

The AHS Scientific Advisory Group is a contributing member of [COVID-END, the COVID-19 Evidence Network to support Decision-making](#). This document highlights the key findings for Alberta of the COVID-END report on public health and health systems impacts of SARS-CoV-2 Variants of Concern prepared by member group Curran et al. on May 4, 2021

The original report can be accessed [here](#).

Topic: Public Health and Health Systems Impacts of SARS-CoV-2 Variants of Concern (VOC)

Specific Research Question 1: What is known about the implications of the current three priority VOC (B.1.1.7, P.1, B.1.351) for public-health measures on:

- a) Modifying approach to vaccination (e.g., using vaccines that offer greater protection against variants, using different vaccines for first and second doses and/or re-vaccinating those initially vaccinated with vaccines with limited efficacy for new strains)
- b) Modifying infection-prevention (i.e., public-health) measures in the community (e.g., changing duration of hand washing; changing mask type and characteristics, double masking, or other changes to masking; and changes to physical and temporal distancing)
- c) Modifying infection-control procedures, such as:
 - Changing duration for quarantining of exposed or potentially exposed individuals
 - Changing duration for isolating suspected or confirmed cases (e.g., for exposed health workers)
 - Changing testing strategy, including approach to testing, frequency of testing, and turn-around time for test results

Specific Research Question 2: What is known about the implications of the three priority VOC for health system arrangements (particularly for hospitals) on:

- a) Adjusting capacity planning to accommodate changes in the risk of re-infection and the risk of severe disease (e.g., hospitalization, admission to ICU, and death)
- b) Adjusting personal protective equipment (PPE) procedures for health workers
- c) Adjusting restrictions to and screening staff and visitors (e.g., visitor policy changes, approach to and frequency of screening)
- d) Adjusting service provision (e.g., cohorting patients in hospitals based on the VOC they have)
- e) Adjusting patient accommodations, shared spaces, and common spaces (e.g., improvement to HVAC (heating, ventilation and air conditioning) systems)

Context for Alberta

As of May 1 2021, approximately 60% of active cases of SARS-CoV-2 in Alberta are variants of concern (VOC: B1.1.1.7, B.1.351 and P.1).

As of May 6, 2021, there have been 37,420 VOC cases in Alberta, of which 94% have been B117. Since the start of the pandemic, 17.8% of all cases in the province have been VOC, but have comprised 28.7% of total hospitalizations and 20% of total ICU cases. Calgary Zone has had 45% of the VOC cases thus far. Outcomes of VOC cases to date include 3.7% admitted to hospital, 0.3% fatal, and 23.1% of hospitalized cases have gone to ICU. In the week prior to May 6, 75% of admissions were VOC related with the highest proportion in 45 to 64-year-olds, and the next 18 to 44-year-olds.

Preliminary Alberta data show 5864 outbreaks with 45,686 cases (average of 8 cases per outbreak) since the start of the pandemic: 1374 (23%) have been VOC outbreaks, with 16,554 cases (average 12 cases per outbreak). Seventy of the VOC outbreaks have occurred since April 1. In that time, 39/42 (93%) of larger outbreaks (with >20 cases) have been due to VOC. Of 127 acute care outbreaks, 18% have had documented VOC cases, most of those occurring since March 2021, with an average of 24 confirmed cases per outbreak (non-VOC outbreaks have an average of four confirmed cases per outbreak). In Long Term Care the number of confirmed resident cases per outbreak has dropped 5 fold, and outbreak associated deaths have dropped 10 fold, although the number of VOC related VOC outbreaks climbed from 2 in January to 20 in April, (compared with 20-30 outbreaks monthly in October-December 2020).

Increased transmissibility of the VOC has implications for public health measures and health system decision-making. Questions about these implications were posed to COVID-END (see Appendix for original questions). The network collaborated with participating Canadian centers and the Public Health Agency of Canada to revise the questions into the ones posted above, which are addressed in the COVID-END report on the Public Health and Health Systems Impacts of SARS-CoV-2 Variants of Concern Rapid Scoping Review.

For more details on COVID-19 VOC, the first foundational review on virologic and transmission characteristics by COVID-END can be found [here](#).

