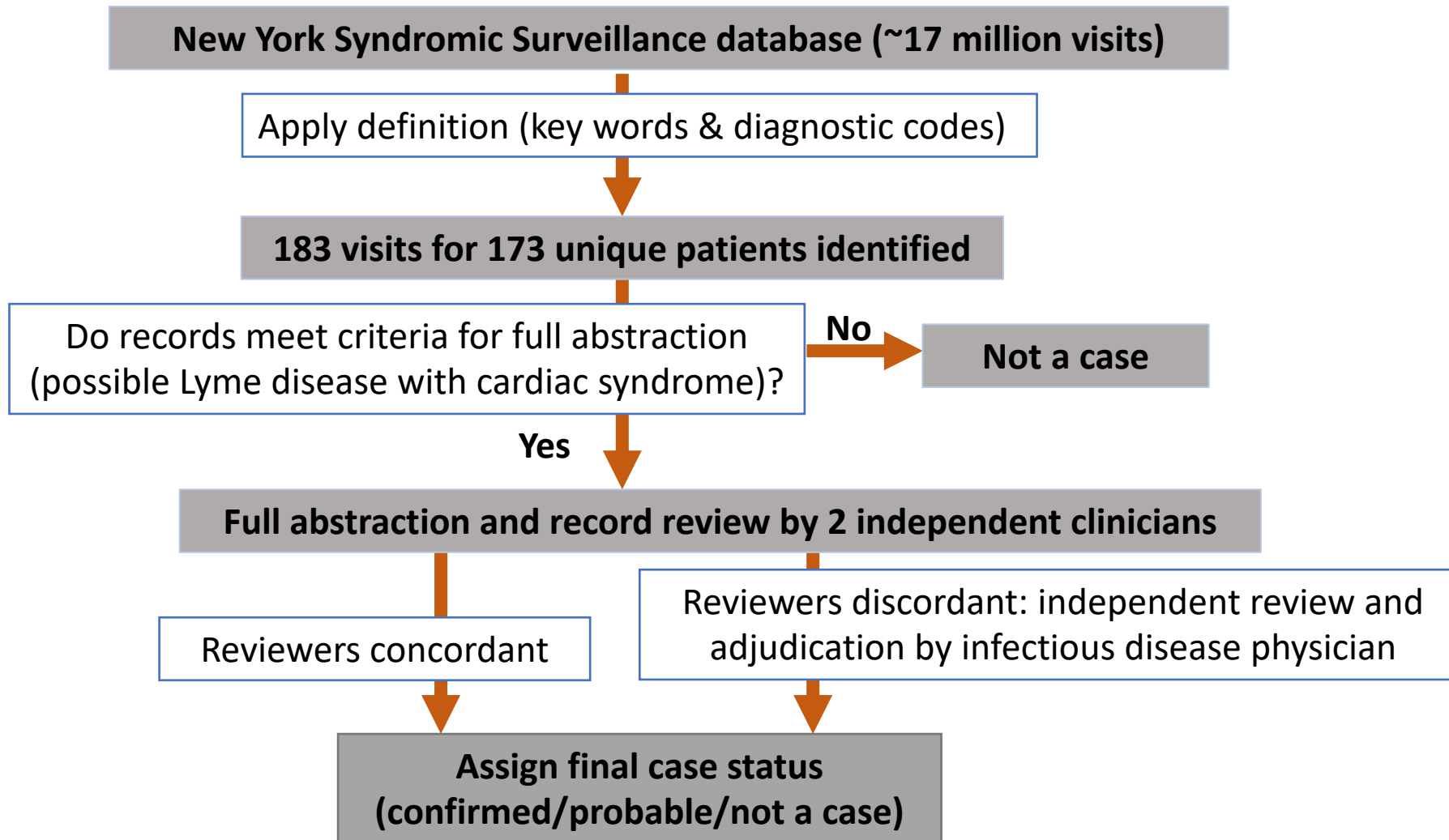
We cross-referenced New York's regional health information exchange system.

