



Reemergence of Parainfluenza Virus Type 3 and Respiratory Syncytial Virus Infections During the COVID-19 Pandemic

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Dear Editor,

Since the first confirmed case of coronavirus disease 2019 (COVID-19) on January 20, 2020, up to January 11, 2022, the Korean government has reported 670,483 COVID-19 cases, with 6,114 deaths [1, 2]. Social distancing measures were applied to varying extents to avoid the transmission of COVID-19 and several other respiratory infections [3-5]. However, attenuating these infection control measures led to a resurgence of respiratory viruses. A particularly unusual surge of respiratory syncytial virus (RSV) infection was reported in Japan, the United States of America, and Australia [6]. We performed a retrospective analysis of nationwide surveillance data from Korean hospital records. The Institutional Review Board of Asan Medical Center, Seoul, Korea, approved this study and waived the requirement for patient written consent (2022-0141).

All results from patients tested using a respiratory virus panel (Anyplex II RV16 or Allplex Respiratory Panels, Seegene, Seoul, Korea) over five years (2017–2021) at a university-affiliated hospital in Korea were reviewed. The national surveillance data for acute respiratory viruses for the same period were retrieved from the Infectious Disease Portal (<https://www.kdca.go.kr/npt/biz/npp/iss/ariStatisticsMain.do>). Data were analyzed with the chi-square test using MedCalc software (version 19.2, Ostend, Belgium).

Annual RSV outbreaks with maximum weekly positive case numbers of 1,078–1,460 (nationwide) and 24–45 (hospital) during winter were continuously reported for three years before the COVID-19 pandemic. No RSV outbreak was reported between summer 2020 and autumn 2021. A reemergence of RSV with up to 218 (nationwide) and eight (this institution) weekly positive cases was recorded in winter 2021 (Fig. 1A, B).

Annual PIV outbreaks were also continuously reported during late spring of the three years before the COVID-19 pandemic, with maximum weekly positive case number of 406–673 (nationwide) and 22–40 (hospital). No PIV outbreak was reported between summer 2020 and summer 2021. A reemergence of PIV with up to 634 (nationwide) and 22 (hospital) weekly positive cases was recorded in autumn 2021 (Fig. 1C, D). The peak in the PIV infections in 2021 was as high as that before the COVID-19 pandemic.

In this hospital, both types of RSV have co-circulated for five years since 2017. RSV type B (RSVB) was dominant during 2017–2021, except in 2019. Before the COVID-19 pandemic, all PIV types co-circulated with PIV3 as the most prevalent type; however, only PIV3 was found in 2021 (Fig. 2).

In Japan, in 2021, a reduction was reported in the number of RSV-infected 0–11-month-old children [6]. However, the percentage of RSV-positive children <2 years old did not change

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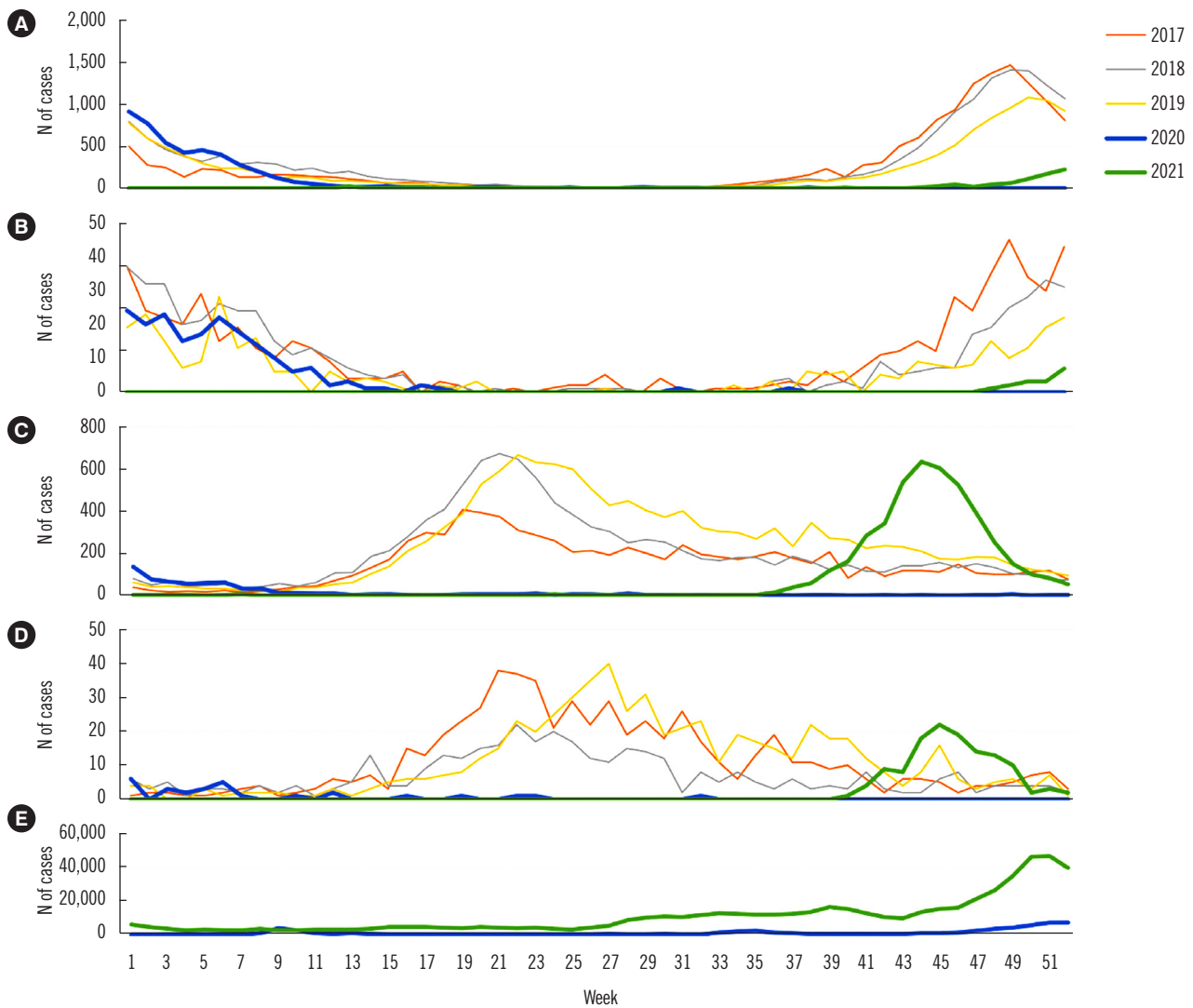


