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## Letter to the Editor

## The impact of visitor restrictions on health care-associated respiratory viral infections during the COVID-19 pandemic: Experience of a tertiary hospital in Singapore



## To the Editor:

We read with interest the recent article by Weiner et al that described hospital visitation policies during the coronavirus disease 2019 (COVID-19) pandemic, and called for epidemiological evidence to support and inform the imposition of visitor restrictions.<sup>1</sup> Indeed, the imposition of visitor restrictions has been introduced in various healthcare settings to mitigate transmission of SARS-CoV-2;<sup>2,3</sup> however, as such measures were typically imposed as part of a bundle of other infection-prevention measures, the actual contribution of visitor restrictions in minimizing health care-associated transmission of respiratory-viral-infections (RVIs) is unclear. Furthermore, evidence is emerging that restricting access to family caregivers and visitors poses risks of social isolation, psychological distress, and delayed recovery,<sup>4</sup> which has to be weighed against potential benefits associated with preventing health care-associated RVIs (HA-RVI).

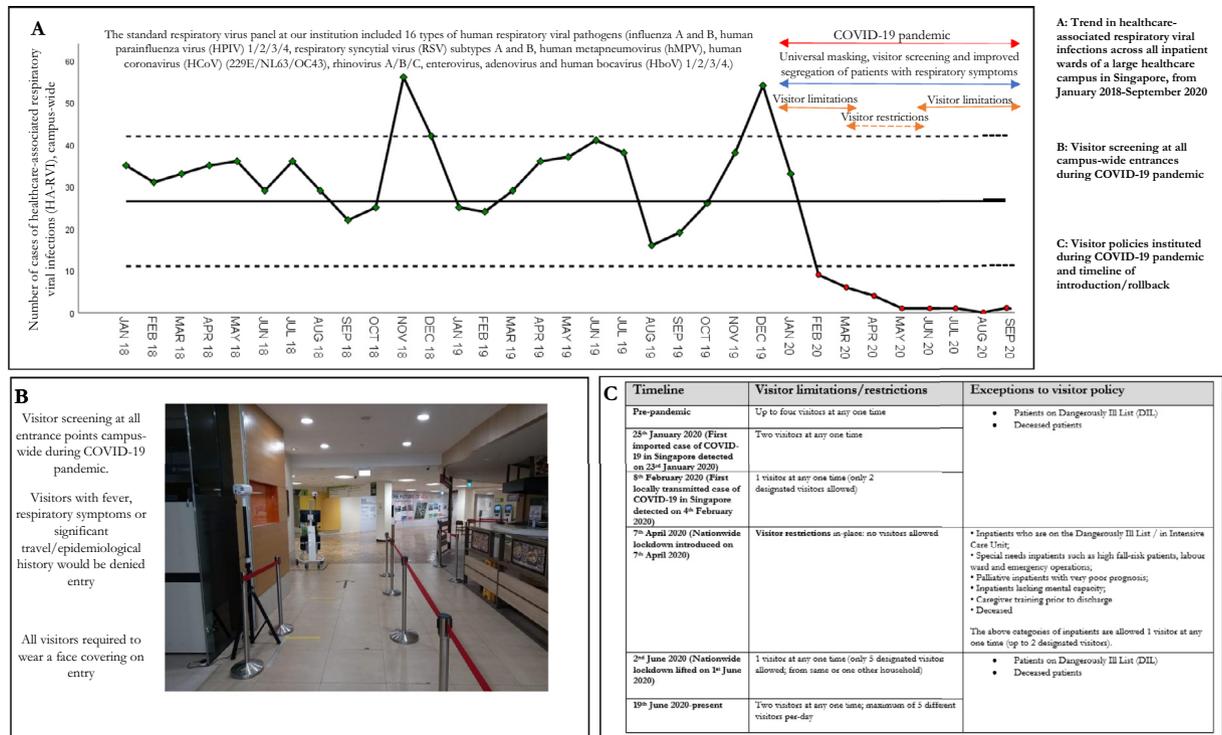
In Singapore, a Southeast Asian city-state, various infection-prevention measures were implemented soon after the first reported case of COVID-19 in end-January 2020. From February 2020 onward, a COVID-19 containment strategy was implemented across the largest health care campus in Singapore, comprising the Singapore General Hospital (SGH), the largest acute tertiary hospital in Singapore (1735 beds), a 545-bed community hospital as well as four subspecialty centers in cardiology, neurology, ophthalmology, and oncology, all located on a single site (Fig 1a). Our institution's campus-wide approach involved improved segregation of patients with respiratory symptoms, universal masking of staff, patients and visitors, point-of-entry temperature screening for all staff and visitors, as well as visitor limitations/visitor restrictions.<sup>3</sup> All visitors underwent mandatory screening upon entry; visitors with fever, respiratory symptoms or significant travel/epidemiological history would be denied entry (Fig 1b). Prior to the pandemic, a visitor limit of 4 visitors was in place; from February 2020 onward, only 1 visitor was allowed. In April-May 2020, visitor restrictions were instituted and no visitors were allowed. From June 2020 onward, hospitalized inpatients were allowed a single visitor; finally, from August 2020 onward, visitor limits were relaxed to 2 visitors (Fig 1c). The combined infection-prevention bundle was remarkably successful in mitigating health

