Letter to the Editor

trd Tuberculosis & Respiratory Diseases

Epidemiology of Severe Acute Respiratory Infection in Korea: 2022 to 2024 Surveillance Data

https://doi.org/10.4046/trd.2025.0043
ISSN: 1738-3536(Print)/
2005-6184(Online)
Tuberc Respir Dis 2025;88:610-613

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Received Mar. 12, 2025
Revised Mar. 22, 2025
Accepted Apr. 28, 2025
Published online Apr. 28, 2025

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Severe acute respiratory infection (SARI) is a significant public health concern due to its high morbidity, rapid transmission, and potential for outbreaks and pandemics. The World Health Organization (WHO) defines SARI as an acute respiratory infection with fever (≥38°C) and cough within the last 10 days that necessitates hospitalization. Since 2015, the Korean Disease Control and Prevention Agency (KDCA) has operated a hospital-based SARI surveillance system and, in 2017, established a sentinel surveillance network in collaboration with the Korean Academy of Tuberculosis and Respiratory Diseases (KATRD). This network, encompassing 42 general hospitals nationwide, aims to monitor trends and facilitate the early detection of emerging respiratory pathogens. In this brief report, we provide an overview of the epidemiologic data on SARI from 2022 to 2024 in Korea.

Case Definition and Surveillance System

Since the 2009 influenza pandemic, the WHO has emphasized the importance of continuous SARI surveillance to detect and mitigate emerging infectious diseases. In 2014, WHO refined the case definitions for influenza-like illness (ILI) and SARI to improve global standardization[1]. According to WHO guidelines, SARI is defined as an acute respiratory infection with a history of fever (≥38°C) and cough, with symptom onset within the last 10 days, requiring hospitalization.

In response, the KDCA established a SARI surveillance system in 2015 and later developed a sentinel surveillance network in 2017 in partnership with KATRD. This network includes 42 general hospitals affiliated with university medical centers[2] since May 2020. The primary objectives of this system are to monitor trends in severe respiratory infections, estimate their impact on hospitalization and mortality, and enable the early detection of unusual or unexpected respiratory disease outbreaks. The data collected from participating hospitals facilitate real-time epidemiological analysis, which is critical for timely public health interventions.

Data Collection and Quality

The KDCA's hospital-based SARI surveillance system operates through two main mechanisms aligned with WHO guidelines: monitoring the clinical burden of severe respiratory infections and enabling rapid responses to novel pathogen outbreaks. Within this framework, patients meeting the SARI case definition are identified upon hospital admission. Clinical and demographic data from 13 sites on respiratory syncytial virus (RSV), influenza virus (IFV), human adenovirus (AdV), human para-

influenza virus (HPIV), human rhinovirus (HRV), human metapneumovirus (HMPV), human bocavirus (HBoV), and human coronavirus (HCoV), three atypical bacterial pathogens and pneumococci are recorded in the KDCA's intranet-based Integrated Information System for Infectious Disease Control (Figure 1). Additionally, respiratory specimens from unusual cases are collected and analyzed to detect emerging pathogens.

