Research Letter

Resurgence of influenza A infections in children after the relaxation of COVID-19-related social distancing measures and normalization of international travel in Qatar

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The implementation of non-pharmaceutical measures and restrictions on international travel to mitigate the spread of coronavirus disease 2019 (COVID-19) have impacted the spread and seasonality of several respiratory viruses worldwide, including influenza A virus.1–3 Qatar is a small country in the Northeast coast of the Arabian Peninsula with a subtropical desert climate. Before the introduction of COVID-19 restrictions, influenza A circulated in Qatar throughout the year with a largest peak of infection between November and December, and a secondary peak of variable amplitude between March and April.4 Here, we assessed trends in influenza A infection rates in children during the COVID-19 pandemic in Qatar.

Sidra Medicine is a Paediatric tertiary-care hospital and the main referral centre for children in Qatar. Figure 1A shows the monthly number of laboratory-confirmed influenza A infections in our hospital from the last typical autumn outbreak in September 2019 to June 2022. Figure 1B shows the trajectory of the monthly average of the stringency index (SI) from the Oxford COVID-19 Government Response Tracker as a proxy for domestic mobility, and the monthly percent change in the number of international visitors compared with the same months in 2019 as a proxy for the volume of international travel between March 2020 and June 2022.5,6

After the implementation of the first COVID-19 related lockdown in mid-March 2020 that included school closures, mandatory masking and entry ban for international visitors, we documented a prolonged absence of influenza A activity. Influenza A re-emerged in summer 2021 during the relaxation of a second lockdown, although the rate of detection remained significantly lower for the following months compared with pre-pandemic years. However, an unusual surge in influenza A infections was recently detected in our hospital coinciding with a higher influenza A activity, predominantly H3N2, in Qatar compared with other countries of the Arabian Peninsula (Figure 1A).7 For instance, the rate of laboratory-confirmed influenza A infections and influenza-like illness (ILI)-related Paediatric emergency visits (PEDV) increased >10-fold (positivity rate: 24.9% vs 2.5%; P < 0.001) and 20-fold in June compared with the same month in 2019. Notably, whereas there were no admissions for ILI to the Paediatric Intensive Care Unit during 2019, 10 critical care admissions were registered between May and June of this year. Finally, the positivity rate for influenza A and ILI-related PEDV plummeted from mid-July reflecting a disruption of transmission chain due to the summer school break and the exodus of the large expatriate population in Qatar for summer vacation.

We used Spearman’s rank correlation coefficient to assess the strength of the correlation between the monthly numbers of laboratory-confirmed influenza A infections and monthly average of the SI, and percent change in the number of international visitors between March 2020 and June 2022.8–10
Figure 1. Monthly number of laboratory-confirmed influenza A infections in children in Sidra Medicine in Doha, Qatar, between September 2019 and June 2022 (A). From March 2020 to June 2022, influenza A infections are plotted alongside with the stringency index from the Oxford COVID-19 Government Response Tracker, and the percent change in the monthly number of international visitors compared with the same months in 2019 (B). Qatar has imposed two COVID-related lockdowns in mid-March 2020, and at the end of March 2022, which are marked in red. Both lockdowns were gradually lifted in four phases. Periods of gradual easing of restrictions are marked in yellow. The dashed lines mark the progressive reopening of in-person schools and nurseries.

(Rs = 0.77). Likewise, it is interesting to note that during autumn 2020, amid the last phase of the easing of lockdown measures that included gradual reopening of nurseries and schools in a hybrid learning mode, influenza A remained undetected in our hospital. Noteworthy, the number of international visitors in autumn 2020 had dropped to only 4% compared with 2019. Moreover, during that time, ~90% of travellers arrived via international flights, since the only terrestrial border with Saudi Arabia was closed. In contrast, the number of international visitors in May and June this year were 25 and 9% higher, compared with the same months in 2019. Furthermore, there was a substantial increase in the influx of visitors from neighbouring countries as more than 30% of visitors arrived by land.

Our data suggest an off-season peak of influenza A infections among an immunologically naïve paediatric population due to a prolonged low influenza activity after the advent of COVID-19 in Qatar. Although we did not assess the role of other potential confounding factors like indoor mask wearing in public places that was no longer mandatory in Qatar from 21st May, our results suggest that the size and severity of forthcoming influenza
A outbreaks in countries with populations with waning immunity that are currently transitioning to pre-pandemic normality, will not only be driven by an increase in domestic mobility and person-to-person contacts, but also by the magnitude of the introduction of influenza A strains from other regions resulting from the long-awaited normalization of international travel.1–10

Author contribution
APL designed the study, collected and analysed data, and drafted the manuscript. HAM performed the statistical analysis and designed Figure 1. MI and MS collaborated with data analysis. MRH collaborated with designing the study and teaming up with APL to draft the manuscript. PT coordinated and supervised the execution of the study. All authors read and approved the final version of the manuscript.

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Conflict of Interest
The authors have no conflicts of interest.

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