Multisystem Inflammatory Syndrome in Children (MIS-C) Associated with Coronavirus Disease 2019 (COVID-19)

What is MIS-C?

Multisystem inflammatory syndrome in children (MIS-C) is a condition that causes inflammation of certain body parts, including the heart, lungs, skin, gastrointestinal organs, kidneys, brain, and eyes. MIS-C is very rare. It can be serious and children often need to be treated in the hospital.

Symptoms of MIS-C

Children with MIS-C may have:

- Fever
- Abdominal Pain
- Vomiting
- Neck Pain
- Bloodshot Eyes
- Feeling Very Tired
- Diarrhea
- Rash

Causes and Prevention of MIS-C

The exact cause of MIS-C is not known yet, but it appears to be an excessive immune response related to COVID-19. It is unknown why some children have gotten sick with MIS-C and others have not. For more information on clinical presentation, see U.S. CDC's MIS-C website for healthcare providers.

Testing for MIS-C

Testing for SARS-COV-2 by RT-PCR or antigen test is recommended. SARS-COV-2 serologic testing is also 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.

Since MIS-C frequently includes cardiac involvement, many centers perform cardiac testing including:

- Echocardiogram
- Electrocardiogram
- Cardiac enzyme or troponin testing (per the center's testing standards); and
- B-type natriuretic peptide (BNP) or NT-proBNP

Additional 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.

Case Definition of MIS-C

As described in the CDC Health Advisory, "Multisystem Inflammatory Syndrome in Children (MIS-C) Associated with Coronavirus Disease 2019 (COVID-19)," 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

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.

Coding

New ICD-10-CM Diagnosis Code for MIS: **M35.81.** This code applies to the following syndromes:

  - Multisystem inflammatory syndrome in adults (MIS-A)
  - Multisystem inflammatory syndrome in children (MIS-C)
  - Pediatric inflammatory multisystem syndrome (PIMS)
- Use additional codes, if applicable, for:
  - Sequelae of COVID-19 (B94.8)
  - Personal history of COVID-19 (Z86.16)
  - Exposure to COVID-19 or SARS-CoV-2 infection (Z20.822)
- Code first, if applicable, COVID-19 (U07.1)
- Code also any associated complications

How to Report MIS-C

Clinicians who suspect MIS-C should hospitalize patients immediately, collect lab specimens, diagnose, begin medical management, and report the case by phone at 1-800-821-5821 or by fax to 207-287-6865. Reporting of cases will help states and U.S. CDC monitor the occurrence of MIS-C and better understand factors possibly associated with this illness.

References and Resources

- Reporting MIS-C in Children Fact Sheet
- Information for Healthcare Providers about Multisystem Inflammatory Syndrome in Children
- Health Alert: MIS-C Associated with COVID-19

- AAP Interim Guidance of MIS-C
- Case Report Form Instructions
- Case Report Form
- Webinar: Clinical Management of MIS-D Associated with COVID-19