Fig. 1. Weekly number of positive cases of respiratory viruses from 2017 to 2021: respiratory syncytial virus infection cases nationwide (A), respiratory syncytial virus infection cases in a Korean hospital (B), parainfluenza virus infection cases nationwide (C), parainfluenza virus infection cases in a Korean hospital (D), and severe acute respiratory syndrome coronavirus 2 infection cases nationwide (E).

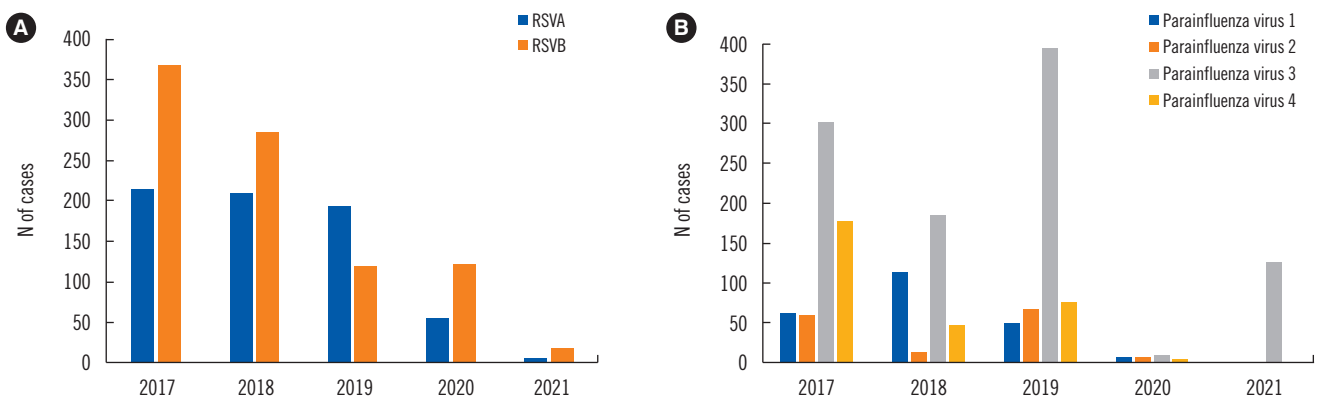


Fig. 2. Types and number of (A) respiratory syncytial virus and (B) parainfluenza virus infections in a hospital. Abbreviations: RSVA, respiratory syncytial virus A; RSVB, respiratory syncytial virus B.

substantially from 28.3% in 2019 to 22.4% in 2020–2021 in the present study ($P=0.13$). Considering that most children are infected with RSV more than once before reaching two years of age and the significant drop in RSV infection rates in the past two years, an increased percentage of the population susceptible to RSV may lead to a RSV outbreak affecting not only younger children but also those older than two years. RSV was the most prevalent respiratory virus infecting children before the COVID-19 pandemic in Korea [7]. Therefore, the reemergence of RSV in pediatric patients after COVID-19 was expected. A PIV outbreak was annually observed immediately after the influenza outbreak during 2016–2019 [8]. PIV3 is the typical cause of the annual outbreak, whereas PIV1 is responsible for biennial outbreaks. Considering there was no PIV3 outbreak in 2020 because of intense social distancing, it was more likely to occur in the following year. These recently observed trends will help predict the patterns of respiratory virus infections owing to the relaxation of non-pharmaceutical interventions after a forthcoming pandemic cause by another respiratory virus.

As of January 10, 2022, 43,144,641 people, representing approximately 86% of the Korean population, had received two doses of the COVID-19 vaccine [9]. With the completion of the vaccination program, leniency in the social distancing rules in the late autumn of 2021 increased the risk of the spread of COVID-19 and other respiratory virus infections. Although the peak of PIV3 resurgence was as high as that before the COVID-19 pandemic in Korea, RSV resurgences of a magnitude greater than those before the COVID-19 pandemic were observed in several countries [6].

Since medical burden is already high due to the prolonged COVID-19 pandemic, additional, unexpected, and large-scale outbreaks of other respiratory viruses can cause medical system failure. Early detection by continuous monitoring is critical for preventing outbreaks [10]. Thus, respiratory virus epidemics should be carefully monitored along with strengthened infection control measures.

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AUTHOR CONTRIBUTIONS

Conceptualization: Sung H. Data curation: Park K, Sung H. Formal analysis: Park K. Funding acquisition: Sung H. Investigation: Park K. Supervision: Sung H, Kim MN. Writing—original

draft: Park K. Writing—review & editing: Sung H, Kim MN. All authors have read the final manuscript and approved this submission.

CONFLICTS OF INTEREST

All authors have no potential conflicts of interest.

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