



# Multisystem Inflammatory Syndrome in Children

Tennessee Provider Update

# MIS-C

- Multisystem inflammatory syndrome (MIS) is a rare but serious condition associated with COVID-19 in which different body parts become inflamed
  - MIS-C case definition includes people who are <21 years old
- **MIS-C Incidence**
  - MIS-C occurs in about 0.03% of SARS-CoV-2 infections (1 case of MIS-C per 3,200 SARS-CoV-2 infections in persons <21 years)
  - Higher among Black, Hispanic/Latino, Asian/Pacific Islander and younger persons
- **MIS-C Mortality**
  - Mortality: 1.2% (95% CI: 0.1%-1.7%)
  - Case fatality ratio decreased over time (<6/29/20: 2.4%, 6/29/20-11/6/20: 1.6%, 11/7/20-3/17/21: 0.7%)
  - Highest number and likelihood of death among persons 16-20 years

<https://www.cdc.gov/mis/about.html>

Payne AB, Gilani Z, Godfred-Cato S, et al. Incidence of Multisystem Inflammatory Syndrome in Children Among US Persons Infected With SARS-CoV-2. JAMA Netw Open. 2021;4(6):e2116420. doi:10.1001/jamanetworkopen.2021.16420

Bowen A, Miller AD, Zambrano LD, et al. Demographic and Clinical Factors Associated With Death Among Persons <21 Years Old With Multisystem Inflammatory Syndrome in Children—United States, February 2020–March 2021. Open Forum Infectious Diseases. 2021;8(8). doi:10.1093/ofid/ofab388



# MIS-C Symptoms

Children and adults with MIS experience:

- Ongoing fever PLUS more than one of the following:
  - Stomach pain
  - Bloodshot eyes
  - Diarrhea
  - Dizziness or lightheadedness (signs of low blood pressure)
  - Skin rash
  - Vomiting

## How to Recognize

### Multisystem Inflammatory Syndrome in Children (MIS-C)

A Delayed Immune Response Related to COVID-19

Children, adolescents, or young adults who develop certain symptoms after having COVID-19 might have MIS-C. They should see a doctor if they had COVID-19, or have been in close contact with someone who had COVID-19, within the past 6 weeks and now have the following:

Ongoing  
Fever



PLUS more than one  
of the following:



Stomach Pain



Diarrhea



Vomiting



Skin Rash



Blood Shot  
Eyes



Dizziness or  
Lightheadedness

Go to the nearest hospital Emergency Room if your child is showing any severe MIS-C warning signs such as:

Trouble breathing | Pain or pressure in the chest that does not go away  
Confusion or unusual behavior | Severe abdominal pain | Inability to wake or stay awake  
Pale, gray, or blue-colored skin, lips, or nail beds; depending on skin tone



Centers for Disease  
Control and Prevention  
National Center for Immunization  
and Respiratory Diseases

For More Information  
[www.cdc.gov/mis/mis-c.html](https://www.cdc.gov/mis/mis-c.html)



