

Highlighting SucceSyS – SyS for Surveillance and Monitoring

4:15 PM EST | December 6th, 2022 | 2022 SyS Symposium

Moderator:

- Jessica Pavlick, DrPH, MPH – Georgia Department of Public Health

Presenters:

- Bridget J. Anderson, PhD – NYSDOH
- Hannah Collins, MPH – Seattle & King County Public Health
- Graham Crawbuck, MS – Washington State Department of Health
- Walaa Elbedewy, MBBCh, MPH, MPA – Georgia Department of Public Health



Council of State and Territorial Epidemiologists



Bridget J. Anderson, PhD
NYSDOH





**Department
of Health**

Utilization of Syndromic Surveillance for Case Finding During Polio Outbreak in New York State (excluding NYC), 2022

**Bridget J. Anderson PhD, Youjung Byun PhD MPH, Michele McClenaghan RN,
Charlene Weng MS, Yisen Zheng MPH**

Presenter: Bridget J. Anderson, PhD

Date: December 6, 2022

Background



When: July 2022



Where: Rockland County, New York



Who: a young adult presented with acute flaccid weakness:

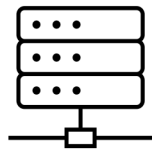
- Respiratory symptoms
 - Fever
 - Gastrointestinal symptoms
 - Limb weakness/paralysis
- **Vaccine-derived poliovirus type 2 (VDPV2)** was detected in stool specimens obtained on days 11 and 12 after initial symptom onset

Investigation described: <http://dx.doi.org/10.15585/mmwr.mm7133e2>



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Methods



NYSDOH SS (excluding NYC):

- 133 statewide hospital emergency departments report

Query



Queries based on ICD-10 codes and text strings indicative of:

1. Polio/acute flaccid paralysis (AFP)/acute flaccid myelitis (AFM) - daily
2. Guillain-Barre syndrome (G61.0) - biweekly
3. Post-polio syndrome (G14) - biweekly



Queries produce statewide lists of patient admissions; Investigation and active follow-up occur for persons under investigation (PUI) who are:

- Age 35 years and younger
- Reside in counties with poliovirus detections in wastewater
 - <https://health.ny.gov/diseases/communicable/polio/wastewater.htm>
- Unvaccinated or under-vaccinated for polio
- Otherwise very high suspicion



Results

- Daily average of 25 records appended to the suspected polio/AFM/AFP PUI roster
- To date, 2,313 records have been reviewed
 - 479 (21%) met age restrictions (35 and younger)
 - 352 (15%) resided in counties with wastewater detections
 - 49 met both age/residence criteria – these received extensive medical record review
 - Six had a sufficiently high level of concern, including unvaccinated/under vaccinated/unknown poliovirus vaccination status, to request specimen for poliovirus testing at the NYSDOH Wadsworth Center
 - Specimen was available for all
- To date no additional poliovirus cases have been detected, including none of the 13 coded with acute poliomyelitis ICD-10 codes (A80 and all sub-categories)

Discussion

Overall, SS has been effective in identifying suspected polio/AFM/AFP PUIs

- However, the follow up is tedious and labor intensive
- Incomplete/poor quality of reported SS data
 - NYS SS returns only DOB and MRN, not patient name, at times challenging patient identification, delaying follow up, and availability of specimen for testing
 - ICD-10 errors and other coding anomalies
 - A80 acute poliomyelitis versus G14 post polio syndrome
- Delayed access to complete medical records necessitated follow up with hospital ICP and other clinical staff
 - Impacts availability of specimen for testing
- Vaccination status, important for prioritization, is not returned as part of the query and requires manual verification in immunization registry

- SS reporting in NYS is voluntary and does not capture care provided in many settings (primary care, urgent care, etc.)
- Care-seeking in hospitals outside of the NYS SS catchment area complicates the identification PUIs, particularly when specialized care is most accessible in an adjoining area outside of the SS coverage area (e.g., metro NYC hospitals)
 - For example, though a resident of NYS outside of NYC, the original case was not detected by NYS SS as the hospitalization occurred in NYC
 - Currently collaborating with NYCDOHMH to identify rest of state PUIs
- Diagnostic coding issues were common and likely related to data entry errors as well as innate quality issues in voluntary surveillance systems
 - These coding issues resulted in the flagging of irrelevant records that needed to be reviewed and ruled out

Questions?

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Monitoring emergency department visits for heat-related illness in King County, WA, 2021- 2022

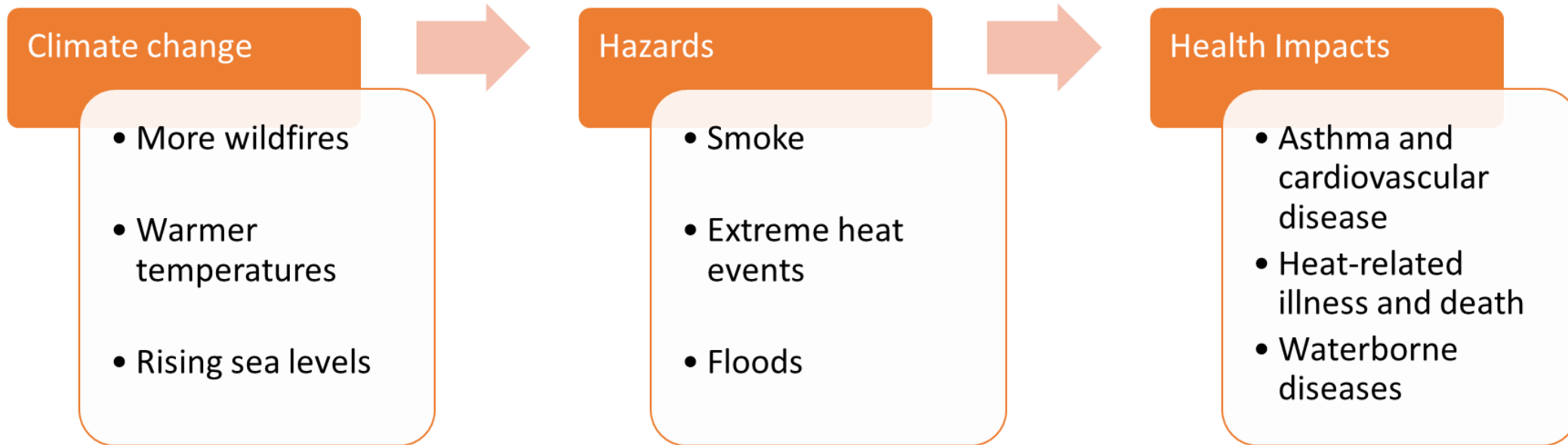
Hannah Collins, MPH

Graham Crawbuck, MS

Agenda

- Background
 - Health impacts of climate change
 - Responding to extreme heat in King County
- Methods
- Results: Heat-related illness in 2021 and 2022
- Using syndromic surveillance in practice
- Discussion and limitations

Health impacts of climate change



Heat-Related Illness (HRI)

- Dehydration
- Heat cramps
- Heat exhaustion
- Heat stroke

Other indirect impacts (drowning, cardiovascular events, etc.)

