

# Effect of COVID-19 on air pollution and respiratory viral infection of children in South Korea

Hyung Kyu Park<sup>1</sup>, Jung Yeon Shim<sup>1</sup>, Hye Lim Jung<sup>1</sup>, Jae Won Shim<sup>1</sup>, Deok Soo Kim<sup>1</sup>, Ji Hee Kwak<sup>1</sup>, Aram Yang<sup>1</sup>, and In Suk Sol<sup>1</sup>

<sup>1</sup>Kangbuk Samsung Medical Center

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## Abstract

**Background:** Air pollution can be a risk factor for respiratory viral transmission and infection. The COVID-19 outbreak in 2020 may have affected ambient air pollution levels. Therefore, this study aimed to investigate air pollution levels and respiratory virus infection rates before and after the COVID-19 pandemic as well as determine relationships between these factors. **Methods:** The daily mean temperature and concentrations of air pollutants (PM<sub>2.5</sub>, PM<sub>10</sub>, O<sub>3</sub>, NO<sub>2</sub>, CO, and SO<sub>2</sub>) in five metropolitan cities in South Korea were collected for the months of February to May from 2015 to 2020. Results of 14 respiratory viruses isolated using polymerase chain reaction in children with upper or lower respiratory tract infections were gathered during the same period. Trends of respiratory virus infection, temperature, and air pollutant level from February to May for six years were evaluated and possible relationships between respiratory virus infections and ambient air pollutant levels were assessed. **Results:** Most air pollutants exhibited significantly decreasing trends in 2020 compared to the years before COVID-19. There were no differences in temperature. Adenovirus, bocavirus, metapneumovirus, parainfluenza virus 3, and rhinovirus were the most frequently detected viruses from February to May from 2015 to 2019, and infection rates dropped significantly in 2020. The concentration of ambient O<sub>3</sub> was associated with rhinovirus infection in hospitalized children (aOR [95% CI], 1.028 [1.002, 1.055]). **Conclusions:** After the COVID-19 outbreak, ambient air pollution levels and respiratory virus transmission decreased in the pediatric population of South Korea.

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