COVID-19: PHAC Modelling Group

Public Health Agency of Canada | Agence de la santé publique du Canada

DECEMBER 8, 2022
AD HOC REPORT

1 EXECUTIVE SUMMARY AND CONTEXT

This is an ad hoc report, dated December 8, 2022 of recent modelling studies conducted by the PHAC Modelling Group.

The Agent-based model was used to explore the impact of reducing COVID-19 quarantine and isolation periods in two separate analyses, taking into account vaccine- and infection-acquired immunity in the Canadian population up to August 2022, corresponding to when BA.2 emerged and subsequently dominated. In addition to reducing the quarantine and isolation periods, scenarios also explored the impact of increasing effort of, or adherence to, these public health measures as a trade-off to reducing the duration of the quarantine and isolation periods. No difference in severe health outcomes was observed when the quarantine period was reduced and the percentage of contacts traced was low (10% and 20%) due to low percentages of cases detected, suggesting higher rates of case detection must occur for contact tracing to be an effective public health measure. A reduction in severe health outcomes was observed when the proportion of detected cases (that adhered to isolation) increased from 20% to 50% and 80%, but reducing the isolation period had a relatively small impact.

The SEIR compartment model was used to explore the effects, on the size and timing of a model-projected fall/winter wave of hospitalisations, of varying three elements: 1) uncertainty in the proportion of hospitalisations due to COVID-19 in reported admissions data, 2) uncertainty about the level of increased transmission with greater indoor contacts in fall and winter and, 3) uncertainty in the rate of waning of immunity. Results showed that the model output may be highly sensitive to small changes in the parameters, and that the size of the impact of these changes is not easily predicted. These simulations underline the significant effects of uncertainty around parameter estimates in the model that has arisen due to national and global decreases in surveillance effort. These uncertainties mean that predicting the precise size of COVID-19 waves is not possible, even though models can still be used effectively for comparisons of the impacts of different interventions such as booster campaigns.