SCAN ME

# Reported MIS-C Cases by Jurisdiction

## Health Department-Reported Cases of Multisystem Inflammatory Syndrome in Children (MIS-C) in the United States

Last updated with cases reported to CDC on or before August 27, 2021\*

TOTAL MIS-C PATIENTS MEETING CASE DEFINITION\*

4,661

TOTAL MIS-C DEATHS MEETING CASE DEFINITION

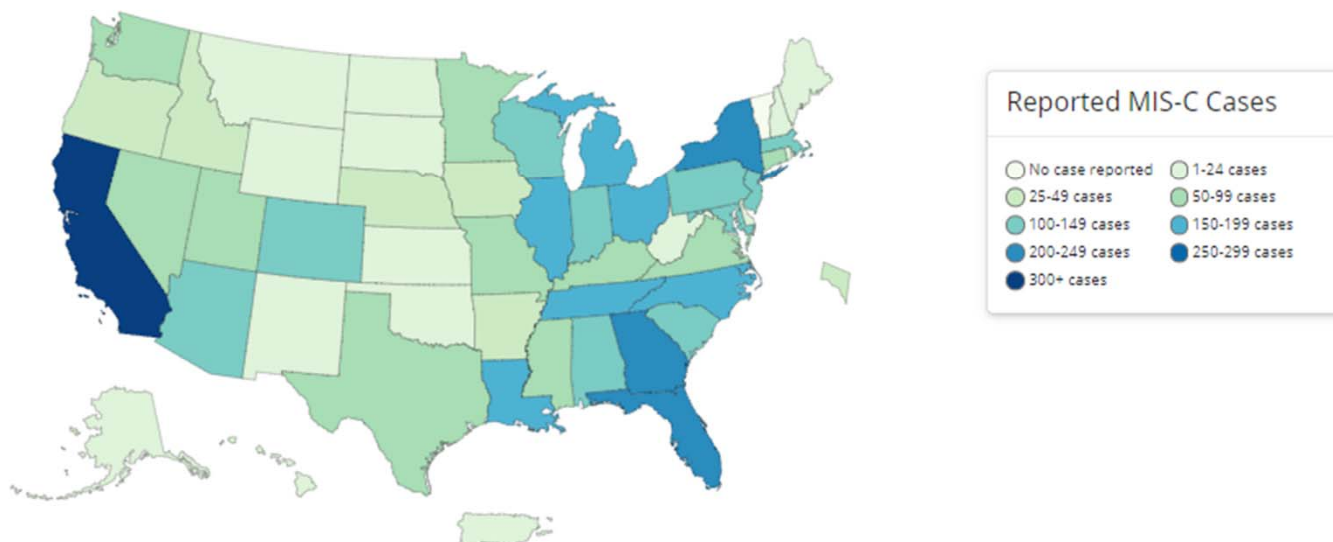
41

\*Additional patients are under investigation. After review of additional clinical data, patients may be excluded if there are alternative diagnoses that explained their illness.

## MIS-C Cases by Jurisdiction

Since reporting began in 2020, 52 U.S. jurisdictions (including 49 states, New York City, Puerto Rico, and Washington, DC) have reported at least one MIS-C case to CDC. Because of the small number of patients reported in some jurisdictions, this report includes case ranges instead of exact case counts from individual jurisdictions to protect the privacy of patients and their families.

Reported MIS-C Case Ranges by Jurisdiction, on or before August 27, 2021\*



# MIS-C in Tennessee

## Multi-System Inflammatory Syndrome in Children (MIS-C)

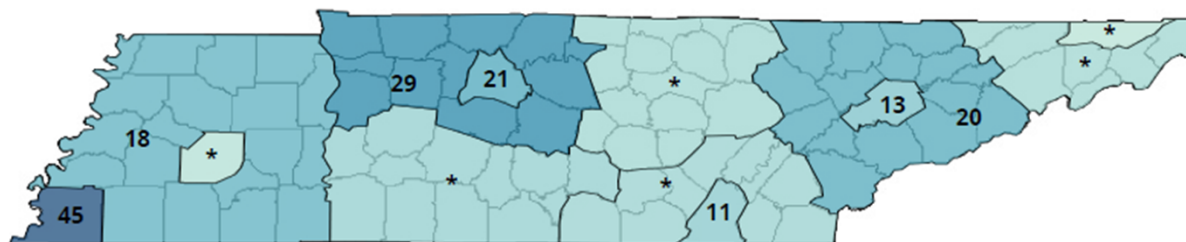
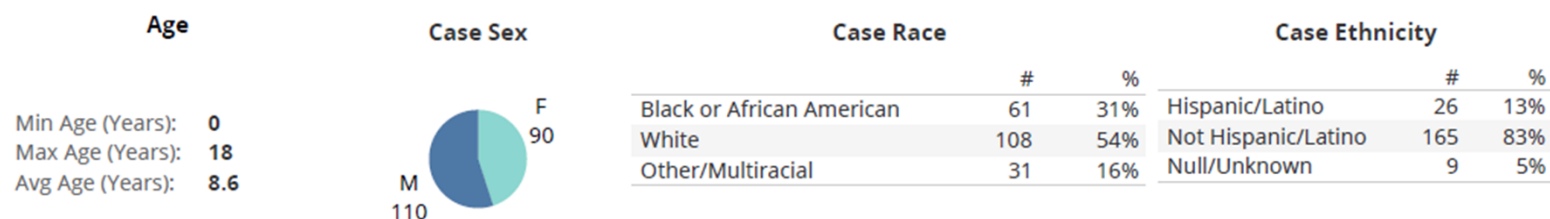
NBS Data Updated\*: October 5, 2021

Confirmed Cases: 196

Probable Cases: 4

Under Investigation: 31

### Confirmed and Probable Case Demographics



\*Data suppressed due to small numbers (<10)

Cases with missing or unknown county of residence are not included in map.

