

# 1 EXECUTIVE SUMMARY AND CONTEXT

This is the March 24, 2022 overview 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 as of March 12, 2022, was 0.9. On that date,  $R_t$  was below one in all major provinces. A decline in  $R_t$  in late December and early January was likely due, in part, to changes in testing practices. However, a similar signal from wastewater analysis suggests that the decline was at least partly due to a genuine decline in transmission as well. Recently,  $R_t$  values in Saskatchewan have begun to rise, suggesting a potential resurgence of cases in that province.

*The short-range statistical forecast* for Canada up to March 31, 2022 is:

- 37,492 cumulative deaths (range 37,347 to 37,601).

Short-range forecasts for cases were not produced given the changes to testing protocols across Canada. The incidence of new deaths is projected to remain steady throughout the next week in Canada.

*The long-range dynamic modelling forecast (PHAC-McMaster University model)* suggests that, nationally, infections, hospital occupancy and hospital admissions will continue to decline, but will likely resurge with the lifting of restrictions. However, the number of COVID-related hospital admissions and occupancy rates are forecast to be lower than those seen in January 2022 for all provinces, with the possible exception of Alberta. Due to changes in data availability, there is significant uncertainty in these forecasts.

*The Wastewater-based forecasts and effective reproduction number estimates* suggest a decreasing trend of infections and data suggest that under-reporting of cases continue to occur. Case surveillance suggests potential resurgence in some locations, but these are not yet confirmed by the wastewater data, which lags about one week behind case data due to processing delays.

### International

*Importation risk modelling* for the week of March 13 to 19, 2022 suggests that an estimated 4,218 people with COVID-19 came to Canada including 2,944 air travellers, primarily from Mexico, the United States of America (USA), and Germany, and 1,274 land travellers from the USA. From March 13 to 19, 2022, the estimated percentages of imported cases from air travel that may be variants of concern or variants of interest are 79.17% B.1.1.529 (Omicron), 19.82% BA.2 (Omicron) and 0.03% B.1.617.2 (Delta). Many jurisdictions are limiting the use of COVID-19 tests, impacting global case count, testing data estimates and the proportion of people who have been previously infected with Omicron.

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

## PHAC Modelling Group Report

- In Canada, the stringency index increased to 78 in response to the Omicron wave in late December 2021, then, after cases declined, recently decreased to 69.
- Internationally, disease activity greatly varies across many countries: many countries have eased public health measures based on current COVID-19 trends, health care capacity, and vaccine coverage, while some have maintained or re-implemented measures.

## DYNAMIC MODELLING

*The Agent-based model* explored the impact of increasing acceptance of boosters, and deploying them at an expedited rate, on Omicron infections and hospitalisations in the coming months. Results suggest that, despite relatively low booster uptake, the current lifting of public health measures may not cause a resurgence of cases that would exceed the number of hospitalisations and deaths observed in previous waves. Overall, comparing different scenarios for booster uptake, as well as speed and timing of booster rollout, there were only small differences in cases, hospitalisations and deaths. Results suggest that delaying increased uptake of boosters until early fall had the greatest impact on reducing a wave in fall-winter 2022-2023.

*The SEIR compartment model* was used to explore the effect of boosters on the Omicron wave. Additionally, following the most recent Omicron wave, scenarios with different speeds and degrees of waning immunity along with different levels of booster administration were examined to see their effect on subsequent waves of COVID-19. Results suggested that booster administration in 2021 may have significantly reduced the Omicron wave of hospitalisations. However, scenarios in which there was rapid administration of additional boosters, to reach 90% of the eligible population, resulted in only a small reduction in hospitalisations during spring 2022. In scenarios where booster administration is rapidly deployed following the Omicron wave, the results associated with a simulated fall 2022 resurgence did not show a significant reduction in hospitalisations. These findings support studying the timing of booster administration to determine optimal efficacy.