

# 01 EXECUTIVE SUMMARY AND CONTEXT

## EXECUTIVE SUMMARY

This is the May 6, 2021 overview of findings of modelling studies conducted and collated by the PHAC Modelling Group.

### Current situational awareness

The effective reproduction number ( $R_t$ ) for Canada on April 24, 2021, estimated using date of illness onset, was 0.94. There has been an increasing trend in  $R_t$  in most provinces from early February to early April. Nationally,  $R_t$  began to decrease in early April and on April 24,  $R_t$  was  $<1$  in most major provinces, except for Alberta and Manitoba.

The short-range statistical forecast for Canada up to May 13, 2021 is for:

- 1,316,974 cumulative cases (range: 1,307,936 to 1,324,345); and
- 24,830 cumulative deaths (range 24,723 to 24,984), by that date.

Overall, case incidence is projected to decrease over the next week in Canada. Mean case incidence is projected to increase in Alberta and Manitoba and is projected to decrease in British Columbia, Ontario, Quebec and Saskatchewan. The incidence of new deaths is projected to decrease slightly in Canada.

The nowcast of the force of infection suggests that the epidemic is decreasing in British Columbia and Quebec, and stable in Saskatchewan and Ontario. However, the force of infection is forecast to continue to increase in Alberta, Manitoba, New Brunswick and Nova Scotia.

The long-range dynamic modelling forecast (Simon Fraser University model) for Canada, suggests the trajectory is towards a decline in the epidemic over the coming two months, with  $\sim 7,000$  daily cases by end of May. In some provinces (British Columbia, Ontario and Quebec) the epidemic is forecast to decline, but with current controls in Alberta and Manitoba the epidemic is forecast to continue to resurge.

The long-range dynamic modelling forecast (PHAC-McMaster University model) suggests that nationally, the trajectory of the epidemic in Canada is plateauing with  $\sim 7,500$  cases per day forecast by end of May. In some provinces (British Columbia, Ontario and Quebec) the epidemic is forecast to decline, but with current controls in Alberta and Manitoba, the epidemic is forecast to continue to resurge. Meanwhile, the epidemic in Saskatchewan is forecast to plateau.

The long range ensemble forecast of reported cases in Canada using dynamic modelling suggests that the measures in place have slowed the third wave down on the national scale, but the effectiveness of measures is heterogeneous amongst provinces. Without additional measures in place or lifting current measures, reported cases in Canada are forecast to remain at approximately 7,500 cases a day until the end of May.

Importation risk modelling for the week of April 25 to May 1, 2021, an estimated 4,223 people with COVID-19 came to Canada, primarily from the United States of America (USA), Turkey and France. For the top 10 countries estimated to contribute infected travellers, the percentages of cases that may be variants of concern or interest (VOC/VOI) are 23% B.1.1.7 (UK variant), 2% B.1.617 (Indian variant), 3% B.1.427 and B.1.429 (Californian variants), 2% B.1.351 (South African variant), and each of the following at less than 1%: B.1.526 (Nigerian variant), and P.1 and P2 (Brazilian variants).

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

- Canada's stringency index increased to 75 as of April 1, 2021 and has subsequently remained at this level, while the weekly rolling average of daily cases reached an all-time high of 8,730 on April 17, 2021 and has dropped by 10% since that time.
- COVID-19 cases have recently plateaued or continue to increase in many provinces/territories. In some of these regions, little to no change in the stringency index has occurred suggesting the stringency index in these regions is too low to control the epidemic.

## Dynamic modelling

The PHAC agent-based model (ABM) was adapted to explore the impact of lifting non-pharmaceutical interventions (NPIs) when a large proportion of the Canadian population has been fully vaccinated:

Part 1: Lifting non-pharmaceutical interventions when 75% of eligible Canadians have been fully vaccinated.

Results suggest that with this population coverage, restrictive closures can be lifted and personal physical distancing eased without threatening the healthcare system. However, case detection and isolation, as well as contact tracing and quarantine should continue to be maintained to ensure sporadic cases, in travellers or the domestic population, do not cause local outbreaks.

Part 2: the impact of vaccine hesitancy by age group when non-pharmaceutical interventions are lifted.

Results suggest that vaccine hesitancy in any age group eligible for vaccination will lead to an increase in severe health outcomes once NPIs are lifted, but vaccine hesitancy in the 20 to 44 age group had the greatest impact due to the size of this section of the population, and because of their high contact rates. The 18 to 19 years age group had a disproportionate per-capita impact due to higher contact rates and lower adherence to public health measures.