

SYNOPSIS

03/17/2020

Review of “Estimating risk for death from 2019 novel coronavirus disease, China, January–February 2020”

Article citation: Mizumoto K, Chowell G. Estimating risk for death from 2019 novel coronavirus disease, China, January–February 2020. *Emerg Infect Dis.* 2020 Mar 13 [Epub ahead of print]. Available from: https://wwwnc.cdc.gov/eid/article/26/6/20-0233_article

One-Minute Summary

- This study **estimates the time-delay adjusted case fatality ratio (CFR)** for coronavirus disease 2019 (COVID-19) in China for: 1) Wuhan, Hubei Province, 2) Hubei Province, excluding Wuhan and 3) China, excluding Hubei Province.
- Using mathematical modeling, the authors incorporated delays from hospitalization to death and applied it to the number of **COVID-19 cases (N=44,795) and deaths (N=1,117)** reported from January 1 to February 11, 2020, in order to adjust their estimates of CFRs.
- **Confirmed cases and deaths in China:**
 - Wuhan, Hubei Province: 43.7% of all cases, 73.4% of all deaths
 - Hubei Province, excluding Wuhan: 31.0% of all cases, 22.2% of all deaths
 - China, excluding Hubei Province: 25.3% of all cases, 4.4% of all deaths
- **Observed crude CFR:**
 - Wuhan, Hubei Province: 4.2% (95% confidence interval [CI]: 3.9-4.5)
 - Hubei Province, excluding Wuhan: 1.8% (95% CI: 1.6-2.0)
 - China, excluding Hubei Province: 0.4% (95% CI: 0.3-0.6)
- **Estimates of the time-delay adjusted CFR:**
 - Wuhan, Hubei Province: 12.2% (95% credibility interval [CrI]: 11.3-13.1)
 - Hubei Province, excluding Wuhan: 4.2% (95% CrI: 3.7-4.7)
 - China, excluding Hubei Province: 0.9% (95% CrI: 0.7-1.1)
- Over the course of the outbreak, the **model-based time-delay adjusted CFRs were higher than the observed crude CFRs**, with exceptions during certain stages of the outbreak.
- The authors suggest that **elevated death risk was the result of a probable breakdown of the healthcare system** and that **social distancing, movement restrictions and enhanced infection control measures in healthcare settings** should be implemented as control measures.

Additional Information

- The authors adjusted for the gap in illness onset to death between vulnerable and healthy populations, which leads to underestimation in CFR. CFR was defined as cumulative number of deaths divided by the cumulative number of cases, at specific points in time.
- In order to estimate the time-delay, the authors obtained detailed epidemiological data on patients with delays in symptom onset to death (n=39) and patients with delays in hospitalization to death (n=33). Using these data, they estimate the time from hospitalization to death was a mean of 10.1 days.
- The authors used mathematical modelling to obtain CFR estimates in real time. CFR estimates and 95% CrIs are based on the posterior probability distribution of each parameter in the model.

PHO Reviewer's Comments

- The authors acknowledge that their estimated CFR, in particular for Wuhan, is subject to ascertainment bias (i.e., more severe cases being more likely to be detected), leading to elevated CFR estimates.
- Since Chinese officials changed the COVID-19 case definition on February 12, 2020, caution should be used when comparing the CFRs in this study to CFRs after this date. The authors state that CFRs after February 12, 2020, would be lower.

Citation

Ontario Agency for Health Protection and Promotion (Public Health Ontario). Review of “Estimating risk for death from 2019 novel coronavirus disease, China, January–February 2020”. Toronto, ON: Queen’s Printer for Ontario; 2020.

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