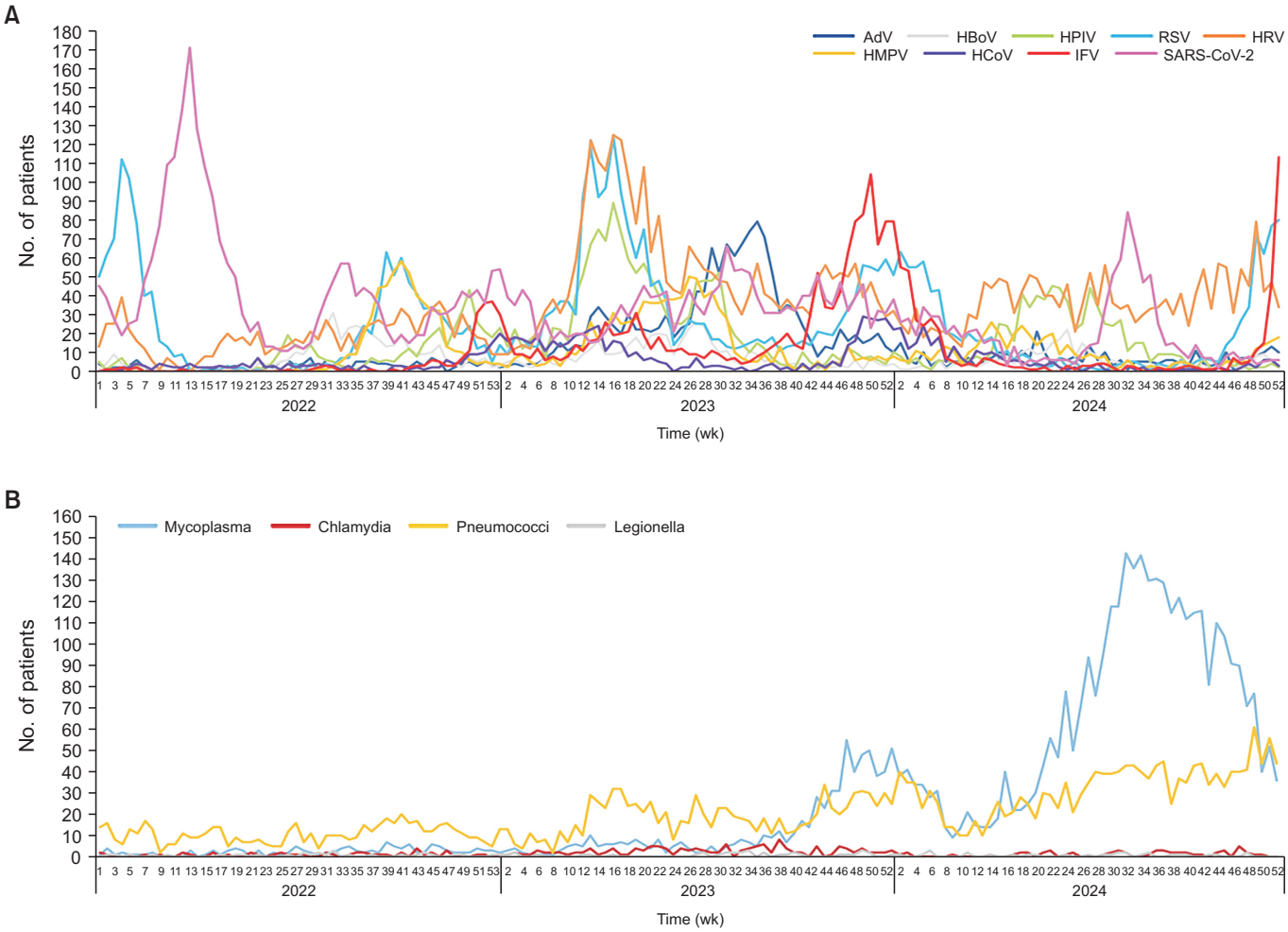
Data integrity is maintained through rigorous quality control measures, including weekly reporting by participating hospitals. The annual timely reporting rate has averaged 93%, with a follow-up completion rate exceeding 98%. Surveillance data from 2017 to 2021 were evaluated using guidelines from the U.S. Centers for Disease Control and Prevention (CDC), demonstrating excellent sensitivity and representativeness[2].

Based on quality-controlled data, Korean Study Group of Respiratory Infectious Disease reported that SARI disease burden between 2018 and 2020 decreased as the impact of nationwide social distancing[3,4].