### Confirmed and Probable Case Outcomes

Hosp Length of Stay		ICU Indicator		ICU Length of Stay		Death Indicator	
Min Hsptl Duration (Days)	0.0			Min ICU Duration (Days)	1.0		
Max Hsptl Duration (Days)	38.0	Yes	# %	Max ICU Duration (Days)	31.0	Yes	# %
Avg Hsptl Duration (Days)	5.5	No	110 55%	Avg ICU Duration (Days)	3.8	No	199 100%

\*MIS-C data is pulled from NBS, which may not represent the most up-to-date information due to lags in reporting.

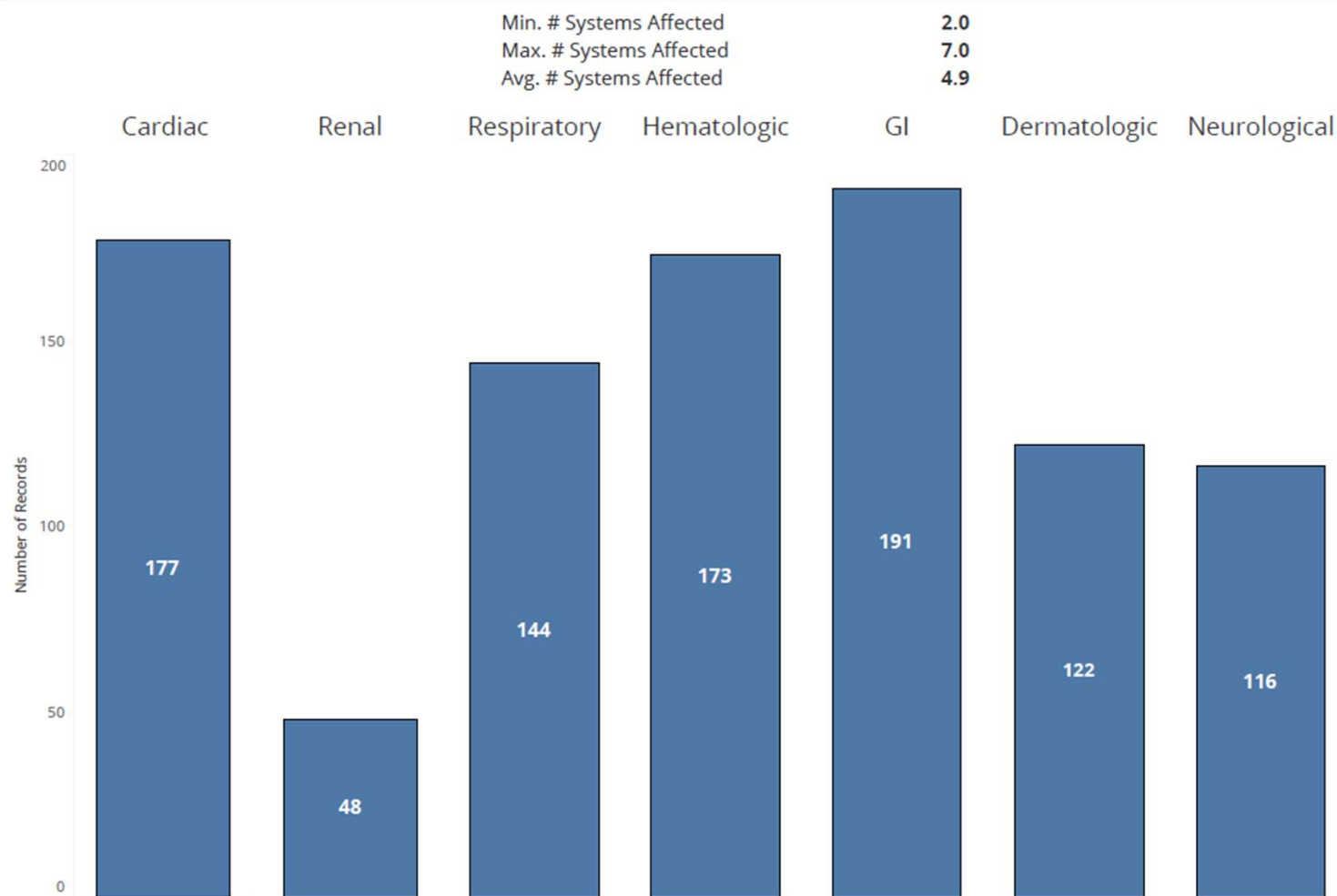
<https://www.tn.gov/content/dam/tn/health/documents/cedep/novel-coronavirus/datasets/Multi-System-Inflammatory-Syndrome-In-Children.pdf>