Key Messages for Alberta

- Although there have been over 30 articles focusing on VOCs that informed this COVID-END review, they were largely a description of what has been observed with in various countries with different health care systems, approaches and policies. There are limited or no comparative studies to inform many of the study questions raised above, limiting the ability to make definitive recommendations.
- Variants of Concern, which now comprise the majority of new cases in Alberta and the vast majority of patients hospitalized in the third wave, appear to result in an increased likelihood of hospitalization, compared to wild type virus (Bager et al., 2021 & Mitze et al. 2021).
- The demographics of the critically ill (those needing hospitalization or ICU care) have shifted to include younger patients with fewer/no comorbid conditions (Tuite et al., 2021). There is insufficient published data to allow us to conclude if length of stay, requirement for intensive care or mortality rates have been impacted by VOC.

- There is evidence of a very significant reduction in outbreak associated cases and deaths within long-term care (LTC) facilities correlating with the increase in vaccination in LTC patients and healthcare workers despite increasing VOC community transmission.
- Current non-pharmaceutical interventions (NPI) used in hospitals and care facilities including distancing, PPE and hand washing appear to be effective to minimize transmission and outbreaks even in context of rising VOC numbers, although there are limited data.
- In contrast, public health measures in the community as currently practiced may not be as effective for VOC as for the wild-type virus, though it is possible that some of this is due to poor compliance with public health measures given the public fatigue with pandemic-related measures. Increased transmissibility of VOC warrant more stringent measures in jurisdictions with VOC outbreaks, particularly where there is crowding, less than optimal distancing, ventilation and suboptimal PPE practices and careful attention to compliance with public health measures.
- Ongoing obstacles to vaccination must be addressed, including vaccine hesitancy, and structural barriers such as physical access to vaccination sites.

Committee Discussion

The committee reached consensus on the recommendations.

Recommendations for Alberta

Public Health

Recommendation 1: Non-pharmaceutical interventions should be continued during the period of vaccination roll-out.

Rationale: NPIs and vaccination reduce the impact of pandemic through different mechanisms (i.e., decrease transmission rates and number of susceptible individuals). As VOCs are associated with increased transmissibility translating into a higher reproductive number (R), maintaining NPIs during vaccination roll-out will reduce the burden of infection, hospitalizations, and deaths. The extent of NPI (combination of physical distancing, mask wearing and hand washing as well as more restrictive measures [e.g., stay at home orders, school and workplace closures, local travel restrictions] to minimize non-essential contacts in hot spots) should be guided by local epidemiology.

Widespread transmission of COVID-19, including Variants of Concern (VoCs), can lead to further mutations and emergence of other VoCs in the future, against which current vaccines may be less effective. This emphasizes the need for the substantial reduction of transmission through simultaneous public health measures and vaccination.

Recommendation 2: The vaccination strategy should prioritize speed and coverage, while mitigating systematic barriers to vaccine access.

Rationale: The population protection through vaccination is a product of vaccine coverage and vaccine effectiveness. The trade-off favoring vaccine coverage over vaccine effectiveness is likely to be magnified for VOC. There are many systematic barriers to vaccine access, such as physical location, vaccine hesitancy, and factors

related to SES that must be addressed to boost vaccination uptake. These are further discussed in the Scientific Advisory Group [review on vaccine strategies](#).

Recommendation 3: In a setting of widespread VOC transmission, comprehensive social distancing measures should be implemented as soon as possible (and within 1-2 weeks) of detecting a signal of exponential growth.

Rationale: As VOC are more transmissible, the exponential growth stage is more rapid and more likely to lead to higher peaks, therefore the window of opportunity to decelerate exponential growth is shorter. Non pharmaceutical intervention (NPIs) that minimize contacts between individuals are likely to be most effective as containment.

Tracking indicators of early exponential growth to refine and enforce compliance with public health interventions rather than using lagging, health care system based indicators may allow earlier and more effective control of VOC surges.

Recommendation 4: In a setting of widespread VOC transmission, high compliance to existing public health recommendations should be emphasized and supported (workplace support, out-of-household quarantine support).

Rationale: There is evidence of high VOC transmission among individuals living in the same household, particularly among pre-symptomatic and asymptomatic cases compared with wild type COVID-19. Therefore, comprehensive public measures (rapid testing, contact tracing, masking, quarantining and support for out-of-household quarantine where appropriate) in household and workplace settings need to be reinforced and supported.

Health Systems Arrangements

Recommendation 1: Current projections for hospital and ICU bed requirements should consider the changing demographic of transmission with higher proportions of younger patients with fewer concurrent medical conditions with VOC infections, and synthesize local data to inform planning using actual LOS and mortality.

Rationale: Observational and modelling studies suggest differences in this cohort based on level of vaccination of high-risk patients as well as proportion and type of VOC infections in the community.

