

# More studies showing longer COVID-19 incubation period in older adults and questioning the appropriate times for quarantine and contact tracing

To the Editor,


Since the publication of my study,<sup>1</sup> on May 22, 2020, showing longer incubation of coronavirus disease 2019 (COVID-19) in older adults, there have been three further published studies<sup>2-4</sup> that confirm my finding. These studies used epidemiological data from December 2019 to March 2020 that were sourced from China, countries outside China, the Diamond Princess cruise ship, and Singapore, with age cut-offs of 42, 60, and 70 years to define their younger and older age groups (Figure 1). Taking all four studies together, the median COVID-19 incubation period (Figure 1) was 4-7 days for younger adults (median age, 26-49 years) and 7-11 days for older adults (median age, 55-73 years).<sup>1-4</sup> However, differing results were obtained concerning any age-related differences at  $\geq 90$ th percentiles (right-hand tails of the incubation distributions). While Pak et al<sup>4</sup> found a longer incubation period at  $\geq 90$ th percentiles for older adults, as in my study,<sup>1</sup> Dai et al<sup>2</sup> and Tan et al<sup>3</sup> did not find such a difference (Figure 1). My study and that of Pak et al<sup>4</sup> both showed that the current 14-day quarantine period was inadequate for older adults: 28% and 17.1% fell outside this period, respectively, while a longer 17-day quarantine period for older adults would reduce the non-coverage to 10%.<sup>1,4</sup> On the contrary, Dai et al<sup>2</sup> and Tan et al<sup>3</sup> opined from their findings that a 14-day quarantine period would be adequate for both young and old.<sup>2,3</sup> Based on initial estimates of the incubation period, the World Health Organization has adopted 14 days in the case definition for COVID-19, and this 14-day period is used in diagnosis, contact tracing, and quarantine. My study and that of Pak et al,<sup>4</sup> however, suggest that this 14-day case definition may have to be revised upward for older adults.<sup>1,4</sup> Rowan H. Harwood,<sup>5</sup> editor-in-chief of *Age and Ageing*, has advocated the adoption of a precautionary approach to protect care homes by quarantining new or returning residents for longer periods due to uncertainty over dates of onset and lengths of infectivity, and the continuing occurrence of widespread outbreaks, mortality, and threats to the well-being of care home residents.

Of the four studies reviewed here, three<sup>1-3</sup> used age cut-offs of 60, 65, and 70 years to define older adults; but the lower cut-off of 42 years in Pak et al's study<sup>4</sup> meant that middle-aged adults were included in

their older age group. Despite the vulnerability to and adverse outcomes of COVID-19 in older adults, the number of older adults aged  $\geq 65$  years recruited into incubation studies has been relatively small, ranging from 21 to 37 in the four studies reviewed here,<sup>1-4</sup> and information on their frailty statuses was lacking. The latter is especially important in view of the pattern that care homes for elders have frequently been sites for COVID-19 outbreaks and deaths. Further studies involving larger numbers of older adults, preferably with frailty factored in (ie, biological age studied instead of chronological age), would help to clarify the right-hand tail of the COVID-19 incubation distribution and inform clinical practice and public-health policy.

## CONFLICTS OF INTEREST

Nothing to disclose.

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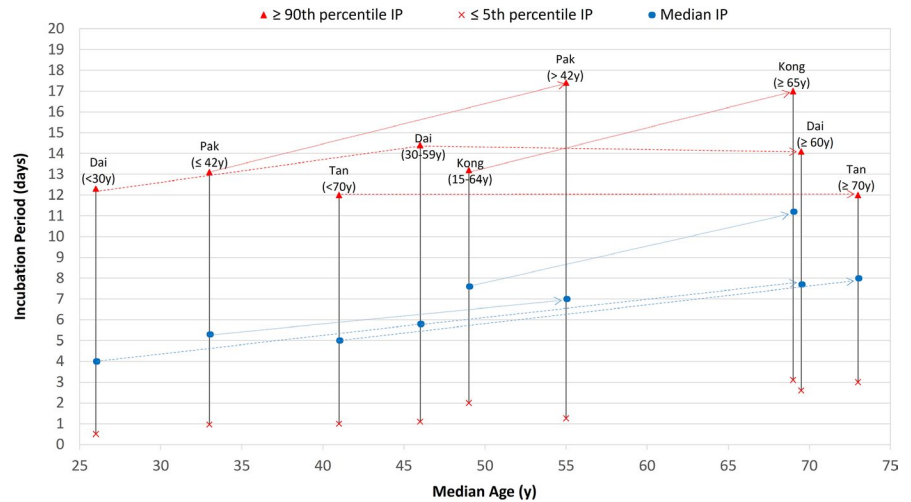
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**FIGURE 1** COVID-19 incubation period (IP) versus age in four studies<sup>1-4</sup> showing longer IP in older adults. Comparisons between younger and older age groups of the same study are indicated by arrows: blue connecting median IP and red connecting  $\geq 90$ th percentile IP, which refers to the 90th percentile for the studies by Kong<sup>1</sup> and Pak et al,<sup>4</sup> the 95th percentile for the study by Dai et al,<sup>2</sup> and the maximum for the study by Tan et al.<sup>3</sup>



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