- Statewide Health Information Network for New York (SHIN-NY)
- Connects New York's regional health information networks that store and share patient health information
- With appropriate public health surveillance permissions, allows users to review electronic medical records

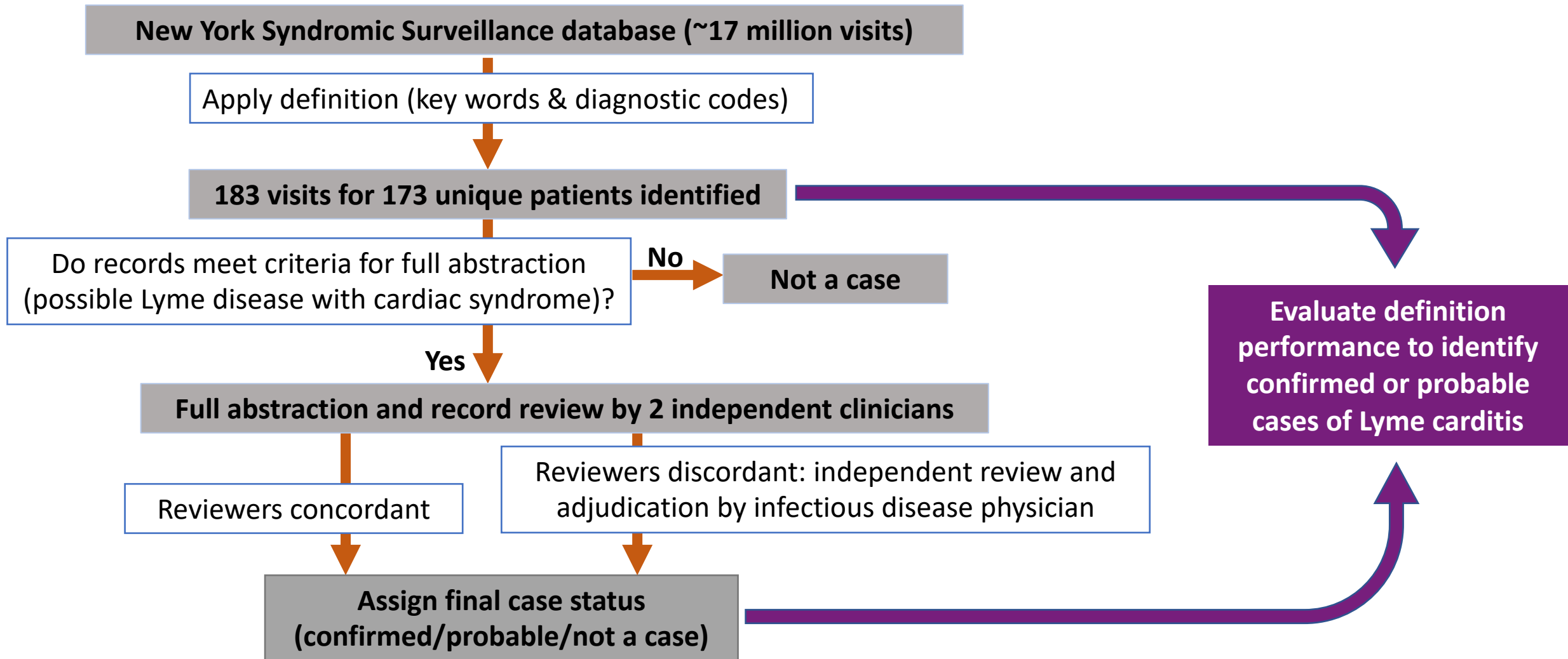
We developed a process to validate the definition through chart review.



We developed a process to validate the definition through chart review.



We developed a process to validate the definition through chart review.



We used a systematic clinician review process.

Confirmed

1. New-onset ECG findings consistent with Lyme carditis unless these are clearly attributed to an alternative cause, AND
2. Meeting lab criteria for LD (within 90 days of visit) OR EM rash documented by clinician (≤ 90 days prior to onset of cardiac syndrome), AND
3. Lyme carditis diagnosis by treating clinician

Probable

1. New-onset ECG findings consistent with Lyme carditis unless these are clearly attributed to an alternative cause, AND EITHER
2. NOT meeting lab criteria for LD (within 90 days of visit) AND NO EM rash documented (≤ 90 days prior to onset of cardiac syndrome) OR
3. NO Lyme carditis diagnosis by treating clinician or Lyme carditis considered equally likely as another diagnosis

Not a Case

Individuals with NO new-onset ECG findings consistent with Lyme carditis or with a clear alternative diagnosis to explain ECG findings

We clearly defined ECG criteria and LD lab criteria.