Recommendation 2: Healthcare worker vaccination and non-pharmaceutical and Infection Prevention and Control interventions including distancing, optimal PPE and hand hygiene should remain as the standard interventions within hospital systems with high levels of VOC infections.

Rationale: Observational and modellings studies within systems with high rates of VOC and high vaccination rates plus use of optimal distancing and high compliance with appropriate PPE demonstrate low rates of transmission to healthcare workers and patients.

Recommendation 3: Continued monitoring of post immunization COVID-19 test positivity is recommended, with regular reporting to allow identification of signals of concern regarding the degree of vaccine protection (after one or two doses) observed in Alberta or of waning immunity across different populations.

Rationale: Existing data repositories within Alberta allow tracking of post immunization positive tests, and reporting of these data to the Chief Medical Officer of Health and the AHS Senior Medical Officer of Health will allow ongoing optimization of vaccine planning in Alberta.

Practical Considerations for Alberta

Public Health

- A combination of NPI (eg masking, distancing, testing, closing non-essential retail, mandating work-from-home) should be employed during vaccination rollout to improve individual and public health outcomes.
- Emphasis should be placed on preventing VOC chains of transmission in high-risk workplaces.
- Given high VOC transmission in households, education on self isolation at home with symptoms and the need for out-of-household quarantine options for families who are unable to use NPI (masking, distancing, etc.) within the home should be reinforced.
- Laboratory capacity should be augmented and maintained to be able to detect and monitor VOC spread within the community.
- Vaccination strategies should include targeted interventions to address vaccine hesitancy and structural barriers to access; access to vaccines should be tailored with a focus on the particular needs of vulnerable/ underserved/ high-risk populations.

Health Systems Arrangements

- Given the elevated potential for transmission in care settings with constraints on distancing and ventilation, systematic efforts to minimize the amount of time COVID-19 patients spend in such settings (for example, through rapid disposition planning, and strategic diagnostic decisions around lab and radiologic investigations in Emergency Department settings) is encouraged.
- VOC transmission within health care settings should prompt a reassessment of the degree of adherence to fit for work, and patient/designated support worker screening processes, and if good adherence is documented, review of process adequacy should be carried out.

Research Gaps

The nature and findings on the impact of VOC on public health and health systems is rapidly evolving with emerging evidence. A better understanding of the biology and viral kinetics of VOC and how they may differ from wild type viruses will inform our ability to respond to VOCs. Based on the rapid review by COVID-END, there is inadequate evidence to support decisions related to:

- Optimal vaccination strategies to reduce VOC
- Best practices for screening staff and visitors in health service organizations and adjusting service provisions
- Adjusting patient accommodations and shared spaces in the hospital setting with the presence of different VOC

- The effectiveness of infection-prevention strategies for safer workplace environments in the context of VOC
- Impact of vaccination on the requirement for and the duration of quarantine and/or isolation for VOCs
- Screening and testing for VOC under different conditions
- Masking and hand washing in the context of VOC
- Adequate screening and genomic surveillance for emerging VOCs

Noting these research gaps, locally in Alberta, we recommend prioritizing the analysis of data to inform future decision making on:

- The effectiveness of vaccines against VOC
- The severity of disease (including hospitalization, ICU admissions, and mortality) in people infected with VOC
- The effectiveness of current PPE on VOC transmission in hospitals and LTCs

Appendix

Original Scientific Advisory Group questions

What is the impact of variant strains of COVID-19 on public health policies and acute care?

Why are these strains more transmissible?

Does the mechanism of transmission vary?

Public health policy:

- What are the implications for outbreak management? (Including exposure time)
- Are there implications of the strains on use of masking / other strategies in the community?
- Is reinfection with COVID-19 more likely with the new strains?
- What is known about transmission characteristics of variant strains (timing of peak viral load, efficacy of masking, etc.)?
- What are the implications of the variant strains on how AHS does contact tracing? (Including exposure time)

Acute care:

- What are the implications of the strains on cohorting in hospitals (can "usual COVID-19 patients" be cohorted with patients)?
- Are patients infected with variant strains at higher risk of severe disease (hospitalization; ICU; death)?
- What are the implications of the variant strains on PPE strategies?

Vaccination

- Do vaccines offer protection?

List of Abbreviations

HVAC - Heating, Ventilation and Air Conditioning

ICU - Intensive Care Unit

IPC – Infection prevention & control

LTC - Long-term care

NPI - Non-pharmaceutical Intervention

PPE - Personal Protective Equipment

VOC - Variants of Concern

Authorship and Committee Members

Name	Contribution
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