‘Heat dome’ may push Western Washington temperatures into record-breaking territory

June 20, 2021 at 12:27 pm | *Updated June 20, 2021 at 7:04 pm*

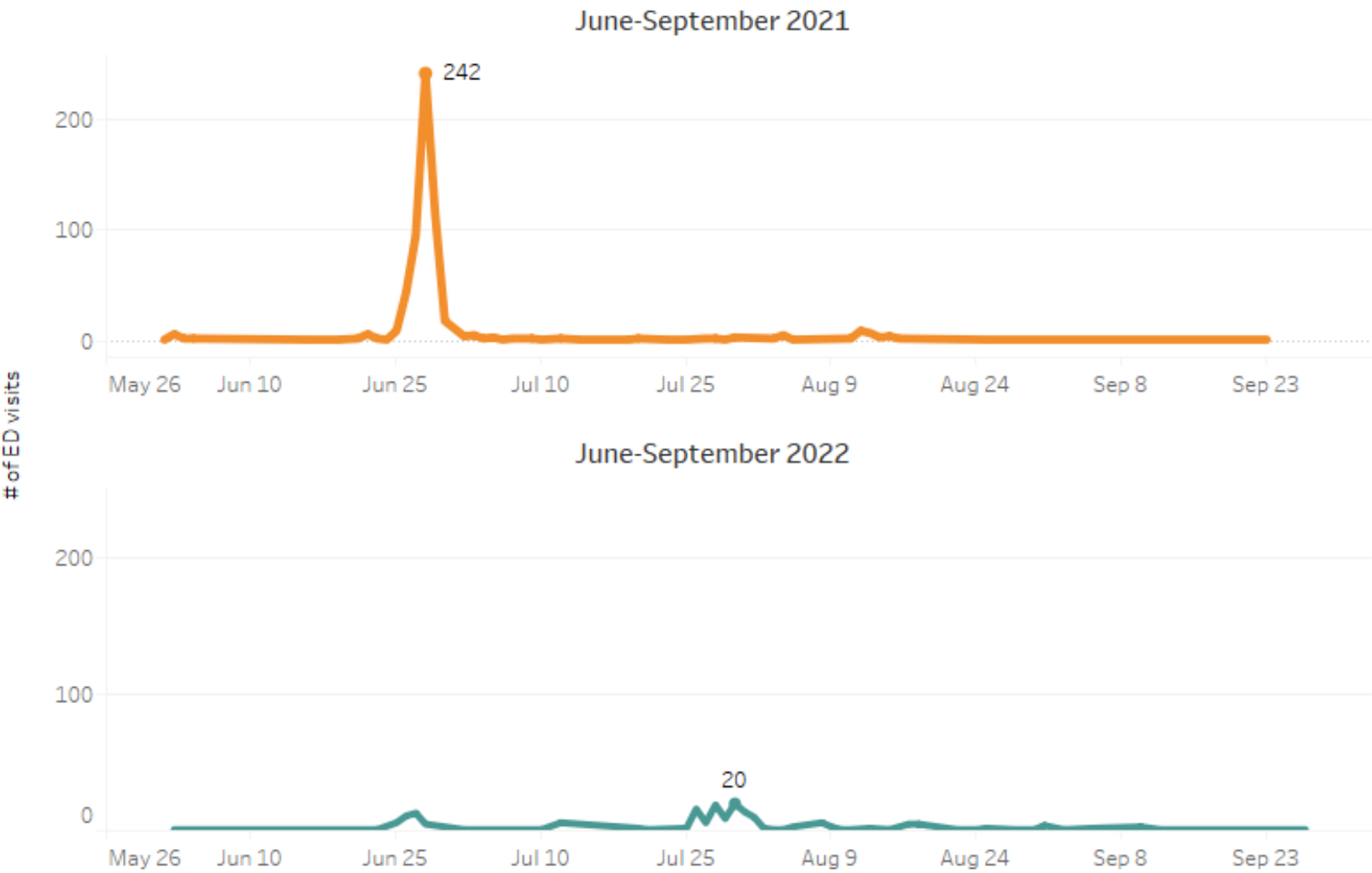


- Pacific Northwest was forecast to experience a major heat event in late June 2021
- PHSKC stood up incident management and used daily syndromic surveillance reports to inform equitable response
- After heat dome, we continued to surveil routinely during the summer months

Methods

- All EDs in Washington State are required to submit to the Rapid Health Information Network
- Timeframe: June-September 2021 & 2022
- King County facilities
- Reported overall count/rate and demographics of 5 syndromes:
 - Heat-related illness
 - Renal Failure
 - Drowning
 - Cardiovascular Disease
 - Respiratory Illness

Daily number of emergency department visits for heat related illness in King County, 2021-2022



Metric	June-Aug 2021	June-Aug 2022
Days > 90 degrees	8	13
Days > 100 degrees	3	0
Count of ED visits for HRI	741	260
Rate of ED visits for HRI	297.1 per 100,000 visits	94.8 per 100,000 visits
% change in # of ED visits for HRI from '21 to '22	-	↓ 65%

Demographics of those visiting EDs for heat-related illness

Demographic characteristic	Percent of all ED visits - 2021	Percent of all ED visits - 2022	Percent of King County Population ¹
Race/ethnicity ²			
AI/AN	2.7	^	1.0
Asian	10.3	8.5	19.3
Black	10.5	10.8	7.2
Hispanic or Latino	5.9	6.9	10.3
NH/PI	1.6	^	0.9
Another race	7.4	8.5	NA ³
White	66.1	65.0	66.1
Age Group			
80+	19.7	11.9	2.7
70-79	15.1	13.5	5.5
60-69	14.3	11.2	9.7
50-59	11.2	8.8	11.8
40-49	11.3	12.3	13.4
30-39	9.3	16.5	18.4
20-29	12.1	13.1	15.9
10-19	3.1	7.3	11.3
0-9	3.8	5.4	11.3

ED: Emergency department; AI/AN: American Indian and/or Alaska Native; NH/PI: Native Hawaiian and/or Pacific Islander

