

## LETTER TO THE EDITOR

## Incident changes in the prevalence of influenza virus during COVID-19 pandemic in Hangzhou, China

Dear editor,

The report entitled “Incident changes in the prevalence of the respiratory virus among children during COVID-19 pandemic in Hangzhou, China” by Han et al. proved to be a rather interesting read.<sup>1</sup> In this report, Xiucui Han et al. studied the prevalence of respiratory viruses in children in Hangzhou of China in recent years (2019–2021). Here, we presented the prevalence of the influenza viruses among people during the COVID-19 pandemic in Hangzhou, China.

Influenza viruses are common respiratory viruses. It is known that influenza viruses are divided into four types: A, B, C, and D according to their core proteins. Among them, influenza type A (H1N1, H3N2) and B (Yamagata, Victoria line) viruses spread together or alternately, which cause seasonal influenza epidemics.<sup>2</sup> According to the World Health Organization (WHO), the annual incidence of influenza viruses in adults is 5% to 10%, while 20% to 30% in children.<sup>3</sup> Influenza patients generally present with fever, cough, sore throat, and general malaise, but the clinical characteristics of people in different ages after being infected with influenza viruses are varied, and even some patients with influenza viruses have atypical clinical symptoms. The severity of illness after influenza viruses infection in humans varies from asymptomatic infection, mild fever, self-limited upper respiratory tract infection to acute severe combined with other diseases, and severe cases can cause death.<sup>4</sup>

Influenza type B virus was first discovered in children in 1940. Since then, influenza type B virus and influenza type A virus are often co-circulated in the annual influenza season.<sup>5</sup> Globally, one or two lineages of influenza type B virus co-circulate with influenza type A virus during the annual influenza season, and a cold epidemic dominated by influenza type B virus occurs every 2 to 4 years.<sup>6,7</sup> Influenza epidemics can not only lead to an increase in outpatient visits and hospitalizations but also lead to a large number of severe cases and deaths, resulting in 250 000 to 500 000 deaths each year.<sup>8</sup>

The Health Commission of Zhejiang Province released confirmed cases of COVID-19 in Zhejiang

Province on January 23, 2020. From the end of 2020, vaccinations against SARS-CoV-2 were launched one after another. In this study, we analyzed people who came to the outpatient clinic of Zhejiang Hospital from January 2019 to December 2021, analyzed the number of positive people for the influenza viruses (Figure 1), and calculated the positive detection rate (number of positive detection of a certain virus/number of visits in the same period) (Figure 2). In this study, we observed the prevalence of influenza viruses in the COVID-19 pandemic by comparing the number of influenza viruses infections and the positive infection rate in the year before the COVID-19 pandemic (2019) and the first year (2020) and the second year (2021) after the outbreak of COVID-19.

The data showed, in 2020, there were the fewest outpatient visits and positive infections in the 3 years, followed by 2021. The number of visits in 2019 was the largest. In 2019, influenza viruses had distinct seasonality, but their seasonality was not fully pronounced in 2020 and 2021. The number and infection rate of influenza type A virus in 2021 are basically the same as those in 2020, and they were much lower than those in 2019. This depends on the reduction of human clustering activities in the process of COVID-19 prevention and control, and on the other hand, it caused by the improvement in hygiene habits. Long-term mask wearing may reduce the infectivity to respiratory viruses, especially in children, the elderly and those with respiratory illnesses. It is worth noting that in the autumn and winter seasons of 2021, the number and infection rate of influenza type B virus was the highest in 3 years, and there was a rebounding growth, which required further research.

The COVID-19 pandemic had changed the prevalence of influenza viruses among people in Hangzhou. Changes in the active period of influenza viruses correlate to personal medical behaviors in the epidemic of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), coupled with the implementation of a series of measures to control COVID-19, such as hand hygiene, wearing masks, reducing gatherings, and increasing social distancing, which can largely change the epidemiological