Results

The number of SARI cases fluctuated yearly, and the predominant pathogens also changed (Figure 1). In 2022, from 1,663,243 hospital admissions, 11,023 (0.67%) met the SARI case definition. The median age of the patients was 39 years (interquartile range [IQR], 2 to 72) with 58.30% being male. The most frequently detected pathogens in adults were severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (72.79%) and pneumococci (13.0%). Among children and adolescents, RSV (25.88%), and HRV (20.27%) were pre-

Figure 1. Pathogen detection of hospital-based severe acute respiratory infections in South Korea from 2022 to 2024. (A) Nine viral respiratory infection; pathogen detection status (2022 to 2024) by weekly reported. (B) Four bacterial respiratory infection; pathogen detection status (2022 to 2024) by weekly reported. AdV: human adenovirus; HBoV: human bocavirus; HPIV: human parainfluenza virus; RSV: respiratory syncytial virus; HRV: human rhinovirus; HMPV: human metapneumovirus; HCoV: human coronavirus; IFV: influenza virus; SARS-CoV-2: severe acute respiratory syndrome coronavirus 2.



dominant. Influenza cases were relatively low (1.64%) across all age groups. Intensive care unit (ICU) admissions accounted for 6.81% (732 cases), and the overall case fatality rate (CFR) was 5.36% (579 deaths). Pediatric cases (<18 years) accounted for 44.87% of all SARI cases.

In 2023, the number of SARI cases increased to 17,601 (1.02%) out of 1,723,332 admissions. The median age dropped to 11 years (IQR, 2 to 71) with 56.50% being male. In adults, SARS-CoV-2 remained the most prevalent pathogen (40.49%), followed by pneumococci (16.49%). Among children and adolescents, HRV (24.49%), RSV (17.36%), and human AdV (13.38%) were dominant. Notably, AdV cases surged from 1.38% in 2022 to 7.99% in 2023, indicating a substantial epidemiologic shift. Influenza cases also increased to 7.96%, contributing to a rise in hospitalization rates. ICU admissions declined slightly to 859 cases (5.08%), and the CFR decreased to 3.80% (623 deaths). Pediatric SARI cases rose to 53.52% of total admissions.

By 2024, the number of SARI cases decreased to 13,990 (1.02%) out of 1,382,346 admissions. The first half of the year noted a significant decrease in admissions, coinciding with a nationwide suspension of junior doctor training programs, which impacted hospital capacity and surveillance coverage. The surveillance system and SARI cases stabilized during the second half of the year. The median age of the patients was 12 years (IQR, 4 to 69), with 54.90% being male. Cases of SARS-CoV-2 continued to decline (7.15%). In pediatric populations, HRV (19.59%), pneumococci (11.77%), and RSV (9.33%) remained prevalent. The global resurgence of RSV, as reported by European Centre for Disease Prevention and Control, was also reflected in Korea data[5]. A significant mycoplasma outbreak was observed, affecting 33.93% in younger and 21.94% in older populations respectively, consistent with global trends[6]. ICU admissions remained stable at 5.27% (727 cases), and the CFR further dropped to 2.77% (380 deaths). Pediatric cases comprised 56.15% of total SARI cases, continuing the trend of increased disease burden in younger age groups.

Despite its strengths, the current SARI surveillance system has limitations, particularly regarding geographic representativeness. Being a hospital-based sentinel system, its data may not fully capture regional disparities if facility distribution is not proportional to the population[7]. The ongoing collaboration between KDCA and KATRD focuses on improving data coverage, ensuring population representativeness, and enhancing early warning capabilities.

Conclusion

The findings suggest that the dominant pathogens of respiratory infections are annually shifting post-coronavirus disease 2019. A significant increase in pediatric SARI cases and a decline in SARS-CoV-2-related hospitalizations accentuate the evolving epidemiological landscape. The emergence of mycoplasma in 2024 and the fluctuation of other viral pathogens underscore the importance of sustained surveillance. Strengthening national respiratory infectious disease surveillance is essential for preparedness and effective response to future outbreaks.

Authors' Contributions

Conceptualization: Moon JY. Data curation: Lee YS, Lee HS. Writing - original draft preparation: Moon JY. Writing - review and editing: Moon JY. Approval of final manuscript: all authors.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

Funding

This study was supported by the 'Hospital-based Severe Acute Respiratory Infectious Disease Surveillance Project' of Korea Disease Control and Prevention Agency (KDCA) (Funding No: KDCA-2024-6100-6134-309).

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