**CDI COVID-19 Survival Toolkit**

**A new challenge in pediatrics: Possible COVID-19 related pediatric inflammatory multi-system syndrome (PIMS)**

*by Dawn Valdez RN, LNC, CCDS*

On April 27,an alert from the [*Pediatric Intensive Care Society*](https://picsociety.uk/wp-content/uploads/2020/04/PICS-statement-re-novel-KD-C19-presentation-v2-27042020.pdf) circulated from the United Kingdom regarding a *small rise* in the number of critically ill pediatric patients that were being reported with COVID-19. What is different about these pediatric patients is that they were demonstrating multi-system inflammatory markers, toxic shock syndrome, and some signs and symptoms of Kawasaki disease without having the full-blown disease. Most of the children reported in this small subset also had gastrointestinal (GI) related symptoms.

On May 2, the alert from the United Kingdom led to the [*International PICU-COVID-19 Collaboration conference*](https://discoveries.childrenshospital.org/covid-19-inflammatory-syndrome-children/) (coordinated by [Jeffrey Burns, MD, MPH](http://www.childrenshospital.org/directory/physicians/b/jeffrey-burns), chief of critical care medicine at Boston Children’s Hospital) which was an online video conference held to collaborate with pediatric experts in intensive care, cardiology, rheumatology, infectious disease, and Kawasaki disease in efforts to compare data and determine a research plan.

During this conference, the physicians from the several specialties reviewed data from several dozen cases in Europe and the United States and offered the following criteria for physicians:

1. “A child with a persistent fever, inflammation (defined as neutrophilia, elevated CRP [C-reactive protein] and lymphopenia) and evidence of single or multi-organ dysfunction (such as shock, cardiac, respiratory, renal, gastrointestinal, or neurological disorders) with additional features. The child may fulfill full or partial criteria for Kawasaki disease.”
2. “Exclusion of any other microbial cause, including bacterial sepsis, staphylococcal or streptococcal shock syndromes, infections associated with myocarditis such as enterovirus.”
3. “SARS-CoV-2 PCR testing may be positive or negative.”

*Boston Children’s Hospital* rheumatologist [Mary Beth Son, MD](http://www.childrenshospital.org/directory/physicians/s/mary-beth-son), who was one of the conference panelists stated (emphasis added):

“In some cases, children present ***with shock and*** ***some have features of Kawasaki disease***, ***whereas others may present with signs of cytokine storm***. In some geographic areas, there has been an ***uptick in Kawasaki disease*** cases in children who don’t have shock.”

On May 4, just days after the initial alert from the United Kingdom, Deputy Commissioner Demetre C. Daskalakis, MD, MPH, from the Division of Disease Control of the New York City Health Department[published a letter to his colleagues](https://www1.nyc.gov/assets/doh/downloads/pdf/han/alert/2020/covid-19-pediatric-multi-system-inflammatory-syndrome.pdf) stating the following (emphasis added):

“A pediatric multi-system inflammatory syndrome (PIMS), recently reported by authorities in the United Kingdom, ***is also being observed among children and young adults in New York City and elsewhere in the United States.”***

The letter from Daskalakis goes on to state that they have identified 15 patients as of May 4 that fit the characteristics of the described syndrome. SARS-CoV-2 testing by polymerase chain reaction (PCR) showed four positive and 11 negative results followed by six of the negative patients re-tested positive via serology testing.

On May 8, [an article published in the *New York Times* by Ali Watkins](https://www.nytimes.com/2020/05/08/nyregion/child-dead-new-virus-kawasaki.html) stated that the patient count diagnosed with this syndrome is up to 73 and New Jersey has reported the first death related to PIMS while another death is under investigation by the New York Department of Health.

On May 8, on the west coast, Children’s Hospital of Los Angeles published a similar article titled “[Pediatric Inflammatory Multisystem Syndrome (PIMS): What Parents Should Know](https://www.chla.org/blog/health-and-safety-tips/pediatric-inflammatory-multisystem-syndrome-pims-what-parents-should)” stating that experts in Los Angeles were reporting pediatric patients with “significant inflammation, toxic shock syndrome and symptoms of Kawasaki disease following infection with the novel coronavirus” which mirrors what has been reported in the United Kingdom and New York City.

**Common findings, identification/testing, and treatment**

Taken from the [Royal College of Paediatrics and Child Health](https://www.rcpch.ac.uk/sites/default/files/2020-05/COVID-19-Paediatric-multisystem-%20inflammatory%20syndrome-20200501.pdf).

*Common findings include:* (note: symptoms vary among patients)

* Persistent fever greater than 38.5°C
* Headache, confusion, syncope
* Respiratory symptoms, neck swelling, cough, sore throat
* Abdominal pain, vomiting, diarrhea
* Lymphadenopathy, swollen hands/feet
* Conjunctivitis, rash, mucous membrane changes and reddened hands and tongue
* Acute respiratory failure, acute kidney injury, toxic shock syndrome (in those that present with organ failure), and many are appearing to have full or partial Kawasaki disease

*Identification/testing:*

* Rapid identification is needed due to the quick progression of the syndrome – pan cultures
* Common labs include: Fibrinogen, D-dimer, CK-MB, troponins, ferritin, CRP, triglycerides, SGOT/SGPT, IL-6 and IL-10, CBC with differential and a CMP.
* Echocardiogram/EKGs
* CXR, CTA of chest and abdominal ultrasound

*Treatment:*

Common reported treatment includes:

* Anticoagulation
* IV immunoglobulin, IL-10 or IL-6 blockade
* Corticosteroids
* Early identification and the initiation of prophylactic antibiotics for potential sepsis is being implemented in most settings
* IVF resuscitation as needed

**Conclusion**

Although considered rare at this time, a rising number of pediatric patients with a mixture of COVID-19 test results are experiencing rare symptoms of PIMS, that presents as either full or partial symptoms of Kawasaki Disease, toxic shock syndrome, persistent fevers with single or multi-organ failure. Unlike with COVID-19 attacking the lungs in adults, this syndrome seems to be an attack on the heart in the pediatric population.

At this point in time, the true numbers of pediatric patient’s affected are unknown as further research is underway. Patient’s identified with Kawasaki disease in California at the beginning or shortly before the COVID-19 pandemic surfaced are being contacted by Children’s Hospital of Los Angeles for further testing of COVID-19 antibodies to determine if their illness could be the same syndrome currently being identified and there is a quick rise in patient’s diagnosed with this condition in the New York/New Jersey area.

Currently, there is no specific ICD-10 code to identify the syndrome. Systemic inflammatory response syndrome (SIRS), toxic shock syndrome, and Kawasaki disease for those with full symptoms are options along with any other presenting diagnosis.

***Editor’s Note:*** *Valdez is a CDI education specialist and CDI Boot Camp instructor for HCPro in Middleton, Massachusetts. For information, contact her at* [*dvaldez@hcpro.com*](mailto:dvaldez@hcpro.com)*.* For information regarding CDI Boot Camps, [*click here*](http://hcmarketplace.com/product-type/boot-camps/clinical-documentation).

**Examples: Possible Combinations for PIMS with and without COVID-19**

**Note – This is not an all-inclusive list of possible diagnoses**