care-associated transmission of SARS-CoV-2, with no patient/visitor-HCW transmission.<sup>3</sup> As an unintended positive consequence, a substantial decrease in HA-RVI was detected soon after introduction of the infection-prevention bundle, though simultaneous introduction made it difficult to ascertain the specific contribution of visitor restriction.<sup>5</sup> However, given that visitor restrictions were relaxed progressively while all other infection-prevention measures were maintained, it was possible to evaluate if the relaxation of visitor restrictions coincided with a subsequent rebound in HA-RVI.

Over an 8-month study period from February 2020 to September 2020, all symptomatic inpatients campus-wide were tested for COVID-19 and 16 common RVIs, including influenza, via multiplex PCR. Cases of RVI were categorized as HA-RVI if the RVI was identified beyond the maximum incubation period from the time of admission.<sup>5</sup> Comparisons of HA-RVI rates during the pandemic period were compared with the prepandemic period (January 2018-January 2020) using the incidence-rate-ratio (IRR) method, with the null hypothesis being that the incidence of HA-RVI would be proportional to the number of inpatient days at-risk for each period. Trends in HA-RVI were then correlated against the sequential imposition and relaxation of visitor restrictions/limits. The institutional review board of SGH approved the study and waived informed consent.

Prior to the COVID-19 outbreak, the campus-wide cumulative incidence of HA-RVI was 9.69 cases per-10,000 patient-days (989 cases; 1,020,463 patient-days). After visitor limitations (single-visitor policy) were introduced together with other infection prevention measures in February 2020, the cumulative incidence of PCR-proven HA-RVI fell to 2.23 cases per-10,000 patient-days (15 cases; 67,335 patient-days), a statistically significant decrease (IRR = 0.23, 95% confidence interval [CI] = 0.13-0.38,  $P < .001$ ) (Fig 1a). From April to May 2020, after the imposition of visitor restrictions (no-visitors policy), the cumulative incidence of HA-RVI fell further to 0.66 cases per-10,000 patient-days (5 cases; 75,203 patient-days; IRR = 0.30, 95% CI = 0.08-0.86,  $P = .013$ ). From June to July 2020, after the rollback of visitor restrictions (single-visitor policy), the cumulative incidence of HA-RVI remained low, at 0.24 cases per-10,000 patient-days (2 cases; 81,866 patient-days); there was no statistically significant difference in HA-RVI compared with the preceding 2 months when visitor restrictions were enforced (IRR = 0.36, 95% CI = 0.03-2.24,  $P = .212$ ). Finally, from August to September 2020, after the further relaxation of visitor limitations (two-visitor policy), the cumulative incidence of HA-RVI remained at 0.12 cases per-10,000 patient-days (1 case; 80,602 patient-days); further relaxation of visitor limitations did not coincide with a significant increase in HA-RVI (IRR = 0.57, 95% CI = 0.01-9.76,  $P = .573$ ). Over the study period, despite managing  $\geq 1,600$  cases of COVID-19, only 1 case of potential health care-associated transmission was detected.<sup>3</sup>

The key finding of this study is that while visitor restrictions introduced as part of an infection-prevention bundle initially coincided with a significant and substantial drop in health care-associated transmission of common RVIs across a large health care campus, the



**Fig 1.** Campus wide visitor screening and visitor limitations/restrictions, as well as trends in health care-associated respiratory viral infections (HA-RVI) from January 2018 to September 2020 across a large health care system in Singapore. (A) Trends in healthcare-associated respiratory viral infections across all inpatient wards of a large healthcare campus in Singapore, from January 2018 to September 2020. (B) Visitor screening at all campus-wide entrances during COVID-19 pandemic. (C) Visitor policies introduced during COVID-19 pandemic and timeline of introduction/rollback.

subsequent rollback of visitor restrictions and visitor limitations was not associated with a subsequent rebound in HA-RVI. Visitor management complements other infection prevention efforts and needs to be calibrated carefully taking into consideration patients' psychological well-being and prevention of infection transmission.

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