

1 EXECUTIVE SUMMARY AND CONTEXT

This is the July 8, 2021 overview of findings of modelling studies conducted and collated by the PHAC Modelling Group. Summaries below are hyperlinked to the related section of the report for full details.

CURRENT SITUATIONAL AWARENESS

Domestic

The effective reproduction number (R_t) for Canada on June 26, 2021, estimated using date of illness onset, was 0.76. From early February to early April 2021, there was an increasing trend in R_t in most provinces. Nationally, R_t began to decrease in early April and on June 5, R_t was <1 in all provinces.

The short-range statistical forecast for Canada up to July 15, 2021 is for:

- 1,421,565 cumulative cases (range: 1,420,557 to 1,422,746); and
- 26,514 cumulative deaths (range 26,448 to 26,572) by that date.

Overall, case incidence is projected to decrease by 26% over the next week in Canada. Mean case incidence is projected to decrease throughout the projection period in all modelled provinces, except for Alberta, where case incidence remains steady. The incidence of new deaths is projected to decrease slightly in Canada.

The Nowcast of the force of infection suggests the epidemic is declining and it will remain at a low level in all provinces.

The long-range dynamic modelling forecast (PHAC-McMaster University model) suggests that nationally and in each province, the trajectory is towards a decline in the epidemic over the coming 2 months with less than 400 daily cases by early August, if reopening plans limit contact rate increases to 50%. If reopening causes a 75% or more increase in effective transmission, then a resurgence is likely. These forecasts include increasing impacts of the delta VOC on transmission.

International

Importation risk modelling for the week of June 27 to July 3, 2021, suggests that an estimated 440 people with COVID-19 came to Canada including 277 air travellers, primarily from Colombia and the United Kingdom (UK) and 163 land travellers from the United States of America. From June 27 to July 3, 2021, the estimated percentages of cases that may be variants of concern or interest are 14% B.1.1.7 (alpha), 5.2% B.1.351 (beta), 4.4% B.1.617.2 (delta), 2.3% P.1 (gamma), 1.7% B.1427/B.1429 (epsilon) and 1.6% B.1.526 (iota).

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 has recently fallen from 74 to 70 associated with provincial reopening plans, and the weekly rolling average of daily cases has fallen by 95% from a high of 8,730 on April 17, 2021.
- Experiences in some countries suggest that swift re-implementation of public health measures may still be needed as the virus evolves and pockets of vulnerable populations remain – both of which have led to resurgence.

DYNAMIC MODELLING

The PHAC agent-based model (ABM) explored the impact of reopening the Canadian border with increasing importation of the delta variant in Canada. Results suggest that after full reopening there may be a fall/winter resurgence (a fourth wave) due to the circulation of a more transmissible and virulent delta variant but will remain within healthcare capacity. Reopening the Canadian border to the United States of America (USA) and other international travellers, while maintaining pre-departure testing, did not cause the fourth wave to exceed healthcare capacity. Reopening the border to only USA travellers resulted in fewer cases, hospitalizations and deaths compared to reopening to all international travelers but delaying reopening from mid-July to early August had a minimal impact on the size of the fourth wave. Simulations suggested that increasing vaccine acceptance to >80% of the eligible population, and enhancing testing and contact tracing, would control a fourth wave when public health measures are lifted, and when the border reopens.

The PHAC compartment model was used to assess the impact of different levels of acceptance for the second vaccine dose on the risk to healthcare capacity when lifting public health measures in the presence of the delta variant, which partially escapes immunity conferred by one dose of vaccine. Results suggest that complete lifting of all public health measures in mid-July resulted in a significant resurgence of cases and hospitalizations, although this was within healthcare capacity. When lifting of measures was partial, resulting in a return to 75% of pre-COVID-19 contact rates, resurgence did not occur. Also, with second dose acceptance reduced from 98% to 70%, the resurgence approached the healthcare capacity limit, but there was relatively little difference in simulation results if virulence of the delta variant was set at 50% or 80% greater than that of wildtype strains.