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Clinical Notes

Decrease in pediatric inpatients with respiratory syncytial virus infection during severe acute respiratory syndrome coronavirus 2 pandemic

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Since the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic began, strict measures to avoid disease transmission have been recommended in Japan, such as wearing masks in public, practicing hand hygiene, encouragement of social distancing, working remotely, cancellation of large events, and school closures. These measures have not only affected SARS-CoV-2 transmission but also prevented the transmission of other respiratory viruses such as seasonal influenza.[1] Respiratory syncytial virus (RSV) is a highly contagious respiratory pathogen that causes bronchiolitis and pneumonia.[2] There is no vaccine for RSV, so the standard precaution is to interrupt its transmission.[3] However, it is difficult for children under school age to undertake effective hand-hygiene practices, wearing masks, and social distancing.

To investigate the effectiveness of infection prevention measures for young children, we compared the weekly number of pediatric inpatients with RSV infections in 2020 with those in the previous two years (2018–2019) in the Saitama prefecture, Japan. The Saitama prefecture, which is adjacent to Tokyo, has a population of 7.3 million people, of which 0.9 million are children (<15 years).

We used data from 2018 to 2020 from the Japanese Pediatric Society Saitama Branch RSV Infection Surveillance Working Group. This group has been collecting data on the number and age of hospitalized patients with RSV infections weekly, as diagnosed by physicians based on clinical symptoms or laboratory findings from 22 hospitals that treated almost all pediatric inpatients in the Saitama prefecture since 2018. The number of intubated patients was also collected.

Continuous variables, such as the yearly mean of the weekly rates (the number of admitted patients divided by the number of hospitals) were compared using analysis of variance; categorical variables, such as proportions, were compared using the χ^2 test with the Fisher modification when appropriate. Statistical significance was defined as $P < 0.05$. Analyses were performed using R software, version 4.0.3 (R Foundation for Statistical Computing, Vienna, Austria). The study was approved by the institutional ethics committee (no. 2020-05-008).

There were 1,515, 1,465, and 161 inpatients with RSV infections in 2018, 2019, and 2020, respectively (Fig. S1). The median age was 0 years for the three years. In 2018 and 2019, the prevalence of RSV infections increased in autumn. While RSV infections peaked between weeks 30 and 40 in 2018 and 2019, there was no peak in 2020 (Fig. 1). The average number of weekly infection rates per hospital significantly differed across the years ($P < 0.05$). Among the inpatients with RSV, 2.2% of them (33/1,515) were intubated in 2018, 2.6% (38/1,465) in 2019, and 2.5% (4/161) in 2020; there was no statistically significant difference in the proportions across the groups ($P = 0.77$).

The number of pediatric inpatients with RSV infections was significantly lower in 2020 than in previous years in Saitama, Japan. It is well known that RSV presents as a common cold among family members first, and is transmitted to infants.[2] This study suggests that prevention measures against respiratory infections undertaken by the general population can also reduce the incidence of infections in infants without being affected by meteorologic conditions. There was no significant difference in the rate of endotracheal intubation in patients; hence, it was unlikely that the RSV itself became less virulent. Even after the reopening of schools, the number of inpatients with RSV infections remained low. School closures were therefore unlikely to have a critical impact on the RSV epidemic.

In Japan, the National Institute of Infectious Diseases (NIID) collected the number of RSV patients as a pediatric sentinel surveillance. According to the NIID weekly reports, the average number of weekly infection rates per sentinel