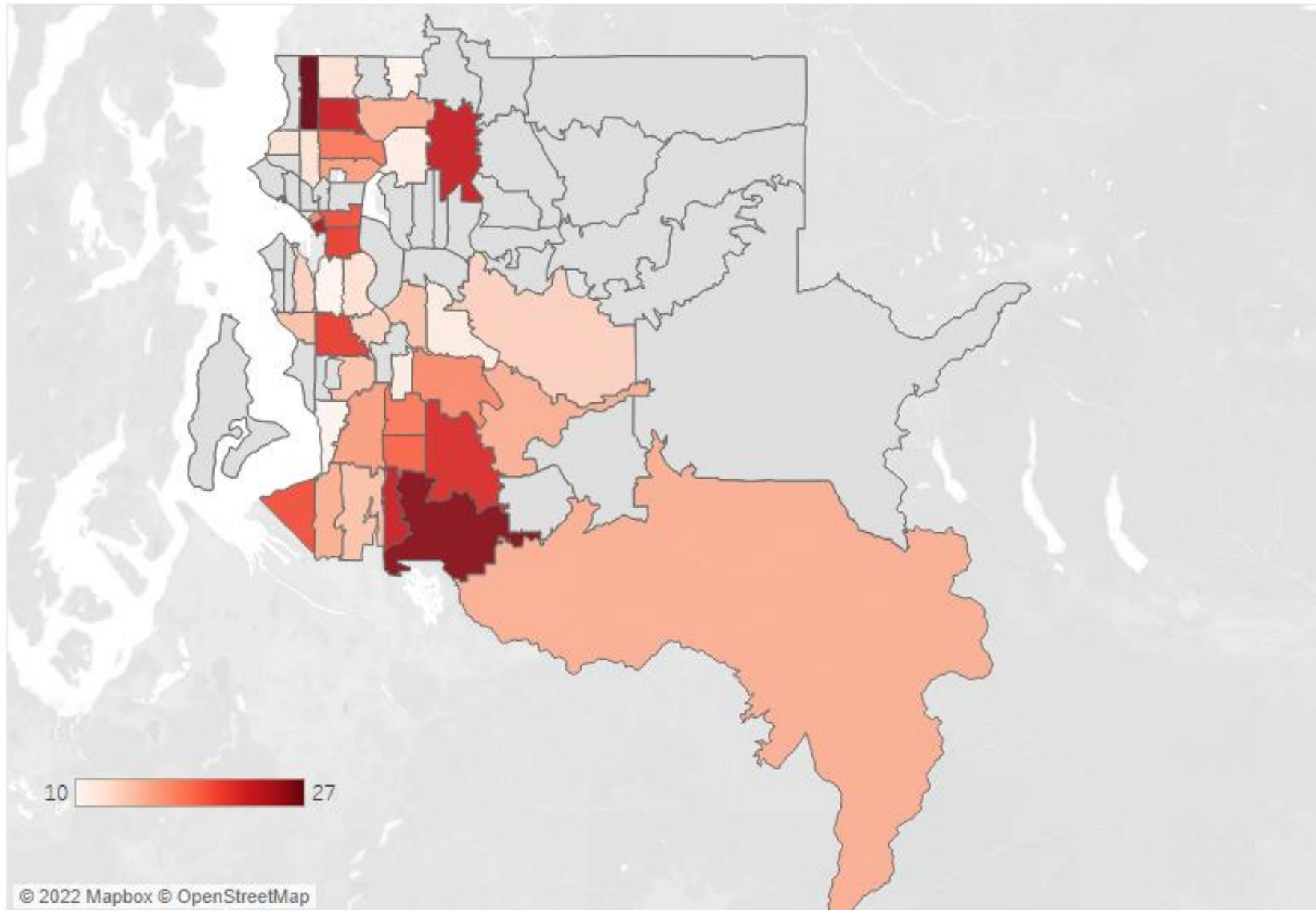
¹Population estimates from the Washington State Office of Financial Management’s (OFM) report for 2020.

²Individuals may identify as multiple races or ethnicities. Total percent for race/ethnicity will add to greater than 100%.

³OFM does not estimate the population of those identifying with additional racial categories.

^ Data are suppressed to protect confidentiality

Heat Related Illness by zip code in King County, WA, June-September 2021 & 2022



Data for ZIP codes with fewer than ten visits are suppressed to protect confidentiality.

Using syndromic surveillance data in real-time practice

- Data from heat events and other climate-related weather events are used to:
 - Inform preparedness and emergency response partners
 - Target where resources should be directed with a focus on equity
 - Understand the impacts of these events on people's health and how they're changing over time
 - Inform the public through communications
 - Plan for future events

Discussion

- Syndromic data described how two summers of extreme heat impacted the health of hundreds of King County residents
- Syndromic surveillance has many advantages
 - Available in near real-time
 - Ability to analyze data with a focus on equity
 - Demographic and geographic characteristics
 - Can define new syndromes quickly and identify additional health impacts
- This framework for HRI syndromic surveillance can be expanded to other jurisdictions

Limitations and next steps

- Limitations

- Potential misclassification of ED visits
 - Data entry errors at facilities
 - Incomplete validation of syndrome definitions
- Data available at visit-level, not person-level
 - Individuals may be counted multiple times
- Challenges with available demographic information

- Next steps

- Continue refining and developing syndrome definitions
- Collaborate with emergency management partners to use data for planning and decision making
- Automate reporting during extreme weather events

Questions?

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References

- Burkom, H., Loschen, W., Wojcik, R., Holtry, R., Punjabi, M., Siwek, M., & Lewis, S. (2021). Electronic Surveillance System for the Early Notification of Community-Based Epidemics (ESSENCE): Overview, Components, and Public Health Applications. *JMIR Public Health Surveill* 2021;7(6):E26303 <https://Publichealth.Jmir.Org/2021/6/E26303>, 7(6).
<https://doi.org/10.2196/26303>
- Centers for Disease Control and Prevention. (2022, April 25). *Climate Effects on Health*. <https://www.cdc.gov/climateandhealth/effects/default.htm>
- Centers for Disease Control and Prevention. (2017, June 19). *About Extreme Heat*. https://www.cdc.gov/disasters/extremeheat/heat_guide.html
- Centers for Disease Control and Prevention. (2022, October 20). *New to Syndromic Surveillance?* <https://www.cdc.gov/nssp/new-users.html>
- Furfaro, H. (2021, June 20). 'Heat dome' may push Western Washington temperatures into record-breaking territory. The Seattle Times. <https://www.seattletimes.com/seattle-news/heat-dome-may-push-western-washington-temperatures-into-record-breaking-territory/>
- Washington State Department of Health. (n.d.). *Syndromic Surveillance (RHINO)*. Retrieved November 22, 2022, from <https://doh.wa.gov/public-health-healthcare-providers/healthcare-professions-and-facilities/data-exchange-0/syndromic-surveillance-rhino>



