COVID-19 Omicron Variant Sub-lineage BA.2: Evidence and Risk Assessment (up to date as of May 3, 2022)

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Key Messages

- Based on representative whole genome sequencing (WGS), the Omicron BA.2 sub-lineage has been dominant in Ontario since mid-March, 2022, and comprised 90.7% of samples for April 10 to 16, 2022. The BA.2 proportion does not distinguish between BA.2 and BA.2 sub-lineages, such as BA.2.12.1.

- Among those eligible for PCR testing, the number of reported cases and percent test positivity may have reached their wave six peak. In the week of April 17, the number of PCR-confirmed cases decreased in Ontario by 6%, after rising in preceding weeks. In some older adult age groups; however, cases are increasing. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) percent positivity was 18.3% on April 21, 2022, and was higher in children <13 years of age (19.8%) and 14-17 years of age (23.3%). Since the end of April, percent positivity is slowly declining, and was 14% on May 1, 2022. This is still higher than during most of the pandemic.

- Evidence suggests BA.2 has similar severity compared to BA.1 in adults, but there is less evidence on severity of BA.2 in children. Due to increased transmissibility of BA.2 and removal of public health measures, the absolute number of cases and severe cases may continue to be higher than during much of the pandemic to date. High vaccine uptake among adults and immunity from previous infections may attenuate the overall number of severe cases. A complete primary series and for those eligible, the recommended booster dose(s), provide optimal protection against severe outcomes. Additional dose(s) also reduce the risk of symptomatic infection; however, vaccine effectiveness (VE) against symptomatic infection is lower and wanes more quickly than VE against severe disease.

- In the current context of high case rates and percent positivity, population-level measures, particularly in essential indoor public settings, can help minimize inequitable impacts on those at highest risk of severe disease (e.g., immunocompromised, older adults, racialized, and low income populations), those ineligible for vaccination (i.e., children less than 5 years) and those impacted by disruptions in educational settings (e.g., when individuals cannot attend due to being infected or symptomatic).
Non-pharmaceutical prevention strategies that reduce the risk of transmission can be layered onto a vaccination strategy to reduce the number of cases driven by a more transmissible dominant variant with lower VE against symptomatic infection. These include ventilation, moving outdoors as the weather permits, indoor masking in essential settings, communication on the importance of wearing masks with good fit and filtration for personal and population-level protection (e.g., in indoor “3-C” settings that are closed spaces, crowded, and involve close contact, and/or settings where distancing may be challenging). Preventing high levels of population infection would also likely mitigate the incidence of post-acute COVID-19 syndrome (PACS, “long COVID-19”) and its longer term impacts, for which evidence is still emerging.

**Issue and Research Question**

There are currently 55 Pango sub-lineages associated with the Omicron variant, with BA.1, BA.1.1, and BA.2 as the most commonly reported. Considering the increased transmissibility of the Omicron BA.2 sub-lineage compared to previously circulating variants of concern (VOCs) and BA.1.1, it is important to monitor the potential impact the BA.2 sub-lineage might have in Ontario. This evidence brief updates the Public Health Ontario (PHO) report published April 22, 2022, and summarizes available information and evidence on the BA.2 sub-lineage relevant to the risk in Ontario that has emerged since the last report up to May 3, 2022.

**Methods**

PHO Library Services conducted daily searches of primary and preprint literature using the MEDLINE database (search strategies available upon request). Preprints are research papers that have not undergone peer-review, but are made publicly available to provide the latest data relevant to the rapidly evolving COVID-19 pandemic. Formal critical appraisal of published and preprint COVID-19 literature is out of scope for this PHO variant Risk Assessment. PHO performed grey literature searches daily using various news feeds and custom search engines. English-language peer-reviewed and preprint records that described COVID-19 variants were included. In some of the literature, the term Omicron is used to refer to BA.1 and/or BA.1.1, which have been the dominant sub-lineages in most jurisdictions. Sections from prior risk assessments for which there is no new literature of note, have been removed.

