

01 EXECUTIVE SUMMARY AND CONTEXT

EXECUTIVE SUMMARY

This is the February 11, 2021 overview of findings of modelling studies conducted by the PHAC Modelling Group with some additional findings from external modelling partners.

Current situational awareness

The reproduction number (R_t) for Canada on January 30, 2021, estimated using date of illness onset is <1 (0.84) and is <1 in all provinces.

The short-range statistical forecast in Canada up to February 18, 2021 is:

- 834,416 cumulative cases (range: 829,346 and 839,038)
- 21,423 cumulative deaths (range 21,046 to 21,672)

Mean case incidence is projected to decrease in Canada overall, as well as all modelled provinces. The incidence of new deaths is also projected to decrease.

The nowcast of the force of infection suggests that the epidemic is decreasing in all provinces, except in Saskatchewan.

The long-range dynamic modelling forecast in Canada over the next two months included three scenarios: With current contact rates, the model projects control of the epidemic. If recent lifting of closures results in a 20% increase in contact rates resurgence of the epidemic is forecast. With public health measures that result in the equivalent of a 25% reduction in contact rates, the model predicts the epidemic can be brought further under control.

Importation risk modelling for the week of January 31 to February 6, 2021, an estimated 445 people with COVID-19 came into Canada, primarily from the United States of America (USA), Mexico and the United Kingdom (UK). Variants of concern (VOC) estimated to have arrived in Canada for the week January 31 to February 6, 2021 in infected travellers (in order of risk) are the UK variant, the Californian variant and the South Africa variant, from the USA, UK and France. Infected travellers with the Brazilian VOCs are also predicted to have arrived, but to a lesser extent.

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

- Canada's sustained (month long) and relatively high stringency index (75) has been successful in reducing incidence of reported cases since the peak of the second wave on January 10. The current weekly rolling average of daily cases (3,483) is still almost 10 times higher than the 2020 summer lows of <400 cases.
- There is variation in both magnitude and trends in the stringency index across Canadian provinces and territories. Although cases are decreasing or holding steady in many regions, the stringency index may be too low in some regions to prevent resurgence of the epidemic.

Dynamic modelling

A study *Exploring the effects of different dates of variant of concern (VOC) introduction and effects of lifting public health measures* presents projections of reported cases for major provinces according to different dates of introduction of a VOC and the simultaneous effects of reopening. The projections suggest that the epidemic would accelerate markedly in all provinces with introduction and expansion of the VOC, in the face of current public health measures and restrictive closures.

A study of the *Relationship between non-pharmaceutical intervention (NPI) level, vaccine characteristics and COVID-19 epidemic trajectory with and without emergence of B.1.1.7 (VOC-202012/01) using a deterministic model* provides insight on the level and timing of public health measures (NPIs) required to keep the epidemic under control during and beyond vaccine rollout. The results suggest that physical distancing release can be introduced earlier and at a faster rate with a vaccine that partially prevents transmission in addition to partially preventing disease. None of the physical distancing release scenarios simulated resulted in a controlled epidemic.

In a study on the *Exploration of the COVID-19 epidemic with vaccination rollout, lifting of closures and physical distancing, and invasion of a VOC*, the PHAC agent-based model was used to explore the combined impact of three factors related to the COVID-19 epidemic in Canada (the anticipated vaccination rollout, the invasion of a more transmissible VOC and the lifting of closures and physical distancing). The results suggest that the premature lifting of closures and physical distancing before vaccination rollout is complete will result in a resurgence of the epidemic; resurgence will be greater the earlier the measures are lifted for a sterilizing vaccine. Conversely, resurgence will be greater the later measures are lifted for a non-sterilising vaccine due to a combination of VOC dominance and a larger proportion of the population who remain susceptible to asymptomatic infections as vaccination rollout unfolds.

Special report

A report on a *Comparison of COVID-19 Case Fatality Ratio (CFR) by region and over time in Canada* explores difficulties interpreting case fatality rate (CFR) estimates, with naïve estimates and estimates using an approach of survival analysis for competing risks. The study reports that variations in the proportion of cases for people >80 likely explains the majority of the variation amongst provinces and time periods in the overall CFR for all age groups. Policies for diagnostic testing is likely an additional factor. During epidemic peaks, there may be a greater proportion of severe cases in relation to all cases, which creates the increase in CFR estimates.