Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Letter to the Editor

Unintended Consequence: Influenza plunges with public health response to COVID-19 in Singapore

Dear Editor,

Lam et al. reported that tropical countries showed fluctuating incidence of influenza throughout the year.[1] The emergence of COVID-19 in China during the northern hemisphere winter season of 2019/2020 resulted in worldwide transmission.[2] Influenza activity has remained elevated in many northern-hemisphere temperate countries, as COVID-19 swept across the globe. As of mid-March 2020, influenza circulation remained high in Europe[3] and the United States (US) although there was some decline in activity.[4] In early-April, influenza activity was still elevated in the US.[5]

COVID-19 was first imported into Singapore on January 22, 2020 by a tourist from Wuhan. The tropical city-state's strategy was that of containment.[6] On February 7, 2020, towards the end of epidemiological-week 6, Singapore implemented measures under the Disease Outbreak Response Condition (DORSCON) Orange.[7] During DORSCON Orange, non-essential large-scale events were cancelled or deferred, and daily temperature and health checks were performed in schools and at workplaces. Individuals who were unwell were encouraged to rest at home and to wear a face mask if they absolutely had to go out (such as to medically attend at doctor's offices), and to avoid coming into close proximity and sustained contact with others.

We report the unintended but pleasant consequences of public health measures implemented to contain COVID-19 on influenza activity in tropical Singapore.

We evaluated the weekly influenza positivity rates from epidemiological-week 1, 2017 (week ending January 7, 2017) through epidemiological-week 14, 2020 (week ending April 4, 2020), at Tan Tock Seng Hospital (TTSH), a 1600-bed adult acute-care general hospital co-located with the 330-bed National Centre for Infectious Diseases that is the designated national referral centre for the management of COVID-19. The Centre manages the majority of COVID-19 patients in Singapore. Patients admitted for respiratory illness and suspected of influenza infection had clinical respiratory specimens tested for influenza A and B via polymerase chain reaction test. Routine influenza surveillance on all patients hospitalised at TTSH has been performed since the 2009 influenza pandemic.[8]

From epidemiological-week 1, 2017 through epidemiological-week 52, 2019, the mean weekly influenza positivity rate was 12.9% (standard deviation [SD] 6.7%) (Fig. 1). In 2017, the year experienced increased influenza activity in January-February (epidemiological-weeks 2-9, 2017), March-April (epidemiological-weeks 11-15, 2017), and May-July (epidemiological-weeks 18-29, 2017). In 2018, influenza activity was highest in the first 10 weeks (epidemiological-weeks 1-10, 2018, January-March) and last 11 weeks (epidemiological-weeks 42-52, 2018, October-December) of the year. The high influenza activity continued into the first 4 weeks of 2019 (epidemiological-weeks 1-4, 2019, January).

In 2019-2020, a distinct bimodal increase in influenza activity corresponding to the 2019 southern-hemisphere influenza season (epidemiological-weeks 24-32, 2019, June-July) and 2019/2020 northern-hemisphere influenza season (epidemiological-weeks 48-52, 2019, November-December; epidemiological-weeks 1-5, 2020, January-February) was observed (Fig. 1). From epidemiological-weeks 5 to 11, 2020, influenza activity took a dramatic decline by 70.2 percentage points from 17.8% (epidemiological-week 5) to 5.3% (epidemiological-week 6), then halved to 2.7% in epidemiological-weeks 7 and 8 respectively, followed by further decline to 0.8-1.6% (epidemiological-weeks 9-12), to 0% for two consecutive weeks (epidemiological-weeks 13-14). In the last three years, weekly influenza activity has not fallen below 2%.

Of note, the weekly respiratory samples tested have increased significantly from a mean of 202.3 (SD 41.8) samples per week (epidemiological-week 1, 2017 through epidemiological-week 52, 2019) to 322.0 (69.2) samples per week (epidemiological-weeks 1-14, 2020) ($P<0.0001$). There were 228 and 194 samples tested for influenza in epidemiological-weeks 13 and 14 respectively.

Our findings corroborated with national data on influenza activity, which reported on a weekly-basis the influenza activity in the preceding four weeks. National influenza activity plunged from a mean of 57.3% in the first 6 weeks of 2020 to 4.6% in epidemiological-week 11 and 3.5% in epidemiological-week 14.[9] The trough national influenza activity in the past three years was 15.6%.

During this period, influenza vaccination uptake among TTSH patients has not increased and no large-scale national campaigns to actively promote influenza vaccination has taken place.