**Ontario Risk Assessment**

The current risk of BA.2 sub-lineage transmissibility in Ontario is high, with a low degree of uncertainty. The risk of severe disease is low, with a moderate degree of uncertainty. The risk of reinfection is high with a moderate degree of uncertainty. The risk of breakthrough infection is high with a moderate degree of uncertainty. The risk of impact on the testing is moderate, with a low degree of uncertainty. The risk of impact on surveillance is moderate with a low degree of uncertainty. The overall risk assessment may change as new evidence emerges (see Table 1).
Additional Considerations

- BA.2 case counts used to inform this report do not distinguish between BA.2 and BA.2 sub-lineages such as BA.2.12.1. The BA.2.12.1 sub-lineage, as an example, shows evidence of increased transmissibility compared to BA.2, and therefore may present a different level of risk than BA.2.\(^4,5\)

- Due to increased transmissibility of BA.2, as cases increase the absolute number of severe cases would be expected to rise. High vaccine uptake and immunity from previous infections may attenuate the increase.

- Health care system capacity has improved after the decline of the BA.1 wave; however, health care worker absences and surgical backlog may remain challenging during this current period of high transmission.

Ontario Epidemiology

On December 31, 2021, diagnostic PCR testing was restricted to high-risk populations. On April 11, 2022, provincial PCR testing guidance was updated related to eligibility for COVID-19 treatment (e.g., inclusion of all asymptomatic people aged 70 and older),\(^6\) however, Ontario case counts remain an underestimate and representative surveillance only pertains to tested populations. Although rapid antigen tests (RATs) are more available to the public, these test results are not captured in Ontario’s COVID-19 surveillance, further compounding the underestimate of Ontario case counts. Changes to testing, reporting, and how epidemiological variables are defined (e.g., COVID-19 hospitalizations and deaths) have necessitated recalibration of epidemiological models and deeper understanding of new data sources (e.g., wastewater). Triangulation across indicators can provide greater confidence in trends.\(^7\)

- The Ontario COVID-19 Genomics Network moved from sequencing 25% of eligible samples on March 30, 2022, to 10% on April 13, 2022.\(^8\) The BA.2 counts and proportions in the most recent report do not distinguish between BA.2 and BA.2 sub-lineages, such as BA.2.12.1.\(^8\)

- The proportion of cases identified as BA.2 have had an increasing trend over the past several weeks: 6.3% for the week of January 23 to 29, 25.1% for February 27 to March 5, 80.5% March 27 to April 2, and 90.7% for April 10 to 16, 2022. In the week of April 10 to 16, 2022, the second most prevalent variant was BA.1.1 at 8.7%.

- One case of BA.3 was identified during the week of March 27 to April 2, 2022.

- From January 23, 2022 to April 16, 2022, the weekly growth rate of BA.2 was 1.67 (95% confidence interval [CI] 1.65 - 1.69) times that of BA.1.1.

- After rising for four consecutive weeks from March 20, 2022 to April 16, 2022, the number of confirmed COVID-19 cases decreased by 6% in the week of April 17 to 23 (relative to the previous week).\(^9\) This suggests the number of cases may have reached their wave six peak among those eligible for testing. The rate of confirmed cases increased by 23% in individuals 80 years and older and by 4% in those aged 60-79 years old. The increase among older age groups may be impacted by expanded PCR testing eligibility on April 11, 2022 (see above). From early April, percent positivity was relatively stable near 18-19%.\(^10\) On April 21, 2022, percent positivity reported by the Provincial Diagnostic Network Operations Centre was 18.3% overall, and was higher in children <13 years of age (19.8%) and 14-17 years of age (23.3%) as reported by the Ontario Laboratories Information System.\(^11\) Percent positivity is slowly declining since the end of April and was 14% on May 1, 2022,\(^10,11\) which is still higher than during most of the pandemic.
The role, if any, of changes to PCR testing eligibility on April 11, 2022 is unclear. Uncertainty remains as to whether the decreasing trend in percent positivity will continue.

- Although the overall number of outbreaks is decreasing, the number of outbreak-associated cases is increasing in several settings. On May 1, 2022, the number of cases associated with outbreaks in long-term care increased by 12.7% from the week of April 10 to 16, to the week of April 17 to 23.

