

SYNOPSIS

03/24/2020

Review of “Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus (SARS-CoV2)”

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One-Minute Summary

- This study uses a model-inference framework to estimate the contagiousness and **proportion of undocumented infections** of coronavirus disease 2019 (COVID-19) in 375 cities in China before (January 10 – 23) and after (January 24 – February 8) the implementation of control measures in Wuhan.

Before Control Measures (January 10 – 23)

- The **effective reproduction number (R_e)**, meaning the number of secondary infections per index infection, was **2.4**.
- The model estimated that **86%** (95% Confidence Interval (CI): 82-90) of all infections were **undocumented**.
- Undocumented infections were estimated to be half (55%) as contagious per individual as compared to reported infections.
- The model estimated that the majority of infections were infected from undocumented cases.

After Control Measures (Period 1: January 24 – February 3; Period 2: January 24 – February 8)

- The proportion of infections that were undocumented were **35% in Period 1** and **31% in Period 2**.
- The **R_e decreased to 1.4 in Period 1** and further to **0.99 in Period 2**.

Additional Information

- The modelling estimates suggest that the control measures, which included travel restrictions imposed between major cities and Wuhan, self-quarantine and contact precautions advocated by the government and increased availability of rapid testing for laboratory confirmation. These measures, along with changes in medical care-seeking behaviour due to increased awareness of the virus and increased personal protective behaviour (e.g., wearing of face masks, social distancing, self-isolation when sick), altered the epidemiological characteristics of the outbreak after January 23.
- Inference results for both Period 1 and 2 should be interpreted with caution, as care-seeking behaviour and control measures were continually in flux during this time.

- While model estimates indicate control measures have reduced COVID-19 transmission considerably, whether these controls are sufficient for reducing R_e below 1 for the length of time needed to eliminate the disease locally and prevent a rebound outbreak once control measures are relaxed is unclear.

PHO Reviewer's Comments

- The authors included additional sensitivity analyses, using simulated data, to validate their findings. When the authors assumed a scenario with no transmission from undocumented infections, the number of documented infections would have been 79% lower across all of China and 66% lower in Wuhan and there would have been fewer cities with more than 10 cumulative documented cases, as compared to what was observed.

Citation

Ontario Agency for Health Protection and Promotion (Public Health Ontario). Review of “Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus (SARS-CoV2)”. Toronto, ON: Queen’s Printer for Ontario; 2020.

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