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## Letter to the Editor

**Novel coronavirus (2019-nCoV) cases in Hong Kong and implications for further spread**

Dear Editor,

Since Tang and colleagues commented on the current Wuhan novel coronavirus (2019-nCoV) outbreak four weeks ago,<sup>1</sup> the situation has worsened dramatically. As of today (1 February 2020), there have been an estimated 14,599 infected cases with a total of 305 deaths and 345 recovered involving 27 countries.<sup>2</sup> Online estimate of the case fatality rate is about 2% with a  $R_0$  (basic reproductive number) value of 3–4, indicating that every positive case may give rise to further 3–4 new cases. Nearly all confirmed cases (14,422, 98.8%) are in the mainland China, with most of the remaining cases in nearby countries or cities in East Asia (Japan, South Korea, Hong Kong, Taiwan, Macau), Southeast Asia (Thailand, Singapore, Malaysia, Vietnam) and Australia accounting for the majority of the remaining cases.<sup>2</sup> We would like to shed light on how the epidemic will develop in Hong Kong based on the characteristics of current cases in this region.

Hong Kong is a former British colony and a city situated in a small (426 m<sup>2</sup>iles) area officially designated as a Special Administrative Region (SAR) of the People's Republic of China. With a population of over 7.4 million, it has one of the highest population densities in the world. The geography of Hong Kong includes: (i) Hong Kong island, (ii) the Kowloon Peninsula and (iii) the New Territories which borders mainland China. It also consists of multiple islands, including the Lantau Island (the site of the Hong Kong International Airport). The busiest boundary control point with mainland China is in the New Territories at Lo Wu, where estimates from previous years indicate that around 239,000 passengers may be expected to cross daily during the Chinese New Year (CNY) period.<sup>3</sup> The closest city on the other side is Shenzhen within the Guangdong Province, and there are many people who work in Hong Kong and live in Shenzhen, commuting across the border each day.

At the time of writing, 14 cases of the 2019-nCoV have been confirmed in Hong Kong and all are currently being managed at the designated infectious disease center - Princess Margaret Hospital (PMH). The first case was detected on 23 January 2020 and the most recent one was on the 1 February 2020. Most of these cases were residents from mainland China: Wuhan (7/14=50%) and Shenzhen (1/14=7.1%), visiting Hong Kong while the remaining 6 cases are Hong Kong citizens (Fig. 1).

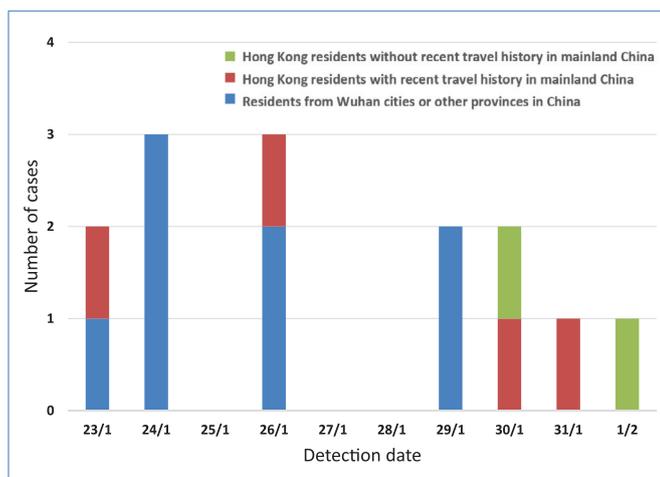
At least two of these 14 cases had not travelled to the mainland China, including Wuhan, within the 14-day maximum incubation period of 2019-nCoV. They may therefore represent cases of inter-person transmission, having acquired their infections from infected individuals with such a travel history. Several cases of inter-person transmission have been reported in the other countries (in-

cluding Japan, Germany and the United States).<sup>4–6</sup> This has also been reported in a family from Shenzhen who visited Wuhan (but not any wet markets) then infected one family member who had not travelled upon their return.<sup>7</sup> This Hong Kong cohort also consists of two husband-and-wife couples and a family of three (husband, wife and adult daughter), all of whom had a travel history to Wuhan.

The mean age of these 14 Hong Kong cases was 59.8 (S.D. 13.4) years and most (9/14=64.3%) were male. 12/14 (85.7%) cases presented with fever (including 5 with cough, 1 with blocked nose, 1 with muscle aches, and the remaining 2 afebrile cases exhibited coughing and shortness of breath). 10/14 (71.4%) cases presented to the Accident and Emergency departments in Hong Kong to seek care, 2/14 (14.3%) were intercepted by the Hong Kong Department of Health teams (using thermal imaging or temperature screening at border control points), and 2/14 (14.3%) developed symptoms and tested positive for 2019-nCoV during quarantine as a contact of a confirmed case. At present, 3/14 (21.4%) cases are in the intensive care unit (ICU) whereas the other 11 cases are clinically stable at PMH. An earlier report<sup>8</sup> on some of the earliest cases of 2019-nCoV infection also describes a higher proportion of cases to be male (30/41=73%), with a slightly higher proportion (13/41=32%) requiring ICU monitoring – though it is still yet possible that more Hong Kong cases may deteriorate and require ICU admission.

What do these early cases imply for Hong Kong? The period over which these cases were detected (23 January to 1 February 2020) includes the week before and the week after the CNY (starting from 25 January 2020). Does this suggest that this period represents the highest incidence of cases developing in Hong Kong because the highest intensity of population movement occurs over CNY, and that this may be expected to decrease once the celebrations are over? Not necessarily, we think, as many of the normal CNY activities in Hong Kong and mainland China were quite severely curtailed to limit the potential spread of this infection.<sup>9,10</sup> In which case, these incidence figures may represent more of the baseline rate of 2019-nCoV cases appearing in Hong Kong. Indeed, a closer look at Fig. 1 suggests that Hong Kong is already experiencing some degree of local inter-person transmission, as the earlier cases were associated with travel to Wuhan and other parts of mainland China, but the more recent cases involved no recent travel to these affected areas.

If this is the case, what can Hong Kong do? A previous study indicated that the mean daily contact rate for an individual in Hong Kong could be characterized as contacting 12–13 other people (both children and adults) spread over a total of nine-hour duration,<sup>11</sup> so presumably reducing the number of social contacts can reduce the risk of inter-person transmission. At present, all primary and secondary schools are closed in Hong Kong, and the universities are either postponing classes until March 2020 or are using distant/remote learning methods.<sup>12</sup> Another approach is



**Fig. 1.** Epidemic curve of Hong Kong 2019-nCoV cases. Note that for the Hong Kong residents without a travel history to mainland China (green bars), this applied to the 14 days prior to their symptom onset.

to limit the number of potentially infected cases entering Hong Kong.<sup>13</sup> This strategy is controversial and our current modelling work is exploring its potential impact.

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