

Ask the Expert: What are the presenting signs and symptoms in children with confirmed COVID-19 disease?

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Editor's Note: *Ask the Expert is a weekly column aimed at providing pediatricians information on pressing topics related to COVID-19. Please send your questions to ahegland@aap.org.*

This story was updated May 18 to reflect new information about multisystem inflammatory syndrome in children (MIS-C).

Understanding of disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in children is changing rapidly. The first confirmed pediatric case of COVID-19 infection in the United States was reported to the Centers for Disease Control and Prevention (CDC) on March 2, 2020.

Since that time, pediatric cases of symptomatic COVID-19 disease (caused by SARS-CoV-2) appear to be less common than among adults. In the United States, about 2% of confirmed cases occur in people younger than 18 years of age. In China, less than 2.2% of cases occurred among people younger than 19 years of age.

When symptomatic, reported signs and symptoms of COVID-19 infection in children appear to be similar to other viral respiratory infections. The prevalence of asymptomatic SARS-CoV-2 infection is not well-understood because asymptomatic children are not tested routinely.

Children of all ages appear to be susceptible to infection by SARS-CoV-2, so far the majority of COVID-19 cases in children are mild. Few children with COVID-19 infection are hospitalized, and fewer children than adults experience fever, cough or shortness of breath (see table). Although rare, hospitalization rates appear to be highest among children younger than 1 year of age and those with underlying conditions (chronic lung disease including asthma, cardiovascular disease, and immunosuppression).

Signs and symptoms among 291 pediatric and 10,900 adult cases with laboratory confirmed COVID-19 infection, Feb. 12-April 2, 2020

<u>Sign/symptom</u>	<u>% with sign/symptom</u>	
	<u>Pediatric</u>	<u>Adult</u>
Fever	56	71
Cough	54	80
Headache	28	58
Sore throat	24	35
Myalgia	23	61
Shortness of breath	13	43
Diarrhea	13	31
Nausea/vomiting	11	16
Runny nose	7	7
Abdominal pain	6	12

Source: *Morbidity and Mortality Weekly Report*. 2020;69(14):422

Infected pediatric patients experience a spectrum of illness ranging from asymptomatic infection (no signs of disease), mild disease (fever, fatigue, myalgia), moderate disease (pneumonia and an abnormal chest radiograph), or severe infection (dyspnea, hypoxia or acute respiratory distress syndrome and multiorgan dysfunction).

A decision to manage a pediatric patient with mild to moderate COVID-19 disease in the outpatient or inpatient setting should be decided on a case-by-case basis with consideration of the presenting symptoms, requirement for supportive care, underlying conditions and the ability of parents or guardians to care for the child at home.

Recent reports from Europe and the United States describe a novel pediatric vasculitis that is characterized by persistent fever and features of Kawasaki disease or toxic shock syndrome associated with rash and abdominal symptoms (abdominal pain, diarrhea, vomiting). Patients diagnosed with this syndrome have required intensive care with respiratory and cardiac support. The full spectrum of this disease is not known, and cases of less severe disease may not have been identified.

This hyperinflammatory shock syndrome is associated with elevated inflammatory markers (C-reactive protein, procalcitonin, ferritin, triglycerides, D-dimers) and has been labeled multisystem inflammatory syndrome in children (MIS-C). A possible association with COVID-19 infection has been based on positive polymerase chain reaction assays or the presence of antibody to SARS-CoV-2 in some patients. These cases appear to be very infrequent.

The CDC is collecting more data and has **developed a case definition**.

Dr. Meissner is professor of pediatrics at Floating Hospital for Children, Tufts Medical Center. He also is an ex officio member of the AAP Committee on Infectious Diseases and associate editor of the AAP Visual Red Book.