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Role of Syndromic Surveillance in the Detection of Multisystem Inflammatory Syndrome in Children (MIS-C) Associated with COVID-19

March 2020 – October 2022, Georgia

Syndromic Surveillance Symposium/ Walaa Elbedewy MBBCh, MPH, MPA /
December 6, 2022

Multi-system Inflammatory Syndrome in Children (MIS-C)

CDC Case Definition for MIS-C

- An individual aged <21 years presenting with fever*, laboratory evidence of inflammation**, and evidence of clinically severe illness requiring hospitalization, with multisystem (≥ 2) organ involvement (cardiac, renal, respiratory, hematologic, gastrointestinal, dermatologic or neurological); AND
- No alternative plausible diagnoses; AND
- Positive for current or recent SARS-CoV-2 infection by RT-PCR, serology, or antigen test; or COVID-19 exposure within the 4 weeks prior to the onset of symptoms

*Fever $>38.0^{\circ}\text{C}$ for ≥ 24 hours, or report of subjective fever lasting ≥ 24 hours

**including, but not limited to, one or more of the following: an elevated C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), fibrinogen, procalcitonin, d-dimer, ferritin, lactic acid dehydrogenase (LDH), or interleukin 6 (IL-6), elevated neutrophils, reduced lymphocytes and low albumin

Additional comments

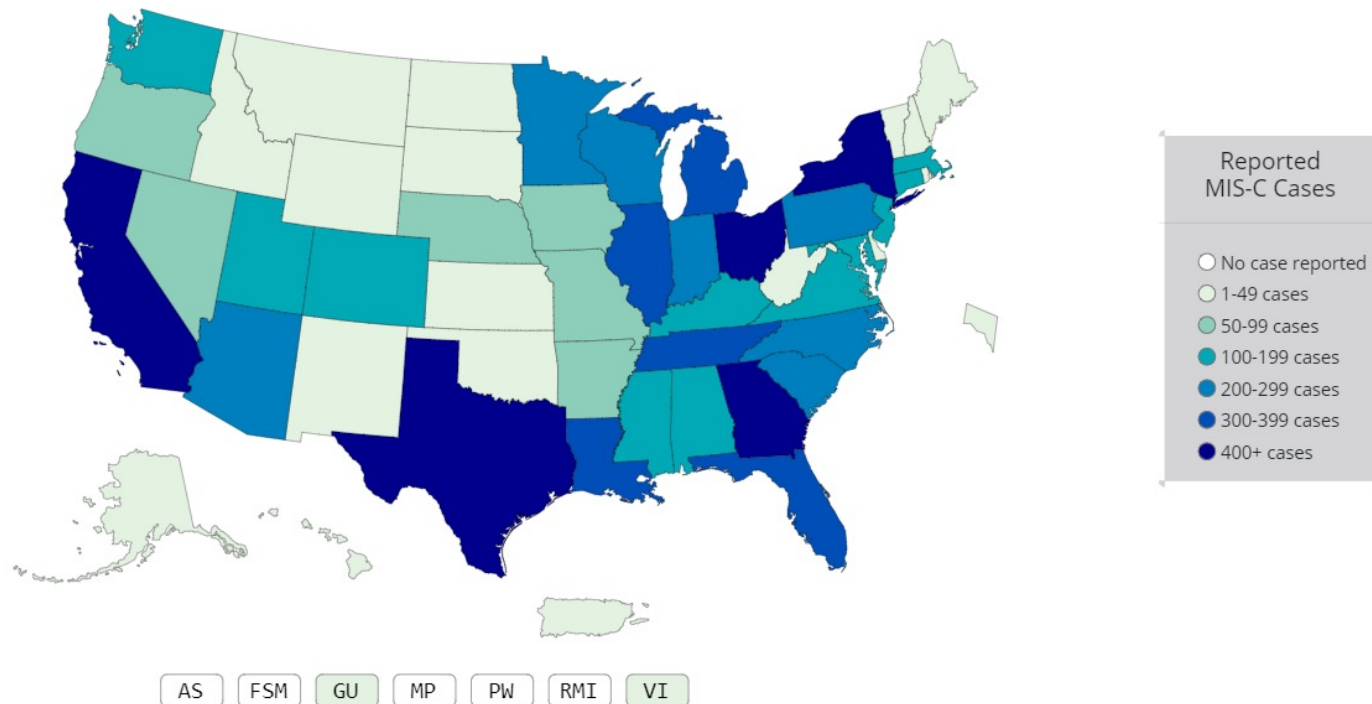
- Some individuals may fulfill full or partial criteria for Kawasaki Disease but should be reported if they meet the case definition for MIS-C
- Consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection

Background

- CDC released an official health advisory through the Health Alert Network to better characterize this newly-recognized condition (May 2020)
- DPH made MIS-C reportable and implemented a case reporting form in the State Electronic Notifiable Disease Surveillance System (SendSS) (May 2020)
- Syndromic Surveillance incorporated (October 2020)

