# Multi-Inflammatory Syndrome in Children (MIS-C) West Virginia

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WEST VIRGINIA
Department of
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- Inform on the process of MIS-C surveillance in West Virginia.

- Describe MIS-C morbidity in West Virginia.

**2020 Case Definition:**

- Person <21 years old presenting with fever, lab. evidence of inflammation, and evidence of clinically severe illness requiring hospitalization, with multisystem (>2) organ involvement; AND
- No alternative plausible diagnoses; AND
- Positive for current or recent SARS-CoV-2 infection by RT-PCR, serology, or antigen test; or exposure to a suspected or confirmed COVID-19 case within the 4 weeks prior to the onset of symptoms.

**2023 Case Definition (revised):**

- Duration of fever not required
- CRP $\geq$ 3mg/dl to indicate systemic inflammation
- Organ system involvement criteria adjusted to include shock. Removed respiratory, neurologic, renal criteria
- Timing of positive SARS-CoV-2 lab test relative to MIS-C illness

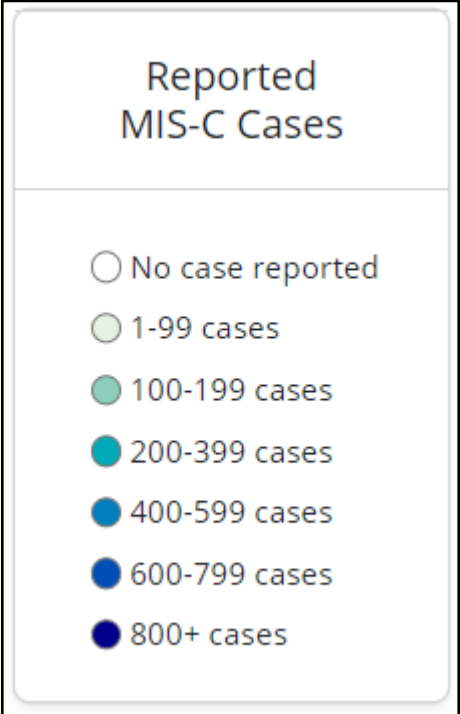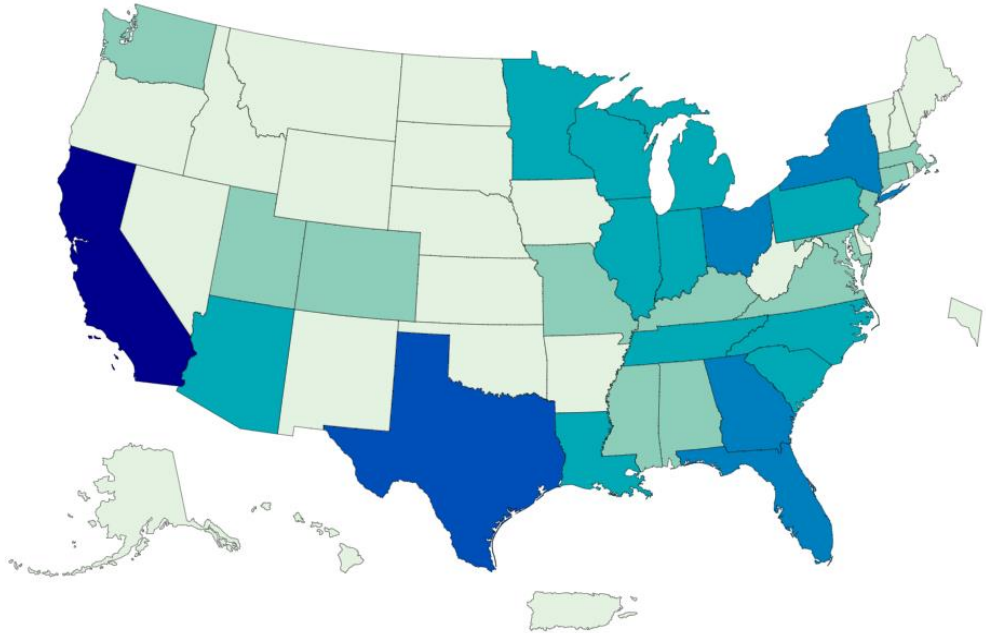MIS-C is a severe hyperinflammatory condition occurring two to six weeks after infection with SARS-CoV-2.

