Review of “Reporting, epidemic growth, and reproduction numbers for the 2019 novel coronavirus (2019-nCoV) epidemic”


**One-minute summary**

- The authors created a mathematical model of the 2019-nCoV epidemic to investigate the changing nature of case finding and epidemic growth.
- The study suggests that case ascertainment is increasing and reporting lags are decreasing
  - Previous models suggest that the proportion of cases reported increased from 2.4% (2020 Jan 12) to 11.0% (2020 Jan 18). The current model suggests that the proportion of cases reported increased to 59% by 2020 Jan 31, assuming that the effective reproduction number (R_e, the number of secondary cases from an infection), in the presence of control measures remains near 2.3 after quarantine (2020 Jan 24).
  - The model suggests that reporting times are decreasing, from >10 days (2020 Jan 27) to ~4 days (2020 Feb 3).
- Large increases in cases reported are likely due to: 1) increased disease activity and 2) increased surveillance efforts.
- Based on both reported cases and modelled estimates, the authors state that by 2020 3 Feb, a R_e of 1.5 is plausible.
- Authors provide readers with interactive model: https://art-bd.shinyapps.io/nCov_control

**Additional information**

- The disease-transmission model uses an initial epidemic start date in mid-November 2019, with a basic reproduction number (R_0) of 2.3 and a serial interval of 7 days.
- The model is based on publicly available data (as of 2020 Feb 3).
- The model estimates case counts based on the number of internationally exported cases.
- **Limitations:**
  - The model focuses on disease activity in China. Should 2019-nCoV spread more widely, the epidemiology in other countries may be different.
  - The model under-represents mild infections.
PHO reviewer’s comments

- Modelled case counts based on internationally exported case counts may be under-estimated as the genetic sequence of 2019-nCoV was made available on January 12, 2020, meaning that until then a specific diagnostic test was not available, which may have led to under-ascertainment.

Citation


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