MIS-C Epidemiology in the US

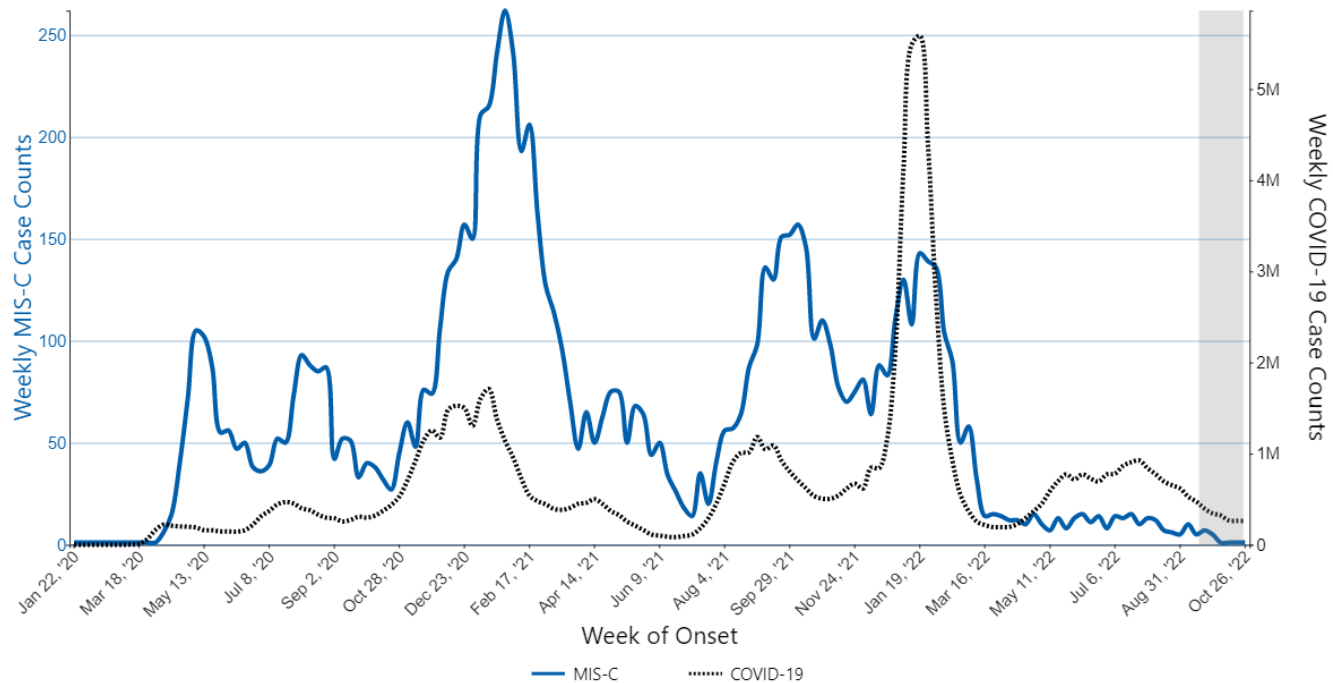
Reported MIS-C Case Ranges by Jurisdiction, on or before October 31, 2022*



Source: <https://covid.cdc.gov/covid-data-tracker/#mis-national-surveillance>; Accessed on November 11, 2022

MIS-C Cases in the U.S. Over Time

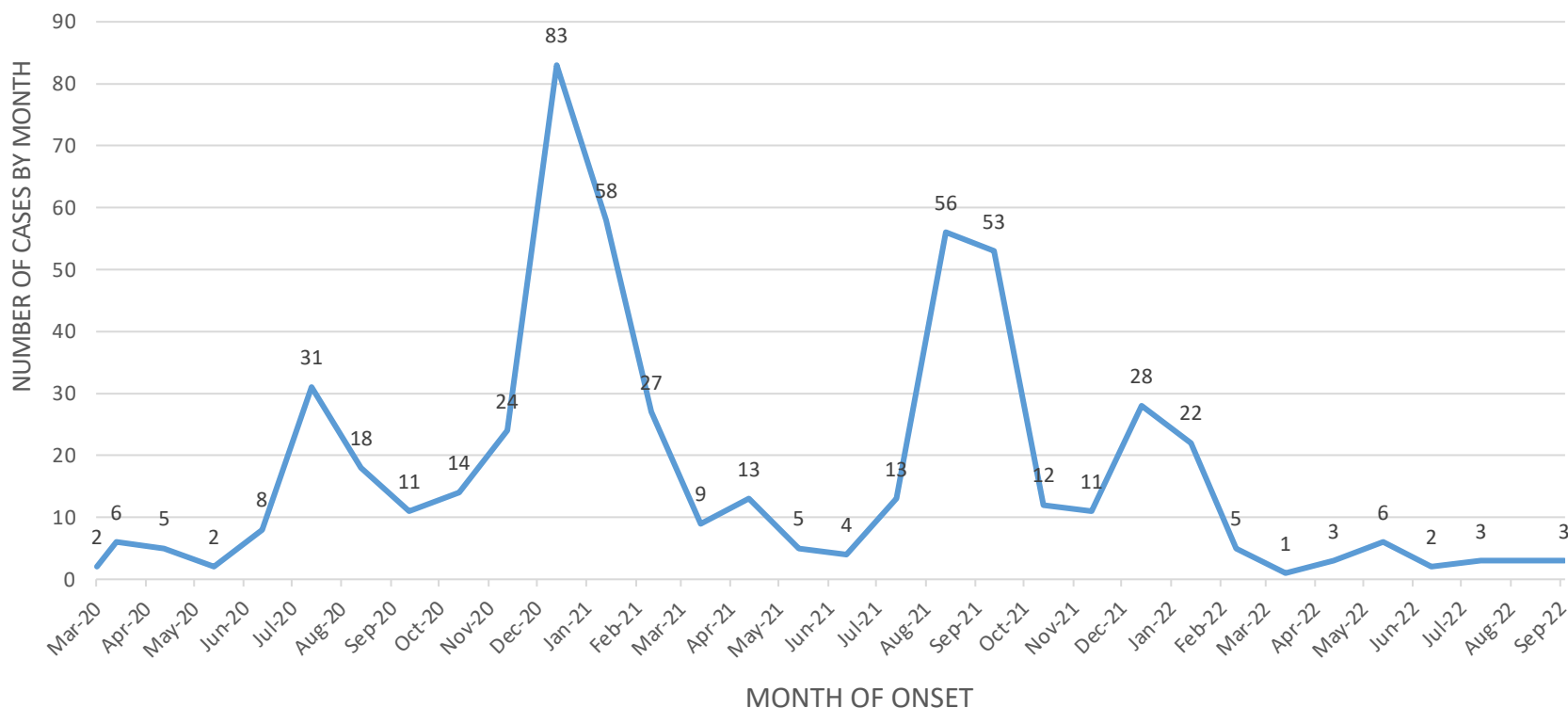
Weekly MIS-C Cases and COVID-19 Cases Reported to CDC



Source: <https://covid.cdc.gov/covid-data-tracker/#mis-national-surveillance>; Accessed on November 11, 2022

MIS-C Cases in Georgia Over Time

Confirmed MIS-C Cases by Month of Onset, Georgia, March 2020 to October 2022



*Preliminary case count as of November 4, 2022

Snapshot of MIS-C in Georgia

Total Number of Cases

Investigated:

717

Cases meeting case definition:

538

Gender:

58.9% Male

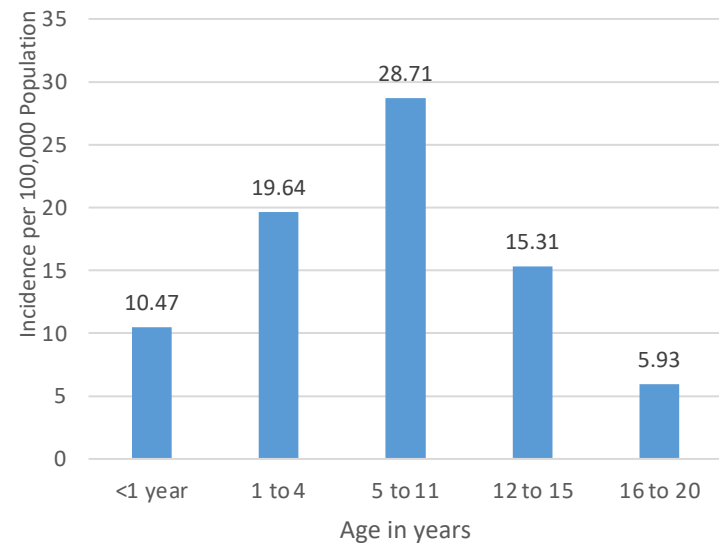
Ethnicity:

79.2% Non-Hispanic

Race:

57.4% Black

Incidence of MIS-C per 100,000
Population by Age Category, Georgia,
March 2020-October 2022



*Preliminary case count as of November 4, 2022

MIS-C Surveillance in Georgia Overview

Physician

- Report suspect MIS-C cases to district health department or state health department
- Collect case data, sends to health department or enters in SendSS
- Relay diagnoses to cases and/or their families

Districts

- Notify DPH of possible case
- Facilitate completion of patient data by providing points of contact in Infection Prevention or Medical Records

DPH

- Confirm cases entered into SendSS once adequate information is available
- Conduct medical record abstractions to complete CDC form if provider does not complete the form
- Transmit data to CDC

Syndromic Surveillance

CDC

- Compile data with that of other states
- Provide guidance on case reporting and investigation and request data cleaning

Syndromic Surveillance: Method

- SendSS Syndromic Surveillance (SyS) module captures diagnoses from 150 Emergency Departments and urgent care facilities
- Discharge Diagnosis field: Multisystem Inflammatory Syndrome
- ICD10 field: M35.81
- Ages: 0-21

Syndromic data captures:
Event, chief complaint, discharge diagnosis, patient age, sex, ethnicity, race, triage notes, disposition, ICD code, patient zip code, county, district and patient ID or medical record number

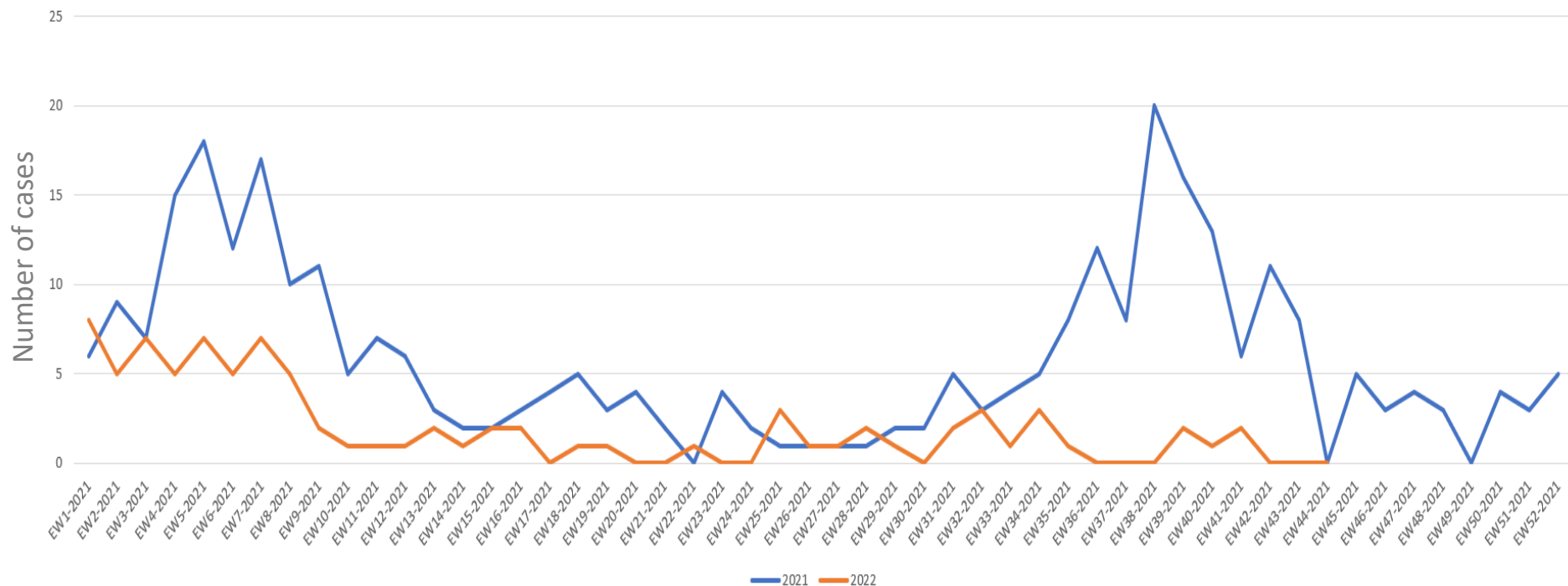
MIS-C Syndromic Surveillance: Follow Up

Follow-up on Suspect SyS MIS-C Cases:

- Matched by MRN using electronic medical records (EMR)
- No EMR access: notification of suspect cases sent District Epidemiologists (DE) or Infection Preventionists
- Cases followed up on by MIS-C Epidemiologist and/or DE
- Cases meeting case definition are entered into SendSS