# MIS-C in Tennessee

## Systems Involved in MIS-C Cases (Confirmed and Probable)

(limiting to cases with at least 1 system reported)

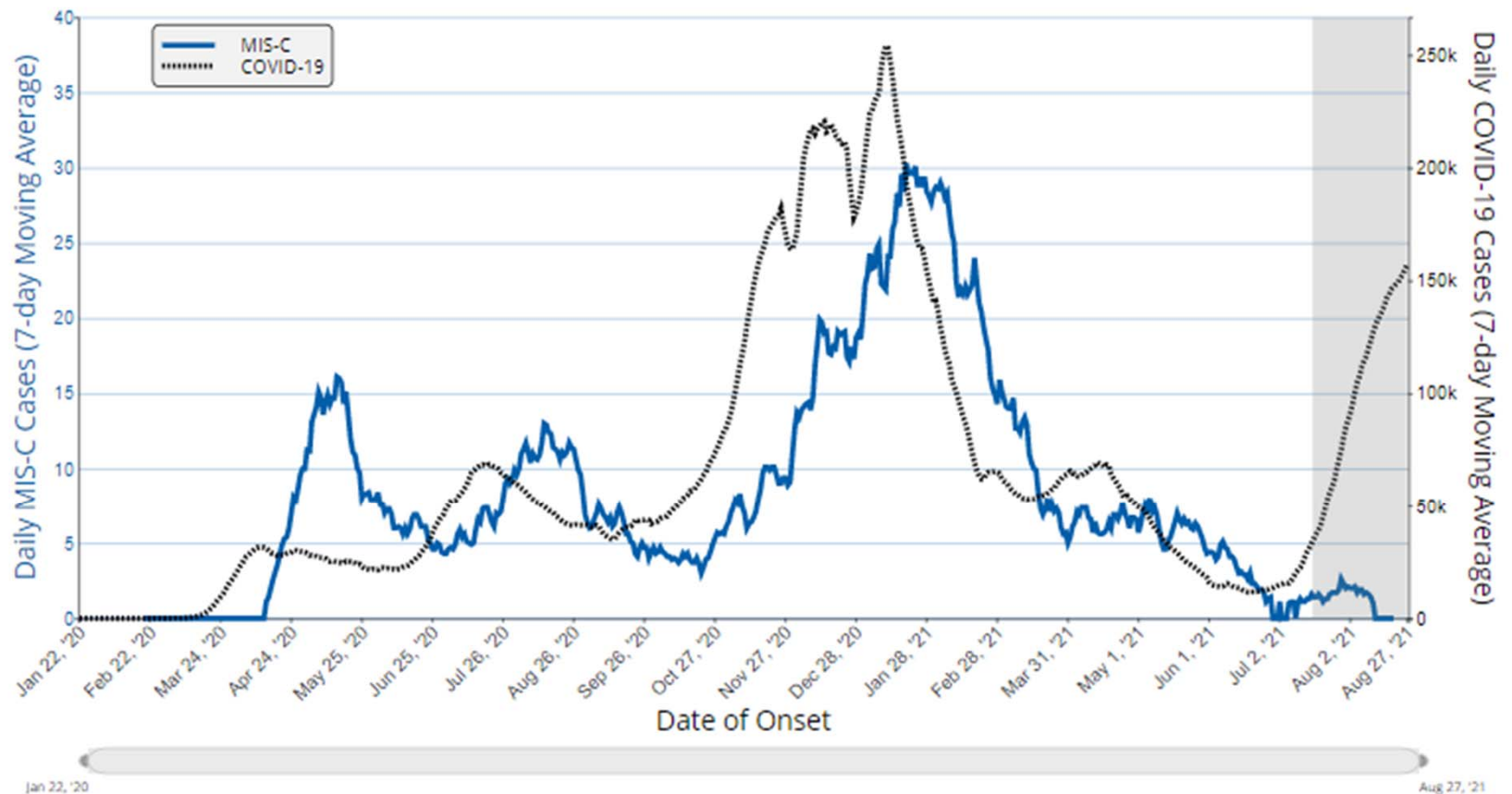


<https://www.tn.gov/content/dam/tn/health/documents/cedep/novel-coronavirus/datasets/Multi-System-Inflammatory-Syndrome-In-Children.pdf>