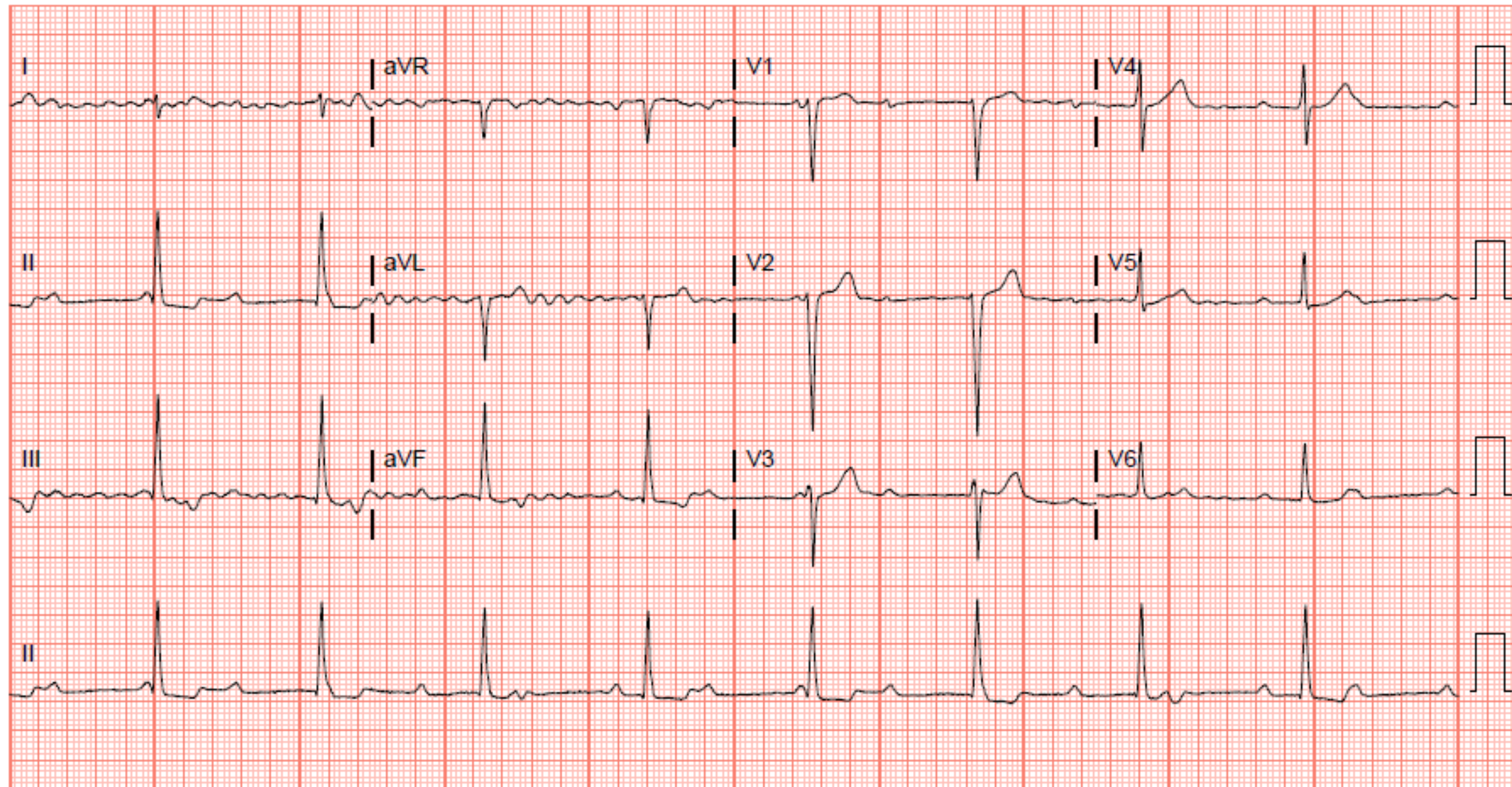
ECG Criteria

1. Atrioventricular block (1st, 2nd, or 3rd degree), **OR**
2. Right or left bundle branch block, **OR**
3. New-onset atrial fibrillation or atrial flutter, **OR**
4. T-wave inversion, **OR**
5. ST segment elevation, **OR**
6. Prolonged QT interval
7. Bradycardia