**MIS-C detection in West Virginia**
- Surveillance
  - Syndromic surveillance
  - Active surveillance at three West Virginia tertiary/pediatric hospitals using ICD-10 codes

- MIS-C nurse investigates, information is reported to the Centers for Disease Control and Prevention (CDC)

- Voluntary reporting to CDC

# MIS-C Surveillance

| MIS-C Cases<br>(February 2020 to March 2023) | United States | West Virginia |
|---|---|---|
| Total MIS-C cases | 9,445 | 42 |
| Death | 78 | 0 |



Reported MIS-C Case Ranges by Jurisdiction, on or before March 31, 2023

Reported MIS-C Cases
- ○ No case reported
- ○ 1-99 cases
- ○ 100-199 cases
- ○ 200-399 cases
- ○ 400-599 cases
- ● 600-799 cases
- ● 800+ cases

https://covid.cdc.gov/covid-data-tracker/#mis-national-surveillance

# MIS-C Case Counts in West Virginia, n=42

| YEAR OF REPORT | 2021 | 2022 | 2023 |
|---|---|---|---|
| Total number investigated | 340 | 105 | 17 |
| Total number of MIS-C cases | 23 | 18 | 1 |
| **AGE GROUP (BY YEARS)** | | | |
| <1 | 0 | 1 | 0 |
| 1 to 4 | 3 | 3 | 0 |
| 5 to 11 | 12 | 11 | 1 |
| 12 to 15 | 5 | 2 | 0 |
| 16-20 | 3 | 1 | 0 |

# MIS-C Case Demographics

| Demographics | 2021 | 2022 | 2023 |
|---|---|---|---|
| **GENDER** | | | |
| Male | 18 | 9 | 1 |
| Female | 5 | 9 | 0 |
| **RACE and ETHNICITY** | | | |
| Asian | 0 | 0 | 0 |
| Black | 0 | 1 | 0 |
| Hispanic | 0 | 0 | 0 |
| White | 22 | 16 | 1 |
| Other/Multiple | 1 | 0 | 0 |
| Missing | 0 | 1 | 0 |

# Clinical Features and Underlying Condition

| Health Status | 2021 | 2022 | 2023 |
|---|---|---|---|
| **CLINICAL FEATURES** | | | |
| Fever $\leq$ 2 days | 2 | 2 | 0 |
| Fever $\geq$ 3 days | 21 | 16 | 1 |
| Missing/Unknown | 0 | 0 | 0 |
| **UNDERLYING MEDICAL CONDITION (n=10)** | | | |
| Obesity* | 4 | 2 | 0 |
| Chronic Lung Disease (including Asthma) | 1 | 3 | 0 |
| Missing/Unknown | 0 | 0 | 0 |

*Obesity was determined using CDC's BMI table

# Organil System Involvement

| ORGAN SYSTEM | 2021 | 2022 | 2023 |
|---|---|---|---|
| Hematologic | 21 | 15 | 1 |
| Gastrointestinal | 17 | 13 | 1 |
| Dermatologic | 15 | 13 | 1 |
| Cardiac | 13 | 9 | 0 |
| Respiratory | 7 | 6 | 1 |
| Neurologic | 2 | 3 | 0 |
| Renal | 3 | 2 | 0 |
| Missing or Unknown | 0 | 0 | 0 |

Cases may have more than 1 organ system involvement.

# Treatment

| TREATMENT | 2021 | 2022 | 2023 |
|---|---|---|---|
| IV Immunoglobulins | 18 | 14 | 1 |
| Systemic corticosteroids | 18 | 13 | 1 |
| Other immunomodulatory treatment (anakinra) | 3 | 2 | 0 |
| No immunomodulatory treatment | 20 | 16 | 0 |
| Extracorporeal Membrane Oxygenation (ECMO) | 0 | 1 | 0 |

Cases may have received more than 1 type of treatment.

# Clinical Outcome

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| OUTCOMES | 2021 | 2022 | 2023 |
|---|---|---|---|
| Total number of MIS-C cases admitted to hospital | 23 | 18 | 1 |
| Total days in hospital, median* | 6 | 2 | 3 |
| Total number of MIS-C cases in ICU | 9 | 5 | 0 |
| Death | 0 | 0 | 0 |
| Missing or Unknown | 0 | 0 | 0 |

**All MIS-C cases have improved or are improving.**

*Estimate median by counting the number of MIS-C cases and arrange the cases in increasing order of number of hospital days. If the number of cases is uneven, add 1 and divide the results by 2 to get the rank of the data point whose value is the median.

# Summary

- Main risk factor: SARS-CoV-2 infection

- Most children with MIS-C do not have any reported underlying medical conditions.  For those with underlying medical condition, obesity is the most common.

- Protect a child from MIS-C:
  - ✓ Stay Up to Date with COVID-19 Vaccines Including Boosters
  - ✓ How to Protect Yourself and Others

- MIS-C Resources for Healthcare Providers: https://www.cdc.gov/mis/mis-c/hcp/provider-resources/index.html

# Acknowledgement

1. U.S. Department of Health and Human Services and CDC*

2. Lesley Roush, RN – MIS-C Abstractor

3. Three West Virginia hospitals:
   - West Virginia University Hospital System
   - Cabell-Huntington Hospital
   - Charleston Area Medical Centers (CAMC)

4. West Virginia Department of Health and Human Resources, Office of Epidemiology and Prevention Services and Office of Management Information Systems

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