

01 EXECUTIVE SUMMARY AND CONTEXT

EXECUTIVE SUMMARY

The January 14, 2021 Modelling Report brings together findings of modelling studies conducted by the PHAC Modelling Group with the findings of some additional studies from external modelling partners.

Current situational awareness

The reproduction number (R_t) for Canada on January 2, 2021, estimated using date of illness onset, is around 1 (1.04).

- R_t is now more consistently >1 in Ontario and Quebec
- R_t is <1 in British Columbia, Alberta, Saskatchewan and Manitoba and is below 1 in Atlantic Provinces

The short-range statistical forecast in Canada up to January 21, 2021 is:

- 746,9983 cumulative cases (range: 741,389 and 753,882)
- 18,528 cumulative deaths (range 18,270 to 18,774)

Mean case incidence is projected to increase in Canada overall, driven mostly by projected trajectories in Ontario and Saskatchewan. The rate of new deaths is projected to continue increase.

The nowcast of the force of infection suggests that the epidemic is increasing in Saskatchewan, Ontario, Quebec and New Brunswick. Force of infection is forecast to decline in Alberta and Manitoba, to remain low in Nova Scotia and to plateau in British Columbia.

The long-range dynamic modelling forecast in Canada over the next two months includes three scenarios: With current contact rates, the model projects continued resurgence of the epidemic. This is driven by resurgence forecast in Ontario and Quebec, and a possible return to resurgence in British Columbia and Saskatchewan. With a 20% increase in contact rates, the model predicts a steeper increase in the number of cases over time. With public health measures that result in the equivalent of a 25% reduction in contact rates, the model predicts control of the epidemic.

Importation risk modelling for the week of January 3 to 9, 2021, estimated that 2,064 people with COVID-19 came into Canada, primarily from the United States of America (USA), Mexico, the United Kingdom (UK) and France.

Assessment of the impact of interventions on the COVID-19 epidemic in Canada and other countries by the Oxford University stringency index:

In Canada, each of the provinces (for which data are available) are showing recent increases in stringency, after keeping their index below 70 since November 2020. It is too soon to see their effect. Despite the weekly rolling

average of daily cases steadily increasing since late December, in Canada public health measures have remained at the same level (64) for almost two months.

In many countries around the world, trends in cases, deaths and stringency index vary. In many countries, resurgence is occurring, including those where SARS-CoV-2 variants have been detected

Dynamic modelling

Four dynamic modelling studies explored the impact of vaccination and the new variant of concern (VOC) on the epidemic:

Study: *Modelling the impact of age-stratified vaccination in the absence of other public health measures*, found that even though all scenarios resulted in reduced clinical cases, hospitalizations, ICU admissions and deaths compared to the baseline scenario, vaccination of older people alone was not sufficient to maintain hospitalizations and ICU admissions below the maximum hospital capacity. The study concludes that, in the absence of non-pharmaceutical public health measures, vaccinating vulnerable age groups alone will not result in bringing severe infections down to a manageable level.

Study on the *Impact of the new variant strain and the speed and coverage of vaccination in the Canadian population* showed that a more transmissible strain of SARS-CoV-2 will result in the epidemic being harder to control, at our current rate of vaccination. It concludes that an increase vaccination efforts will be needed to significantly see the impact of the vaccine on the epidemic. Even with regular shutdowns, vaccination will only reduce the epidemic minimally unless other public health interventions are enhanced.

Study: *Theoretical scenario projections for SARS-CoV-2 variant of concern (VOC) B.1.1.7 introduction into provinces in Canada* developed long term projections of reported cases for major provinces, using different proportions of the population infected initially with the VOC. The projections suggest that with an expansion of the VOC in all major provinces, the epidemic could accelerate markedly unless there is an increase in public health measures.

Study on: *The impact of the emergence of the UK COVID-19 strain B 1.1.7 (VOC-202012/01), and waning immunity on the current epidemic in Canada* predicts that waning immunity will not play a significant role in how the epidemic will unfold in the short term compared with the speed of the emergence of a new, more transmissible variant. This VOC could provoke a dramatic increase in the total final attack rate as well as increase the size of a possible third wave in late summer 2021.

Special report

One special report is presented this week, a *Note on the analysis of COVID-19 testing data*. This report illustrates the variations in the proportion of the total population sampled, and possibly in the sampled population, using the data openly available from the Government of Ontario. This report showed that simple assessments of changes in numbers of positive test results, and positivity rates, are influenced by the proportion of the population that is tested and the sampled population. Comparisons of case numbers over time and across jurisdictions should take into account testing levels and how testing is distributed across the population, including policies for testing, such as the probability of being tested, the target population for testing, and how these may change over time.