LD Lab Criteria

1. Isolation of *B. burgdorferi* sensu stricto or *B. mayonii* in culture, **OR**
 2. Detection of *B. burgdorferi* sensu stricto or *B. mayonii* in a clinical specimen by a *B. burgdorferi* group-specific nucleic acid amplification test assay, **OR**
 3. Detection of *B. burgdorferi* group-specific antigens by immunohistochemistry assay on biopsy or autopsy tissues, **OR**
 4. Positive two-tier serologic test, defined as either:
 - a. (positive or equivocal total antibody screen in “other” field **OR** positive or equivocal IgM screen **OR** positive or equivocal IgG screen) **AND** (positive IgM immunoblot **OR** positive IgG immunoblot), **OR**
 - b. positive test according to modified two-tier test criteria (noted as MTTT in “other” field),
- OR**
5. Positive single-tier IgG Western blot

- Abnormal ECG -



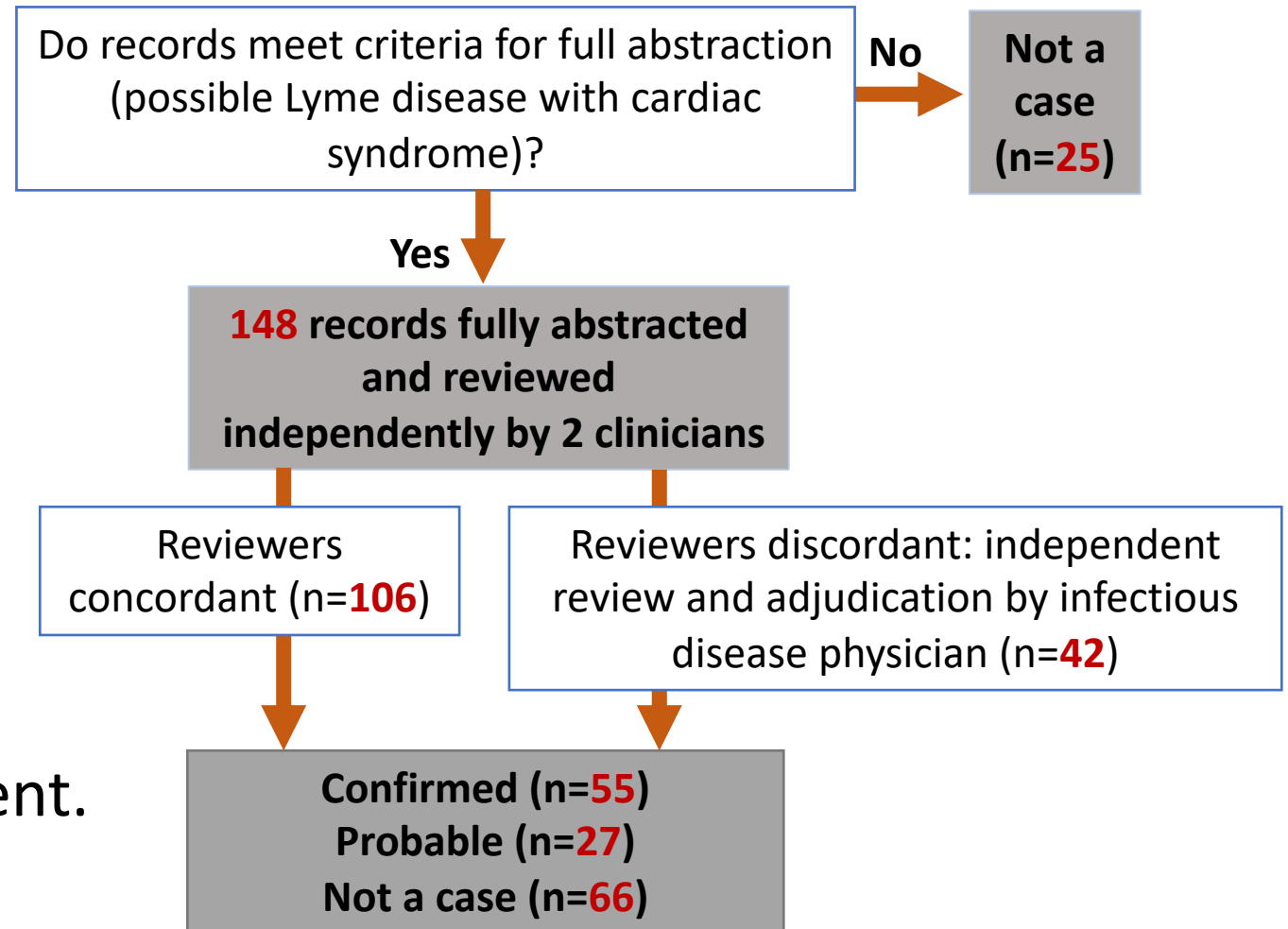
MAC55-1

25 mm/sec

10.0 mm/mV

60~ 0.15 - 150 Hz

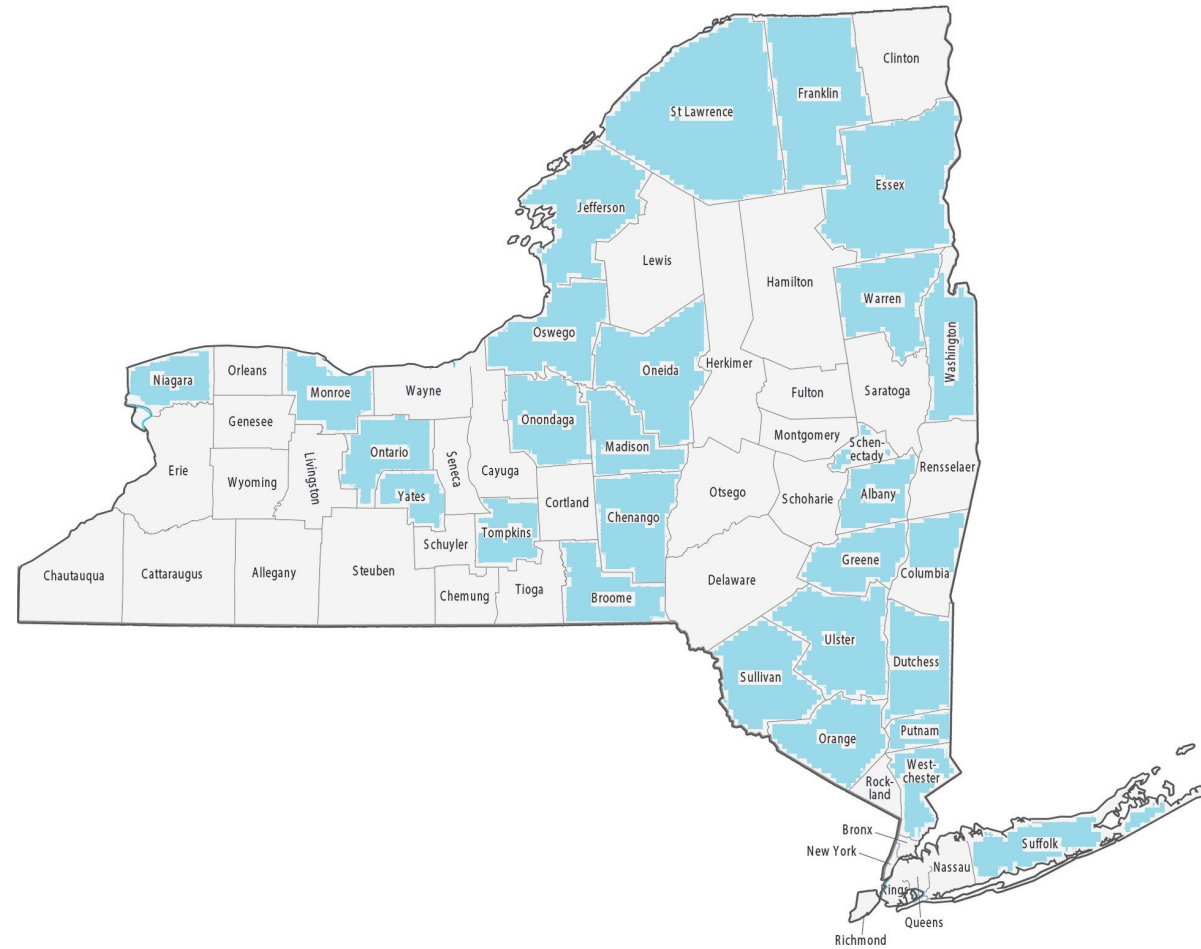
Reviewers concurred in most cases.