# MIS-C and COVID-19 Cases

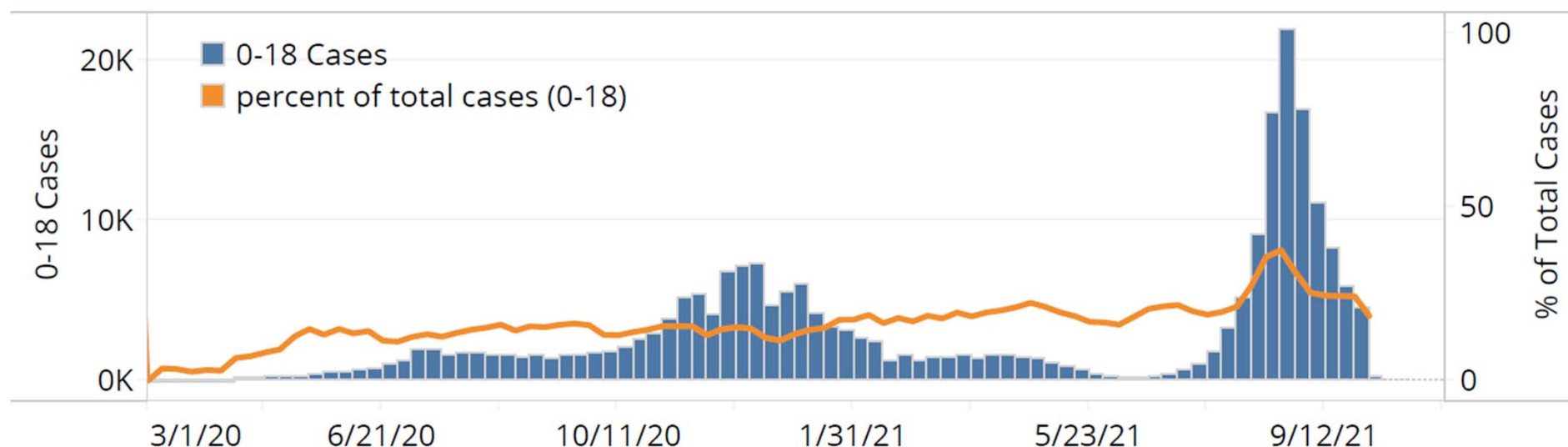
Daily MIS-C Cases and COVID-19 Cases Reported to CDC (7-Day Moving Average)



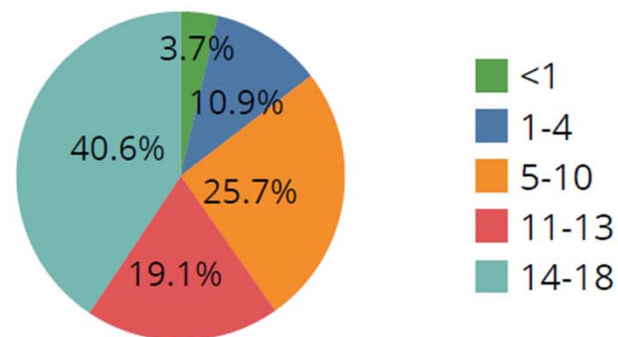


# Pediatric COVID-19 Cases in Tennessee

- The week of 8/22/2021 (6 weeks ago), there was a peak of 21,939 confirmed pediatric COVID-19 cases



