PENNSYLVANIA DEPARTMENT OF HEALTH
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pennsylvania
DEPARTMENT OF HEALTH

Multisystem Inflammatory Syndrome in Children (MIS-C) Update

DATE:	10/2/2020
TO:	Health Alert Network
FROM:	Rachel Levine, MD, Secretary of Health
SUBJECT:	**UPDATE: Multisystem Inflammatory Syndrome in Children (MIS-C) Update**
DISTRIBUTION:	Statewide
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MUNICIPALITY:	n/a
ZIP CODE:	n/a

This transmission is a "Health Update", provides important information for a specific incident or situation; may not require immediate action.

HOSPITALS: PLEASE SHARE WITH ALL MEDICAL, PEDIATRIC, NURSING AND LABORATORY STAFF IN YOUR HOSPITAL**; EMS COUNCILS:** PLEASE DISTRIBUTE AS APPROPRIATE; **FQHCs:** PLEASE DISTRIBUTE AS APPROPRIATE **LOCAL HEALTH JURISDICTIONS**: PLEASE DISTRIBUTE AS APPROPRIATE; **PROFESSIONAL ORGANIZATIONS:** PLEASE DISTRIBUTE TO YOUR MEMBERSHIP; **LONG-TERM CARE FACILITIES:** PLEASE SHARE WITH ALL MEDICAL, INFECTION CONTROL, AND NURSING STAFF IN YOUR FACILITY

- As of October 1, the Pennsylvania Department of Health is reporting 49 confirmed cases of multisystem inflammatory syndrome in children (MIS-C).
- Healthcare providers should report suspected cases among patients younger than 21 years of age meeting MIS-C criteria through PA-NEDSS or by calling 1-877-PA-HEALTH (1-877-724-3258) or your local health department
- Some individuals may fulfill full or partial criteria for Kawasaki disease but should be reported if they meet the case definition for MIS-C.
- Coroners and medical examiners should consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection.

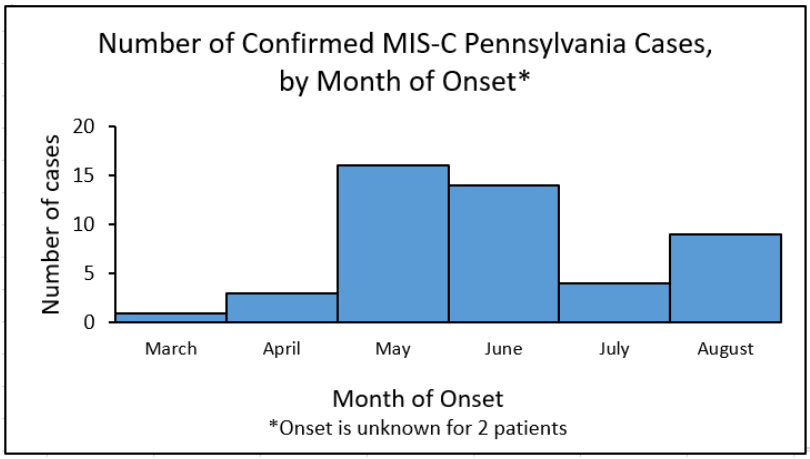
This Health Update provides an update about multisystem inflammatory syndrome in children (MIS-C). This update is based on information from the Centers for Disease Control and Prevention. The Pennsylvania Department of Health (DOH) provides this guidance based on available information about COVID-19 and is subject to change. This HAN replaces PA-HAN 506.

Since mid-May 2020, CDC has been tracking reports of multisystem inflammatory syndrome in children (MIS-C), a rare but serious condition associated with COVID-19. It is not well understood how infection with SARS-CoV-2 causes MIS-C, but it is believed to be immune mediated.

Epidemiology

Nationally, a total of 935 confirmed cases and 19 deaths have been reported from 44 states, New York City, and Washington D.C., with additional cases under investigation. Most cases are in children between 1 and 14 years, with an average of 8 years. More than 70% of reported cases have occurred in children who are Hispanic/Latino (343 cases) or Non-Hispanic Black (269 cases). As of September 29,

Pennsylvania has reported 49 confirmed cases of MIS-C in patients aged <1 to 18 years, with an average of 9.5 years. Just over half of the cases are in males (53%). Race information is known for 45 and ethnicity is known for 42 of the 49 patients, with 56% of cases occurring in children who are Black and 29% occurring in children who are Hispanic. The majority (76%) of patients reside in the southeastern region of the state. The number of confirmed MIS-C Pennsylvania cases, by month of onset is presented in the figure below.