- Kappa statistic was 0.66, indicating substantial agreement.

We identified 82 cases of Lyme carditis.

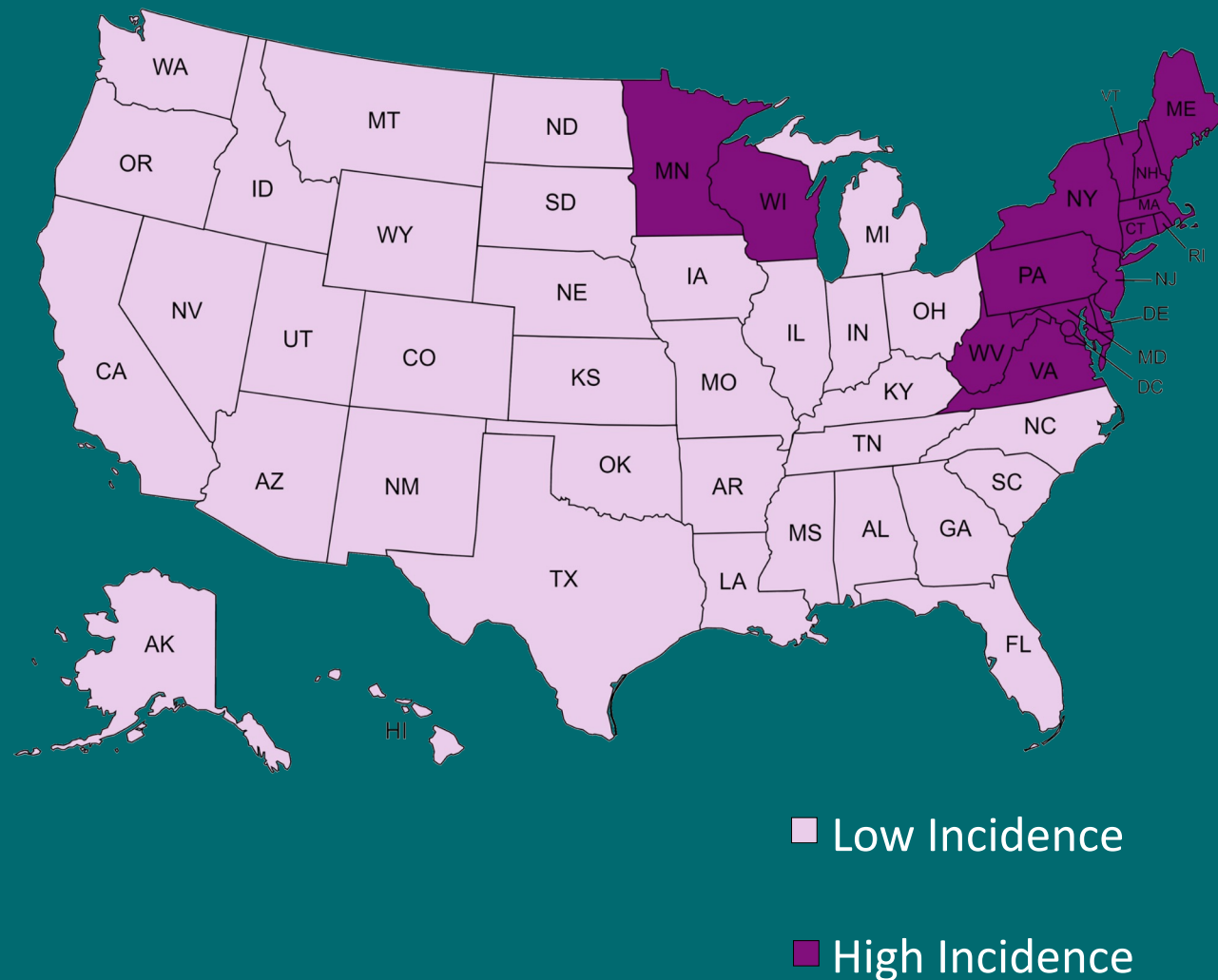
- **Positive predictive value was 47%**
- No temporal or spatial clusters of Lyme carditis were identified
 - Cases occurred in 28 of New York's 57 counties
 - Most (69%) occurred during May–September