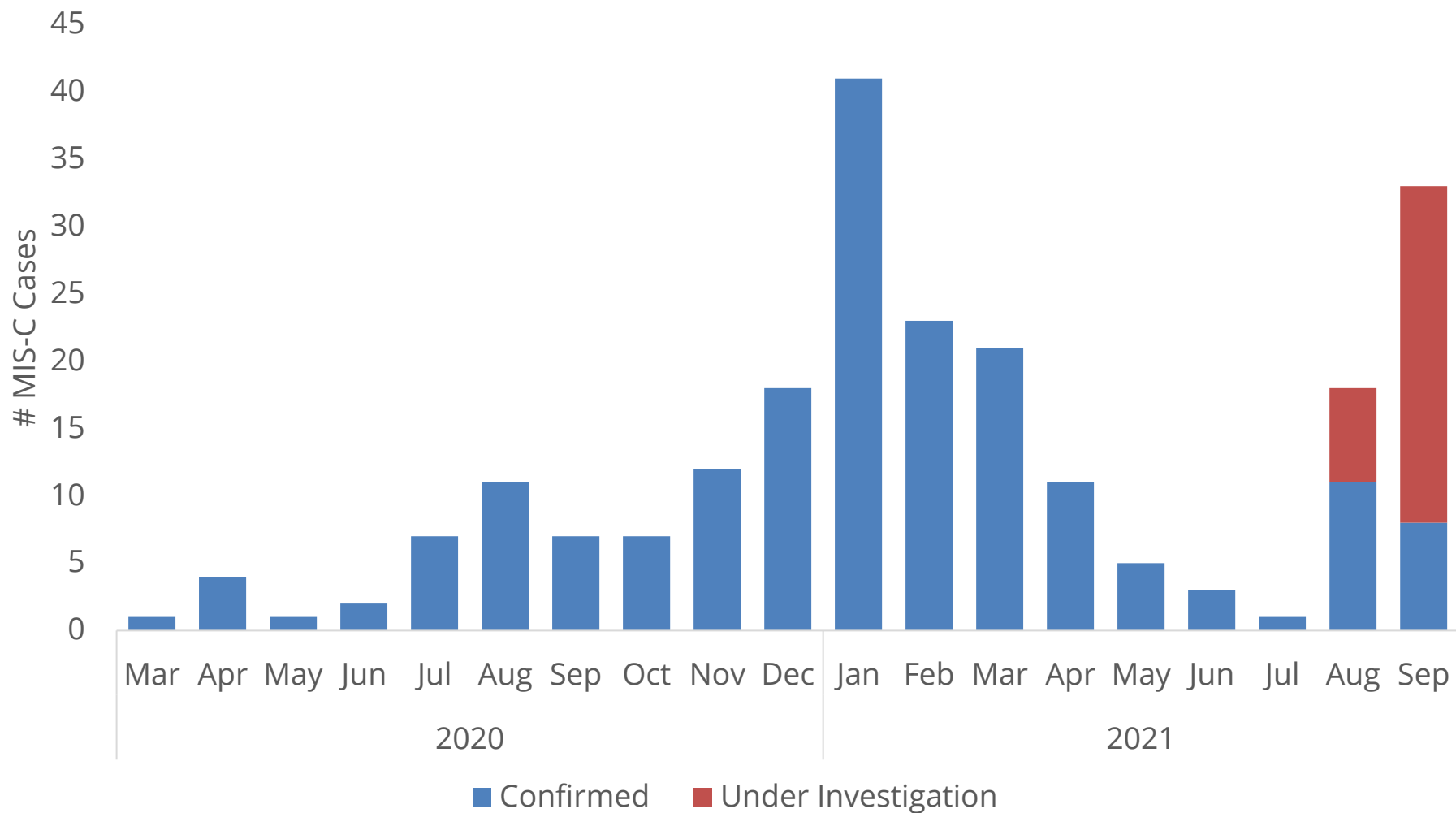
Age Group (yrs)	Cases	% Total
0-18	236,526	19.1%
19-64	845,544	68.1%
65+	157,653	12.7%



<https://www.tn.gov/content/dam/tn/health/documents/cedep/novel-coronavirus/datasets/Data-on-Cases-among-all-Children-0-18.pdf>



# MIS-C in Tennessee



# Reporting Criteria

## Patients less than 21 years of age presenting with:

- **Fever:** at least 100.4°F for more than 24 hours, or report of subjective fever lasting more than 24 hours
- **Inflammation:** Laboratory evidence of inflammation 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), interleukin 6 (IL-6), or neutrophil count, or reduced lymphocyte count or low albumin
- **Multisystem organ involvement:** Evidence of clinically severe illness requiring hospitalization with multisystem organ involvement (cardiac, renal, respiratory, hematological, gastrointestinal, dermatologic or neurological)

## AND

- No evidence of alternative plausible diagnoses

## Notes:

- Patients should be reported regardless of SARS-CoV-2 lab results
- Patients should be reported even if they meet full or partial criteria for Kawasaki disease
- Consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection

# TDH Reporting

- Healthcare providers who have cared or are caring for patients meeting MIS-C criteria are to report suspect cases to Amanda Hartley or Tina Herring at the Tennessee Department of Health **within 24 hours of identification**
- Contact information
  - Phone: 615-741-7247
  - Email: [VPD.IMM@tn.gov](mailto:VPD.IMM@tn.gov)
  - Fax: 615-401-7709
- What to send
  - Patient demographic sheet
  - H&P
  - ID note, if available
  - Lab evidence of elevated inflammatory markers

# Acknowledgements

- Amanda Hartley
- Lizzie Harvey
- Tina Herring
- Erin Hodson
- Morgan McDonald
- Jessica Schultz
- EP Response



Questions?  
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