MIS-C SyS Cases in Georgia Over Time

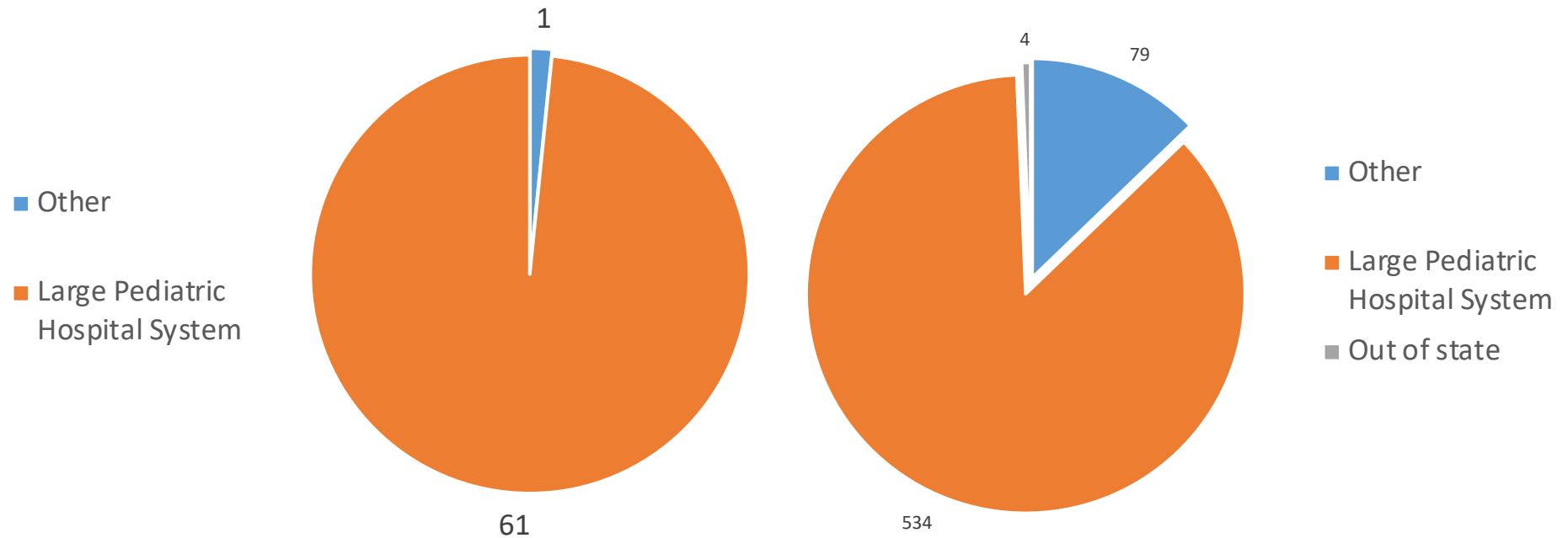
ED / UC patients with Discharge Diagnosis of MIS-C (ICD10=M35.81)
Epi week (EW) 1 of 2021 – 44 of 2022