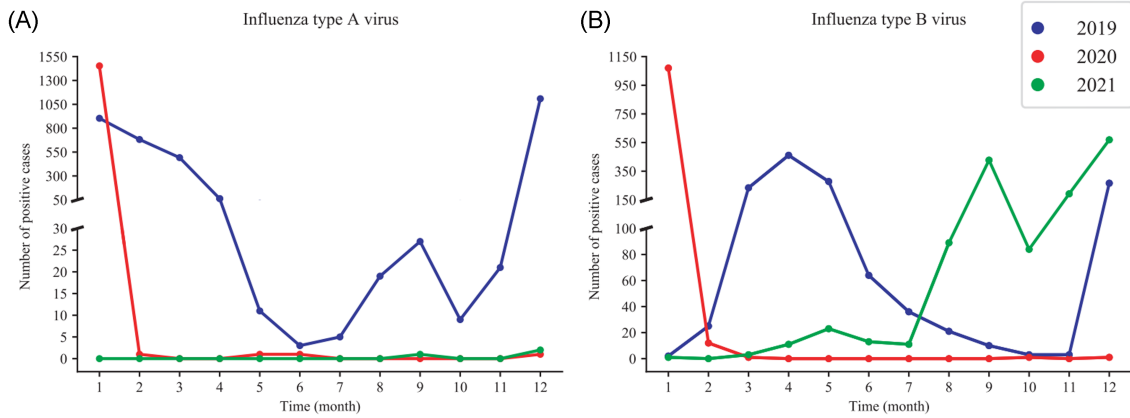


FIGURE 1 The number of positive detection of various respiratory viruses at different times (years)

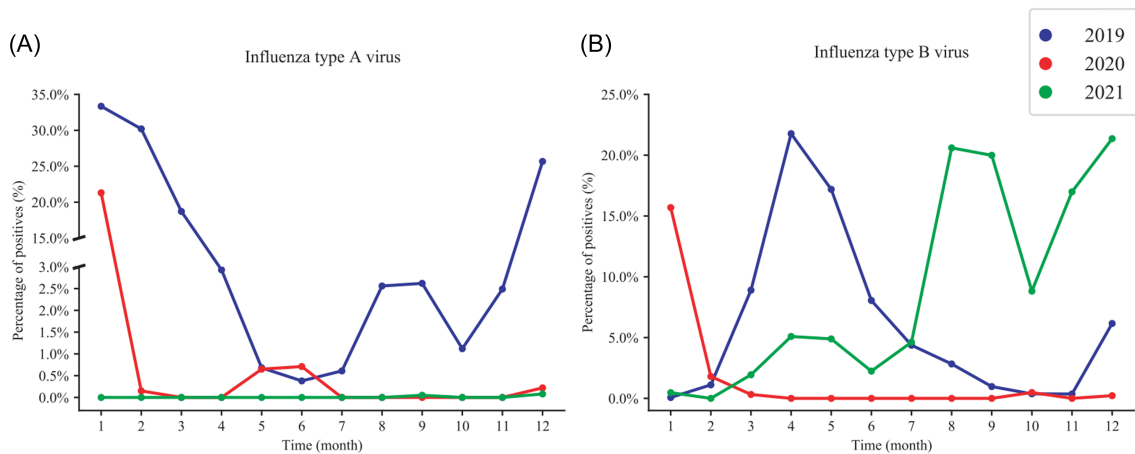


FIGURE 2 The positive detection rate of various viruses at different times (years)

characteristics of influenza viruses. Therefore, the reasons for the changes in the epidemiological characteristics of influenza viruses should be interpreted cautiously and further research is needed. This change may not only come from the hazards of SARS-CoV-2 itself but also from a series of stringent measures taken during the COVID-19 pandemic. First, strict control measures have blocked the spread of respiratory viruses to a certain extent. At the same time, increased awareness of SARS-CoV-2 protection and the importance of good health has also reduced respiratory viral infections. China took “dynamic zero” measures against SARS-CoV-2. The spread of SARS-CoV-2 in China was well controlled. It should be noted that, in the fall of 2021, there was a rebound in influenza type B virus growth. However, the prevalence of influenza type B virus remains uncertain and deserves our attention and continuous monitoring. This study is only a single-center study, and conclusions in other regions may be different.

In short, during the COVID-19 pandemic, nonpharmacological interventions have partially altered influenza viruses' infection rates. The fall and winter of 2021 may be an epidemic season for influenza type B virus. Continuous monitoring of influenza viruses can not only understand its epidemic characteristics and mutation characteristics and determine the composition and vaccination time of influenza vaccine but also predict the epidemic trend and provide scientific basis for the formulation of influenza prevention and control strategies. The reason that determines the main prevalence of influenza type B viruses is still unclear, and more researches are currently focused on influenza type A virus. Therefore, compared with influenza type A virus, during the COVID-19 epidemic, the prevention and control of influenza type B virus is more important. On the premise of controlling the COVID-19 epidemic, we should also be alert to the outbreak of other respiratory viruses.

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None to declare.

## CONFLICT OF INTEREST

All authors have declared that there is no conflict of interest.

## ETHICS STATEMENT

This work was approved by the Zhejiang Hospital Ethics Committee.

## AUTHOR CONTRIBUTIONS

Author Pengfei Xu contributed to study design, collected the clinical data and wrote the manuscript. Hao Wang and Xiucui Han contributed to the analysis of results and drew graphs. Meng Li was responsible for the modification and gave final approval of the manuscript. All authors read and approved the final manuscript.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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