SYNOPSIS

02/03/2020

2019-nCoV - What We Know So Far About…the Incubation Period

Preamble

“What We Know So Far About...” documents are intended to provide a brief overview of some of the published and unpublished reports related to emerging issues with respect to the 2019 Novel Coronavirus (2019-nCoV). The reports are found through ongoing scanning of the published literature and scientific listservs (e.g., ProMED, CIDRAP, Johns Hopkins Situation Reports), as well as media reports. It is recognized that there may be additional information not captured in this document. As this is a rapidly evolving outbreak, the information will only be current as of the date the document was written. Should you want to provide any additional information or have any questions, please contact cd@oahpp.ca.

Background

The incubation period is the time from exposure to symptom onset. A median value and range are often reported. The upper end of the incubation period range can be used to determine the quarantine period for communicable diseases. Quarantine can be considered for people who have been exposed to a communicable disease, but are not symptomatic, in circumstances were it is important for exposed people to be kept apart from others as soon as they become communicable (which may be in their incubation period or when symptoms begin, depending on the communicable disease).

The average incubation period for seasonal human coronavirus infection is two to five days. Novel coronaviruses have demonstrated longer incubation periods; SARS-CoV is estimated to have a median incubation period of four to five days (range two to 10 days) and MERS-CoV to have a median incubation period of five to six days (range two to 14 days).

What do we know so far about the incubation period for 2019-nCoV?

- In this review, we report on evidence from seven papers regarding incubation periods for 2019-nCoV - three papers directly report the incubation period in case reports and four papers report modelling of the incubation period from case report data. The text and table below summarize the available information.
- The median/mean incubation period centres around five days.
Almost all of the estimates for the upper end of the incubation period do not exceed 14 days, supporting 14 days as an appropriate time period to be used for quarantine if it is needed as a public health control strategy.

Reports

Incubation Period Based on Case Reports


This study describes a family cluster where five of six members became symptomatic with 2019-nCoV after travelling to Wuhan. The incubation period was estimated to be three to six days based on their day of arrival in Wuhan to onset of symptoms. On returning home, the family stayed with another family member who became ill within four days of the family returning home.


This is a study of 41 patients infected with 2019-nCoV. In one patient who passed infection to his wife, the serial interval was five days (from onset of symptoms in the husband to onset of symptoms in the wife).


This study is based on two cases of 2019-nCoV. A mother and father, who lived in Wuhan, travelled to Vietnam to visit their son. The father became symptomatic four days after arrival in Vietnam, suggesting an incubation period of at least four days. The son, who stayed in a hotel room with his parents, subsequently became symptomatic three days after being exposed to the father, suggesting an incubation period of three days or less.

Incubation Period Estimates Based on Modelling from Case Report Data


Based on information from 10 cases, the mean incubation period was estimated to be 5.2 days (95% confidence interval: 4.1-7.0), with the 95th percentile for the incubation period estimated at 12.5 days. The authors acknowledge that is a somewhat imprecise estimate.

This is a study of 88 individuals who had been in Wuhan, but had their infections diagnosed elsewhere after leaving Wuhan. For the best fitting model, the mean incubation period was estimated at 6.4 days (95% credible interval: 5.6-7.7 days). For this model, the estimated incubation period ranged from 2.1-11.1 days (2.5th to 97.5th percentile). The poorest fitting model estimated the 97.5th percentile incubation period at 15.5 days and the 99th percentile incubation period at 18.5 days. The authors suggested that keeping infected people in “quarantine for up to 14 days will ensure that they do not develop symptoms after release.”


This is a modelling study based on two groups: Group 1) visitors to Wuhan (12 cases) and Group 2) visitors to Wuhan, as well as Wuhan residents who were diagnosed outside Wuhan (31 cases). Using the best fitting of three models, the median incubation periods were 4.6 days (95% confidence interval (CI): 3.3-5.8) and 5.0 days (95% CI: 4.0-5.8) for groups 1 and 2 respectively. The 99th percentile for the best fitting model was 8.4 days (95% CI: 5.7-10.3) and 8.6 days (95% CI: 6.3-10.5), for groups 1 and 2 respectively. The longest 99th percentile incubation period for all the models for either group was 13.0 days (95% CI: 7.1-20.7).


This is a modelling study based on 101 cases of 2019-nCoV confirmed outside of Hubei province (i.e., in other countries or in other regions of Mainland China with no known local transmission). Median incubation period was estimated at 5.2 days (95%CI: 4.5-6.0). The 2.5th percentile incubation period was estimated to be 2.5 days (95%CI: 1.8-3.6), while the 97.5th percentile was estimated to be 10.5 days (95%CI: 7.4-15.1).
<table>
<thead>
<tr>
<th>First author of study</th>
<th>Case report or modelling</th>
<th>Estimate</th>
<th>Range</th>
<th>Highest estimate from modelling studies</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chan</td>
<td>Case report</td>
<td>3-6 days</td>
<td>N/A</td>
<td>N/A</td>
<td>Six cases</td>
</tr>
<tr>
<td>Huang</td>
<td>Case report</td>
<td>5 days (serial interval)</td>
<td>N/A</td>
<td>N/A</td>
<td>One case</td>
</tr>
<tr>
<td>Phan</td>
<td>Case report</td>
<td>4 days or longer 3 days or less</td>
<td>N/A</td>
<td>N/A</td>
<td>Two cases</td>
</tr>
<tr>
<td>Li</td>
<td>Modelling</td>
<td>5.2 days</td>
<td>N/A</td>
<td>12.5 days, 95th percentile</td>
<td>10 cases</td>
</tr>
<tr>
<td>Backer</td>
<td>Modelling</td>
<td>6.4 days, best fit model</td>
<td>2.1-11.1 days (2.5th to 97.5th percentile, best fitting model)</td>
<td>18.5 days, 99th percentile (worst fitting model)</td>
<td>88 cases</td>
</tr>
<tr>
<td>Linton</td>
<td>Modelling</td>
<td>4.6 and 5.0 days for groups 1 and 2, respectively, best fitting model</td>
<td>2.0-7.3 and 2.4-7.6 for groups 1 and 2 respectively (5th to 95th percentile, best fitting model)</td>
<td>13 days, 99th percentile</td>
<td>12 and 31 cases for groups 1 and 2, respectively</td>
</tr>
<tr>
<td>Zheng</td>
<td>Modelling</td>
<td>5.17 days</td>
<td>2.5-10.5 (2.5th to 97.5th percentile)</td>
<td>10.5 days, 97.5th percentile</td>
<td>101 case</td>
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</tbody>
</table>

N/A = not available
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