MIS-C Reports Before and After Incorporating SyS

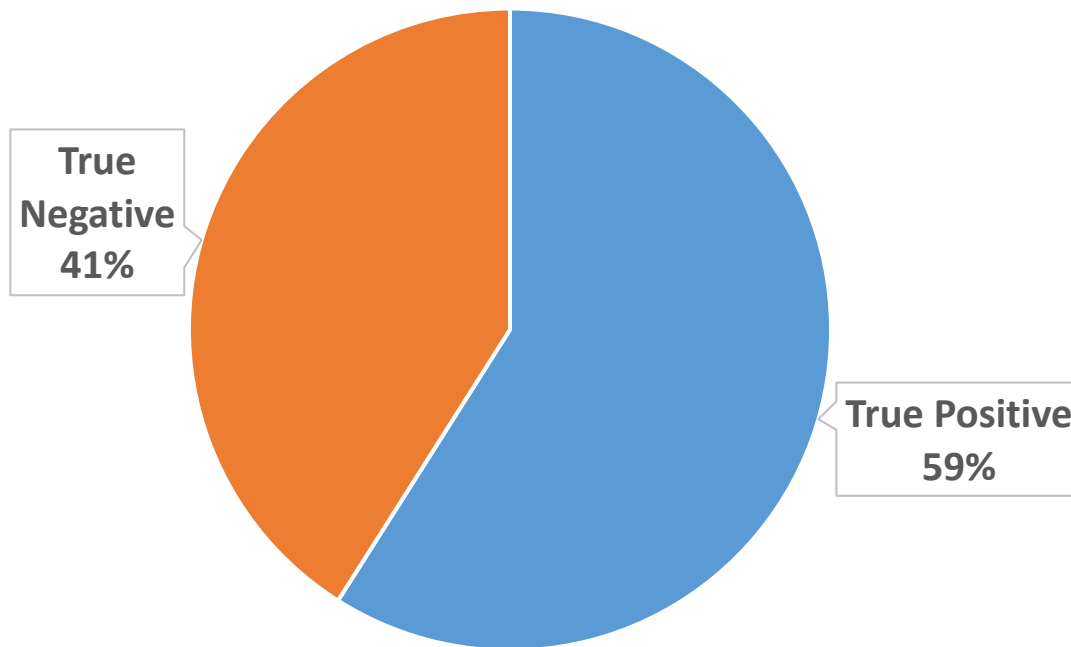
March 11, 2020 - September 30, 2020

October 1, 2020 - October 31, 2022



Results

MIS-C SyS Notifications, Georgia, October 2020-
October 2022



**MIS-C SyS Cases
Investigated:**

True Positive: 249

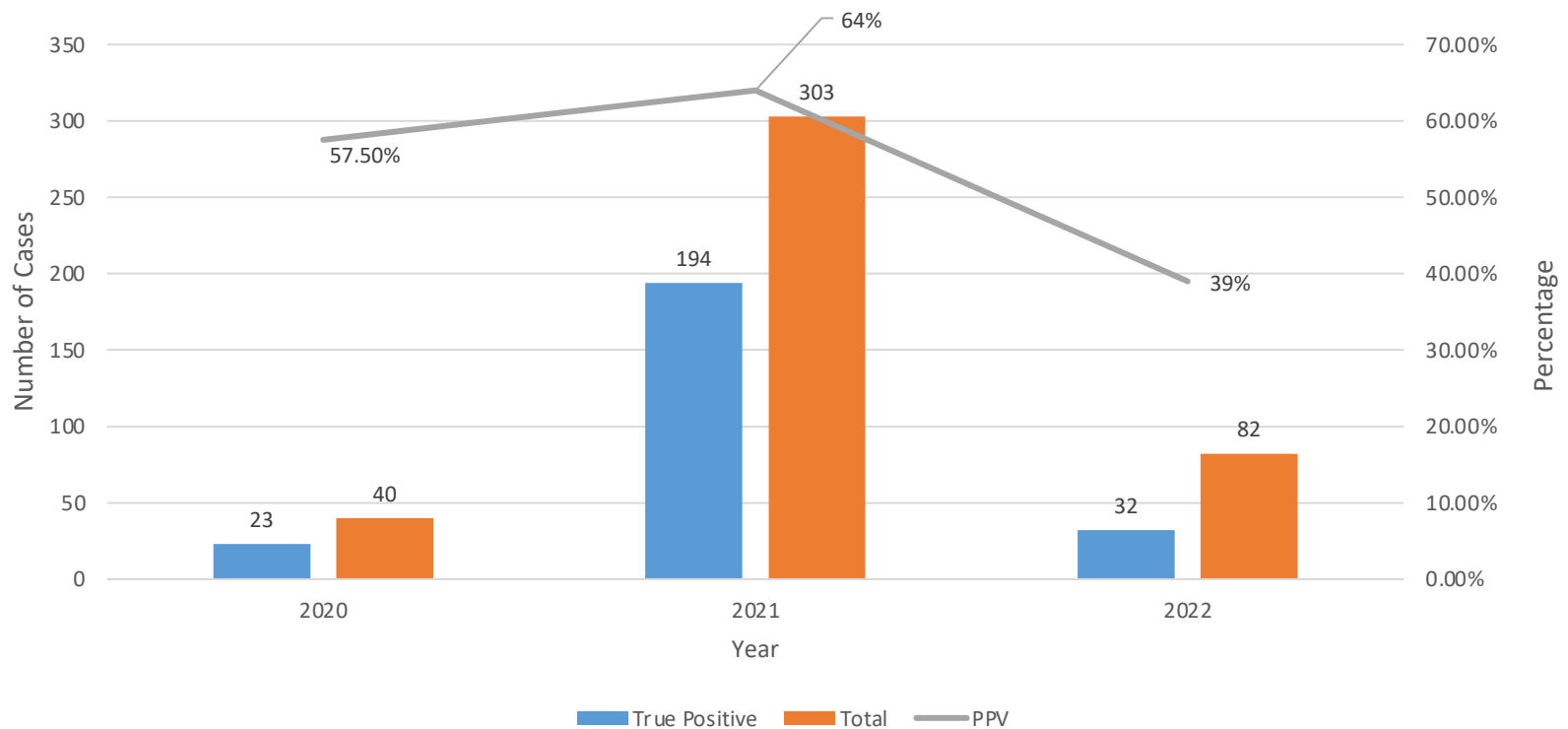
True Negative: 176

PPV: 58.9 %

Pending: 4

Results

MIS-C Syndromic Surveillance, Georgia, October 2020 to October 2022



Updates to and Additional Querying of MIS-C SyS

Starting January 1, 2022

- Tracking timeliness
 - 82 SyS cases detected
 - 32 true positives
 - 21 first reports made to DPH (range 0-20 days before being reported into SENDSS)

Other queries considered:

B94.8 Sequelae of COVID-19

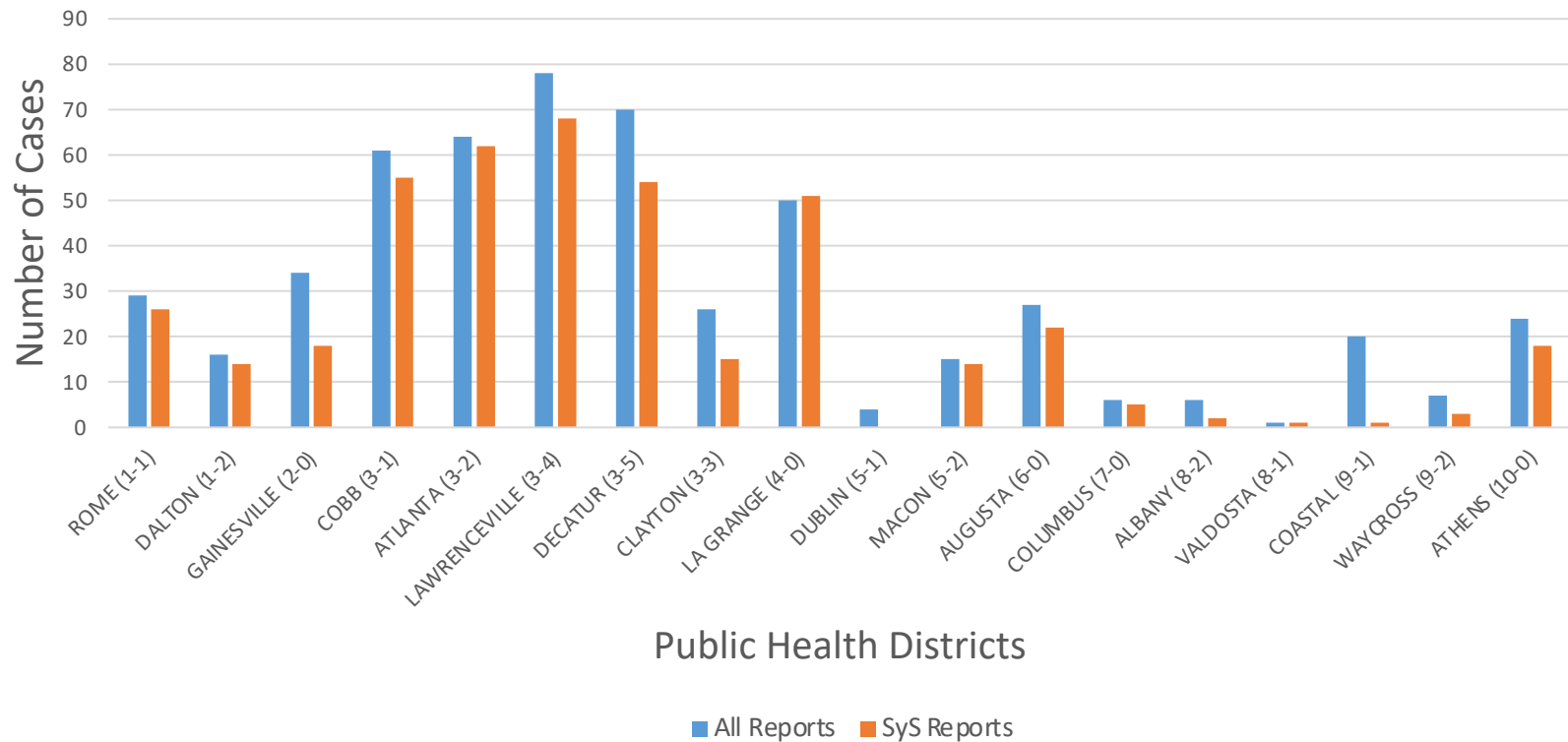
Z86.16 Personal history of COVID-19

Z20.822 Exposure to COVID-19 or SARS-CoV-2 infection

M30.3 Mucocutaneous lymph node syndrome [Kawasaki]

Geographic Distribution

MIS-C Cases by Public Health District, Georgia, March 2020 to October 2022



Conclusions

Syndromic Surveillance :

- Useful in surveillance of new conditions
- Contributed to increased and timely reporting to national surveillance to better understand this new syndrome
- Strengthened collaboration
- 14.3% of confirmed MIS-C cases can be attributed to SyS through SyS notifications and ongoing collaboration with Infection Preventionists

Moving Forward:

- Additional outreach to areas with low MIS-C cases
- Exploring sensitivity with the newly streamlined MIS-C case definition
- Comparing MIS-C burden to COVID-19 burden in <21 years of age in GA

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National Syndromic Surveillance Program

Community of Practice

Resources that Advance the Science and
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2022

Syndromic Surveillance Symposium

December 6–8, 2022



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