

## **HEALTH ALERT: Pediatric Multi-System Inflammatory Syndrome Potentially Associated with COVID-19 (MIS-C)**

### **Situational Update:**

While older adults are at risk for severe novel coronavirus (COVID-19) illness, children with COVID-19 most often develop mild symptoms and rarely become severely ill. However, a **possible link between COVID-19 and a serious inflammatory disease recently termed “Pediatric Multi-System Inflammatory Syndrome Potentially Associated with COVID-19” (MIS-C)** has recently been reported. **Multiple cases of this syndrome which has features overlapping with Kawasaki Disease and Toxic Shock Syndrome have been identified in Europe and in New York City.** In California, a 6-month-old infant who was admitted and diagnosed with classic Kawasaki Disease (KD), also screened positive for COVID-19 in the setting of fever and minimal respiratory symptoms<sup>1</sup> but did not meet the CDC definition of MIS-C. No additional potential cases of this syndrome have been reported to the California Department of Public Health (CDPH) at this time and no cases have been reported in San Mateo County.

There is limited information currently available about risk factors, pathogenesis, clinical course, and treatment for MIS-C. To better characterize this newly recognized condition in the pediatric population, CDC is requesting healthcare providers report suspected cases to public health authorities.

### **Background:**

On April 26, 2020, clinicians in the United Kingdom (UK) recognized increased reports of previously healthy children presenting with a severe inflammatory syndrome with Kawasaki disease-like features.<sup>2</sup> The cases occurred in children testing positive for current or recent infection by SARS-CoV-2, the novel coronavirus that causes COVID-19, based on reverse-transcriptase polymerase chain reaction (RT-PCR) or serologic assay, or who had an epidemiologic link to a COVID-19 case. Patients presented with a persistent fever and a constellation of symptoms including hypotension, multiorgan (e.g., cardiac, gastrointestinal, renal, hematologic, dermatologic and neurologic) involvement, and elevated inflammatory markers.<sup>3</sup> Respiratory symptoms were not present in all cases.

Eight cases, including one death, from the UK were described in a recent publication.<sup>4</sup> In the limited sample of 8 children, it was reported that 75% of the patients were of Afro-Caribbean descent and 62.5% were male. The report also indicated that all 8 patients tested positive for SARS-CoV-2 through antibody testing, including one patient that died.<sup>4</sup>

During March and April, cases of COVID-19 rapidly increased in New York City and New York State. In early May 2020, the New York City Department of Health and Mental Hygiene received reports of children with multisystem inflammatory syndrome. From April 16 through May 4, 2020, 15 patients aged 2-15 years were hospitalized, many requiring admission to the intensive care unit. As of May 12, 2020, the New York State Department of Health has identified 102 patients (including patients from New York City) with similar presentations, many of whom tested positive for SARS-CoV-2 infection by RT-PCR or serologic assay. New York State and New York City continue to receive additional reports of suspected cases.

Additional reports of children presenting with severe inflammatory syndrome with a laboratory-confirmed case of COVID-19 or an epidemiological link to a COVID-19 case have been reported by authorities in other countries.<sup>5</sup>

It is currently unknown if multisystem inflammatory syndrome is specific to children or if it also occurs in adults.

### **Actions Requested of San Mateo County Clinicians:**

- MIS-C should be considered in any patient younger than 21 years of age presenting with features which overlap with Kawasaki Disease and Toxic Shock Syndrome, especially when no pathogen has been identified.
- Early recognition by Emergency Room/Urgent Care providers, Pediatricians and Family Practitioners and prompt referral to an in-patient/critical care specialist is essential.
- Some patients may fulfill full or partial criteria for Kawasaki disease but should be reported if they meet the case definition for MIS-C.
- Clinicians should elicit any recent history of illness with COVID-19 or close contact with individuals who are known to have COVID-19 in all children presenting with signs and symptoms that are compatible with MIS-C.
- Healthcare providers should consider MIS-C in any pediatric death with evidence of SARS-CoV-2 infection.
- **Healthcare providers who have cared or are caring for patients younger than 21 years of age meeting MIS-C criteria should report suspected cases to the San Mateo County Communicable Diseases Control within one day (24 hours). Please complete and fax a Confidential Morbidity Report (CMR) to 650-573-2919 or send it via secure email to [SMCCDControl@smcgov.org](mailto:SMCCDControl@smcgov.org). You may also call us to report a suspected case. During normal business hours, please call 650-573-2346. After hours, call 650-363-4981 and ask for the On-call Health Officer.**

### Case Definition for Multisystem Inflammatory Syndrome in Children (MIS-C)

- An individual aged <21 years presenting with fever<sup>i</sup>, laboratory evidence of inflammation<sup>ii</sup>, and evidence of clinically severe illness requiring hospitalization, with multisystem ( $\geq 2$ ) 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

<sup>i</sup>Fever  $\geq 38.0^{\circ}\text{C}$  for  $\geq 24$  hours, or report of subjective fever lasting  $\geq 24$  hours

<sup>ii</sup>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

### References:

- <sup>1</sup>Jones VG, Mills M, Suarez D, et al. [COVID-19 and Kawasaki Disease: Novel Virus and Novel Case](#). Hosp Pediatr. 2020; doi: 10.1542/hpeds.2020-0123
- <sup>2</sup>CDC [Kawasaki Disease](#) Webpage
- <sup>3</sup>Royal College of Paediatrics and Child Health [Guidance: Paediatric multisystem inflammatory syndrome temporally associated with COVID-19](#)
- <sup>4</sup>Riphagen S, Gomez X, Gonzales-Martinez C, Wilkinson N, Theocharis P. [Hyperinflammatory shock in children during COVID-19 pandemic](#). Lancet. 2020. Advance online publication, doi: 10.1016/S0140-6736(20)31094
- <sup>5</sup>Verdoni L, Mazza A, Gervasoni A, Martelli L, Ruggeri M, Ciuffreda M, Bonanomi E, D'Anitga L. [An outbreak of severe Kawasaki-like disease at the Italian epicentre of the SARS-CoV-2 epidemic: an observational cohort study](#). Lancet. 2020. Advance online publication, doi: 10.1016/S0140-6736(20)31129-6