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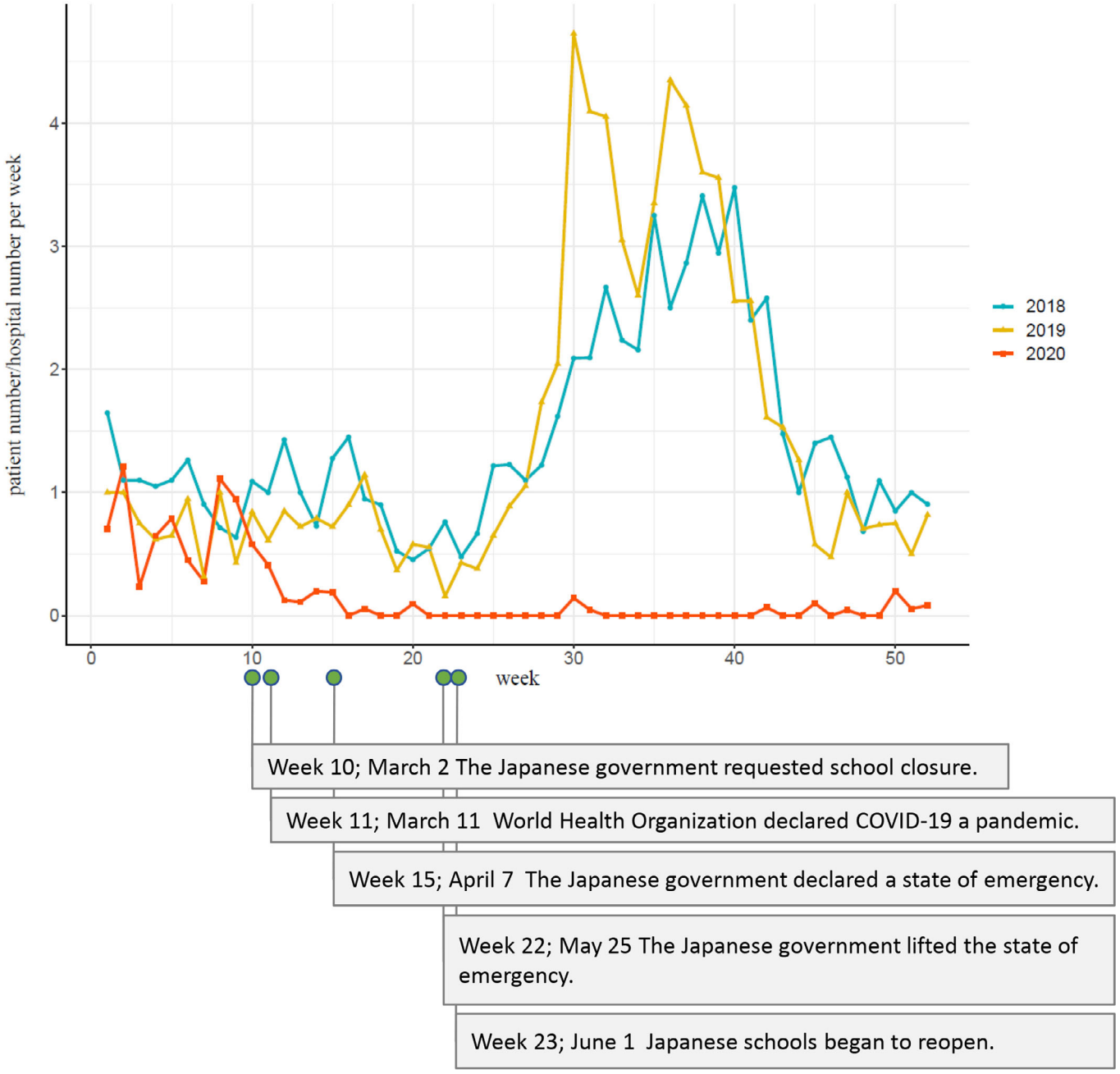


Fig. 1 Average number of pediatric patients with respiratory syncytial virus (RSV) infections admitted weekly per hospital in 2018–2020, and events related to the SARS-CoV-2 pandemic in 2020. (—●—), 2018; (—▲—), 2019; (—■—), 2020. [Colour figure can be viewed at wileyonlinelibrary.com]

facility decreased significantly in 2020 (Fig. S2). However, during the pandemic in Italy, there was a substantial decrease in pediatric care access, reflecting the hesitation of parents and caregivers to risk exposure to SARS-CoV-2 in hospitals.[4] Focusing on inpatients with moderate to severe RSV infections might therefore remove the bias caused by caregiver's hesitation to visit hospitals because of the SARS-CoV-2 pandemic.

Interestingly, in Australia, the number of RSV cases rose in October; however, the reason is unclear.[5] Careful surveillance is necessary to determine the factors that may lead to a surge in the number of patients with RSV infections following the low prevalence of RSV infection in 2020. It is vital to continue practicing sustainable precautions, such as hand hygiene and wearing masks, to reduce the transmission of respiratory infections.

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The authors declare no conflict of interest.

Author contributions

K.Y. and O.T. conceptualized and designed the study, drafted the initial manuscript, and reviewed and revised the manuscript. K.Y. and K.T. designed the data collection instruments, collected data, carried out the initial analyses, and reviewed and revised the manuscript. I.K. coordinated and supervised data collection, and critically reviewed the manuscript for important intellectual content. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Fig. S1. Number of inpatients with respiratory syncytial virus (RSV) infections by age in 2018–2020.

Fig. S2. Respiratory Syncytial virus (RSV) infection cases reported per sentinel weekly in the Saitama Prefecture in 2018–2020. Infectious Diseases Weekly Report [homepage on the internet]. Tokyo: National Institute of Infectious Diseases [Cited 2021 Feb. 19]. Available from: https://www.niid.go.jp/niid/ja/idwr.html.

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