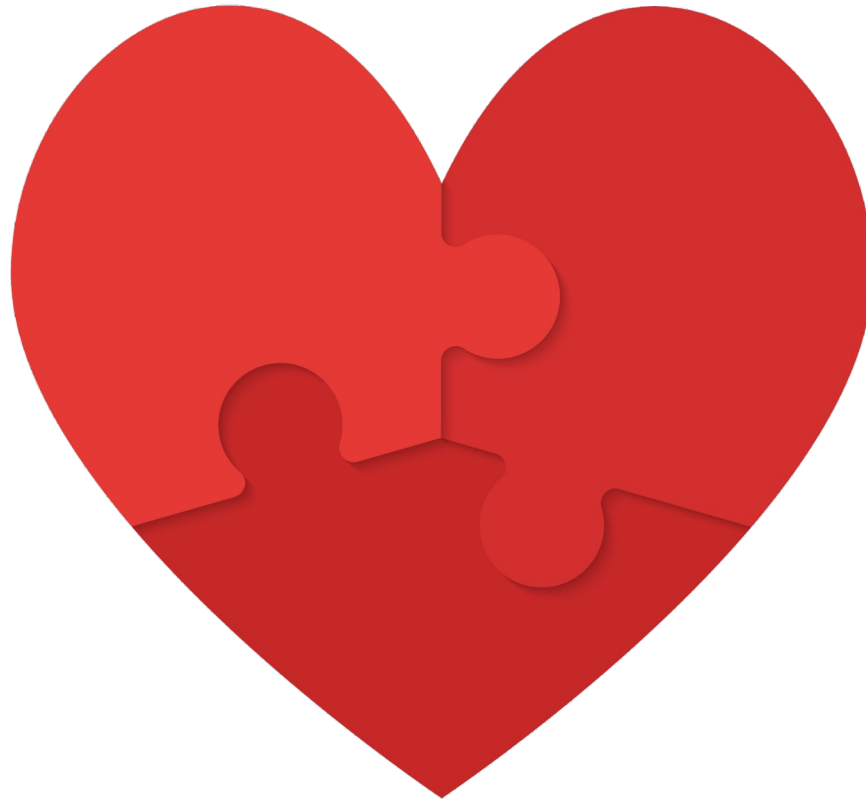
We described characteristics of Lyme carditis cases.

- Median age was 62
- 71% were male
- 51% had positive IgG; 55% had positive IgM
- 67% had second- or third-degree AV block

This definition can be useful within syndromic surveillance systems in areas of high Lyme incidence to detect changing disease patterns, including temporal or spatial clusters of Lyme carditis.



Collaboration is essential.



Next steps

- Report findings in a manuscript
- Apply this definition in other Lyme-endemic states
- Develop definitions for other clinical manifestations of LD

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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Paul Mead, CDC



National Syndromic Surveillance Program

Community of Practice

Resources that Advance the Science and
Practice of Syndromic Surveillance



2022

Syndromic Surveillance Symposium

December 6–8, 2022



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