Case definition for MIS-C:

The case definition for MIS-C is:

- 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 exposure to a suspected or confirmed COVID-19 case within the 4 weeks prior to the onset of symptoms.

*Fever ≥38.0°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.

Clinical Presentation

Patients with MIS-C usually present with persistent fever, abdominal pain, vomiting, diarrhea, skin rash, mucocutaneous lesions and, in severe cases, with hypotension and shock. They have elevated laboratory markers of inflammation (e.g., CRP, ferritin), and in a majority of patient's laboratory markers of damage to the heart (e.g., troponin; B-type natriuretic peptide (BNP) or proBNP). Some patients develop myocarditis, cardiac dysfunction, and acute kidney injury. Not all children will have the same signs and symptoms, and some children may have symptoms not listed here. MIS-C may begin weeks after a child is infected with SARS-CoV-2. The child may have been infected from an asymptomatic contact and, in some cases, the child and their caregivers may not even know they had been infected.

Laboratory testing

- Testing aimed at identifying laboratory evidence of inflammation as listed in the Case Definition section is warranted.
- Similarly, SARS-CoV-2 detection by RT-PCR or antigen test is indicated.
- Where feasible, SARS-CoV-2 serologic testing is suggested, even in the presence of positive results from RT-PCR or antigen testing. Any serologic testing should be performed prior to administering intravenous immunoglobulin (IVIG) or any other exogenous antibody treatments.

Other Evaluations

Given the frequent association of MIS-C with cardiac involvement, providers can consider cardiac testing including, but not limited to:

- echocardiogram;
- electrocardiogram;
- cardiac enzyme or troponin testing (per the center's testing standards); and
- B-type natriuretic peptide (BNP) or NT-proBNP.

Other testing to evaluate multisystem involvement should be directed by patient signs or symptoms. Additionally, testing to evaluate for other potential diagnoses should be directed by patient signs or symptoms.

Treatment

At this time, there have been no studies comparing clinical efficacy of various treatment options. Treatments have consisted primarily of supportive care and directed care against the underlying inflammatory process. Supportive measures have included:

- fluid resuscitation;
- inotropic support;
- respiratory support; and
- extracorporeal membranous oxygenation (ECMO), in rare cases

Anti-inflammatory measures have included the frequent use of IVIG and steroids. The use of other anti-inflammatory medications and the use of anti-coagulation treatments have been variable. Aspirin has commonly been used due to concerns for coronary artery involvement, and antibiotics are routinely used to treat potential sepsis while awaiting bacterial cultures. Thrombotic prophylaxis is often used given the hypercoagulable state typically associated with MIS-C.

The American College of Rheumatology has developed clinical guidance for pediatric patients diagnosed with MIS-C associated with SARS-CoV-2.

Follow-up

Patients with a diagnosis of MIS-C should have close outpatient follow-up, including pediatric cardiology follow-up starting 2 to 3 weeks after discharge.

For more information, see AAP Interim Guidance on Multisystem Inflammatory Syndrome in Children (MIS-C).

Additional considerations

- Some individuals may fulfill full or partial criteria for Kawasaki disease but should be reported if they meet the case definition for MIS-C.
- Coroners and medical examiners should consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection.

Reporting

Healthcare providers are reminded to report suspected cases among patients younger than 21 years of age meeting MIS-C criteria described in the case definition above through PA-NEDSS or by calling 1-877-PA-HEALTH (1-877-724-3258) or your local health department.

If you have questions about this guidance or would like to consult about a patient with suspected MIS-C, please call your local health department or **1-877-PA-HEALTH** (**1-877-724-3258**).

Individuals interested in receiving further PA-HANs are encouraged to register at https://han.pa.gov/.

Categories of Health Alert messages:
Health Alert: conveys the highest level of importance; warrants immediate action or attention.
Health Advisory: provides important information for a specific incident or situation; may not require immediate action.
Health Update: provides updated information regarding an incident or situation; unlikely to require immediate action

This information is current as of October 2, 2020 but may be modified in the future. We will continue to post updated information regarding the most common questions about this subject.