There was an exponential increase in the number of new COVID-19 cases from three in epidemiological-week 4 to 74 and 387 in epidemiological-weeks 11 and 14 (week ending April 4, 2020) with TTSH having managed 784 (65%) of the cases (Fig. 1). Despite increased vigilance for influenza in the management of suspect COVID-19 patients, the detection rate of influenza declined, as the number of COVID-19 cases increased.

Whilst influenza activity in temperate Europe and the US have remained high, influenza activity in tropical Singapore took an unprecedented steep decline. This is likely the unintended but pleasant consequence of suspension of mass gatherings, social distancing, and promotion of social responsibility to stay at home when unwell, in response to the COVID-19 pandemic.

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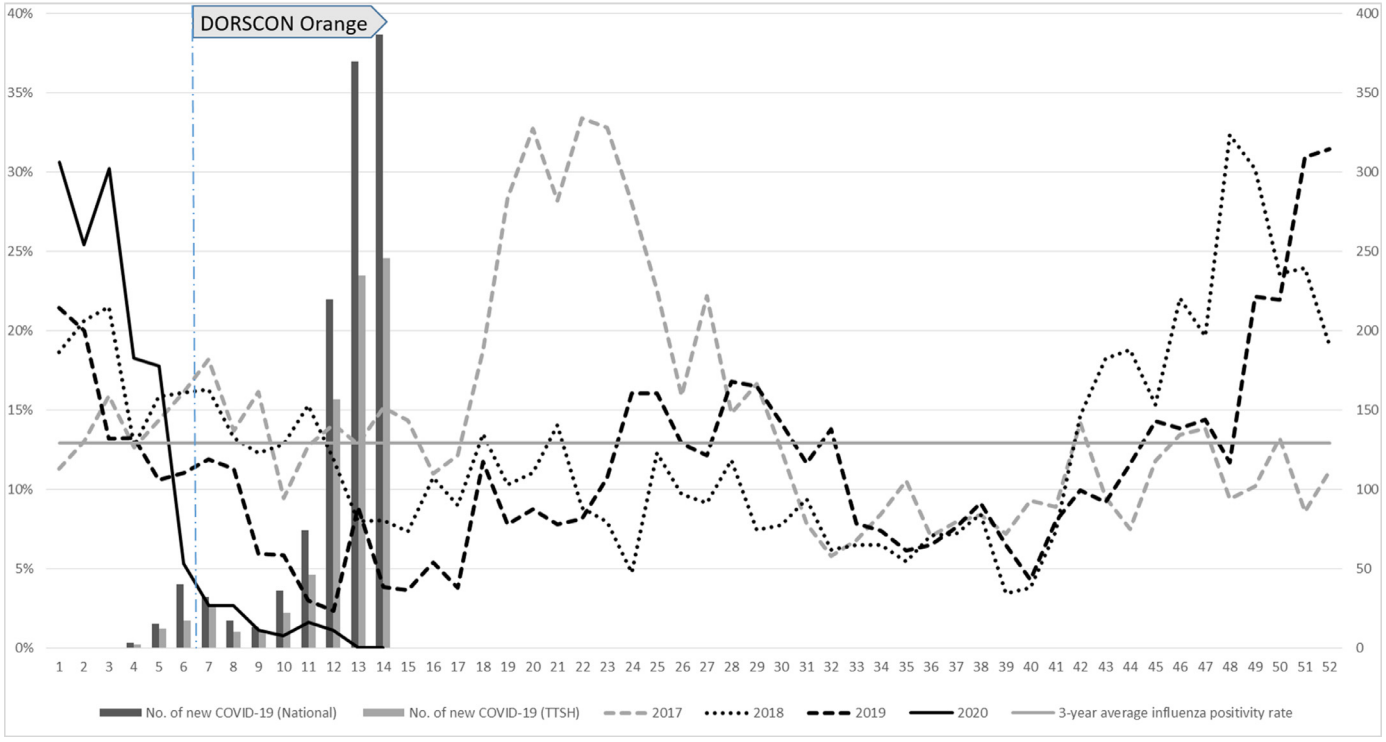

Fig. 1. Weekly Influenza Positivity Rates (%) in TTSH, by epidemiological week, 2017-2020 (primary axis), and Number of new COVID-19 cases nationally and in TTSH in epidemiological-weeks 1-14, 2020 (secondary axis).

Declaration of Competing Interest

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