

## Health & Physiology

# The life-span of SARS-CoV-2 in pediatric patients

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### ABSTRACT

*Symptomatic COVID-19 cases in children are uncommon and their clinical course is relatively mild. In particular, infected children displayed non-specific lung findings on chest image studies, and rarely required respiratory support or ICU care. Notably, some pediatric cases persistently test-positive on rectal swabs in addition to a positive nasopharyngeal test, raising the possibility of fecal-oral transmission.*



Image credits: Kang Zhang ©

As the COVID-19 pandemic sweeps the globe, scientists are racing against the clock to understand this new disease. Researchers worldwide have come together to fight this looming threat and understand how it spreads, who gets sick, and how one becomes immune. For our research, much of the data came initially from the epicenter of the initial outbreak in China. Who is most at risk? How does the virus move from person to person? These are the questions we begin to answer.

While all lives lost are precious, there is something uniquely tragic in the death of a child. Unfortunately, children's bodies do not always behave like those of adults, which requires us in the medical community to gather separate data focused on our youngest patients. Thankfully, it seems that kids do not get as sick and, generally, get well from this coronavirus. However, kids can carry the virus unknowingly to people who may get very ill. Either way, we need to study this problem.

Our study reviewed recent medical records from three Chinese treatment centers for pediatric patients to see if there were any trends we could pull out from the data. All the children tested were positive for COVID-19 from January 23<sup>rd</sup> to February 15<sup>th</sup> of 2020. Some patients who seemed to have similar symptoms like cough and fever, but negative lab tests, were excluded from the study. Doing so, we made sure that we weren't accidentally including other illnesses in our data set. We took all their information from the medical records, but the data available varied from child to child depending on their condition and an individual doctor overseeing each child's care.

So, what did we find? We used 106 cases with positive swab tests, ranging in age from one month to 18 years of age. The average age of the children was around five years, and about half (46%) were female. For those outside the Hubei province, all had traveled there or been visited by someone from there in the past two weeks. Fifty-six came from family clusters, shorthand for a household with multiple cases. The most common symptoms in children were fever and cough, with and without mucus. Perhaps most interesting was that only 30% of kids had more than one symptom, while the adult data suggests it is around 90%. This shows that children seem less sick, on average than adults.

The most concerning information is from the swab tests. We checked nasal and rectal swabs to see how long the virus was present in these tissues. Nasal swabs, initially positive for COVID-19, showed no detectable virus in about seven days, with a range of

1 to 16 days. However, the rectal swabs remained positive for much longer, between 20 and 34 days after the nasal swabs turned negative. What this suggests is that children could still be contagious after they recover from having symptoms. The virus also appears to be fecal-orally transmissible, a fancy way to say it lives and spreads in the gut, spit, and stool, based on these results. This evidence makes this illness much more spreadable than we initially thought.

Our study has a few limitations. We could only precisely calculate the incubation period, or the time from catching the virus to getting sick, in 26 cases. That seemed to be around six days, but more data would increase the accuracy of that estimate. We also cannot be sure why children seem not to become as sick. Hopefully, further investigations will help us discover that answer. We suspect that it might have to do with having prior health problems, so caution is needed in children with chronic diseases. Our short study length limits our ability to show any long term health impacts on the children studied.

Knowing all that, what should we do? It may be necessary to keep children in isolation until the rectal swabs turn negative to prevent infections further. As with any stomach bug, hand washing and good hygiene become much more important in limiting the spread of the virus. While this study is only the tip of the coronavirus-iceberg, it demonstrates that we need to treat it as more than a lung infection that resolves once the cough and fever are gone.