- Hospitalizations, intensive care unit (ICU) admissions and deaths are lagging indicators, often occurring days or weeks after cases are initially reported to public health. Based on information included in Public Health Case and Contact Management Solution (CCM) up to April 27, 2022, the number of confirmed COVID-19 cases hospitalized increased from the week of March 6, 2022 to the week of April 10, 2022, followed by a decrease the week of April 17, 2022. This trend may change, particularly for the most recent week (April 17, 2022), as a lagging indicator and because of reporting lags (i.e., reporting to public health units or entry into CCM). The number of confirmed cases admitted to ICU had an increasing trend from the week of March 20, 2022 to the week of April 10, 2022. Similar to hospitalizations, the number of ICU admissions decreased the week of April 17, 2022, but this may be due to ICU admissions being a lagging indicator and reporting lags. Uncertainty remains about the timing and peak of severity indicators.

- The Ontario Science Advisory Table did not release updated COVID-19 projections since the last PHO Risk Assessment. On May 3, 2022, the Ontario Dashboard indicated the number of COVID-19 cases and percent positivity were decreasing, and the wastewater signal was stable, suggesting community transmission may have peaked but uncertainty remains about whether this trend will continue.

Table 1. Risk Assessment for Omicron variant sub-lineage BA.2

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<thead>
<tr>
<th>Issues</th>
<th>Risk Level</th>
<th>Degree of Uncertainty</th>
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<tbody>
<tr>
<td>Increased Transmissibility</td>
<td>High</td>
<td>Low</td>
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<tr>
<td>Disease Severity</td>
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<td>Moderate</td>
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<td>COVID-19 Re-infection</td>
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<td>Lowered Vaccine Effectiveness/Breakthrough Infections</td>
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<td>Impact on Testing</td>
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<td>Impact on Surveillance</td>
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Epidemiology in Other Jurisdictions

Canada

Surveillance whole genome sequencing (WGS) across Canada indicated that, of SARS-CoV-2 samples collected the week of April 10, 2022, 99.9% were Omicron (0.4% BA.1, 13.7% BA.1.1, 0.1% BA.1.17.2, 1.5% other BA.1, 83.8% BA.2 [51.4% BA.2, 17.5% BA.2.3, 5.0% BA.2.9, 9.9% other BA.2], and 0.3% other Omicron [BA.3]), but data were still accumulating. This is an increase in the proportion of BA.2 samples compared to the week of April 3, 2022. The Public Health Agency of Canada (PHAC) reported that for the period of April 17 to 23, 2022: the average number of cases reported daily decreased 8%, the average percentage of positive tests decreased 2.7%, and the average number of deaths reported daily increased 57%. On May 3, 2022, Canada reported 2,354 new COVID-19 cases, 4 new deaths and 257,001 active cases. The daily percent positivity (over the previous 7 days) was 14.5%, which is a decrease from the test positivity observed since late February/early March. PHAC notes that due to changes in COVID-19 testing policies in many jurisdictions in late December 2021, case counts will underestimate the total burden of disease.

Select Other Jurisdictions

Global: Based on sequences uploaded to GISAID (with sample collection dates from March 23 to April 21, 2022), Omicron remains the dominant variant globally, at 99.7%. The WHO notes that the number of sequences submitted to GISAID has decreased, and while this may reflect decreasing cases, it may also reflect changes to epidemiological surveillance policies in some countries, including changes in sampling and sequencing strategies. The WHO recommends maintaining strong SARS-CoV-2 surveillance through the acute phase of the pandemic.

Denmark: The Danish Health Authority changed their COVID-19 test recommendations the week of March 6, 2022 to limit testing primarily to vulnerable groups and patients admitted to hospital, which is expected to impact trends in the following weeks. COVID-19 case numbers have continued to decrease from February 10 to April 23, 2022. Percent positivity decreased the week of April 17, but varied across age groups. New hospital admissions decreased by 14% the week of April 17. In the week of April 10, 2022, of 8,690 samples with WGS, the Statens Serum Institut reported that 68.1% were BA.2, 25.2% BA.2_H78Y, 4.5% BA.2.1, 1.6% BA.2.3, 0.2% BA.1.1, and 0.0% BA.1. The Danish COVID-19 Genome Consortium reported that in the week of April 24, 2022, 99.4% of sequenced samples were BA.2, and 0.1% were BA.1.1.

United Kingdom (UK): In the four weeks leading up to April 25, 2022, 96.5% of cases in UK countries were BA.2. The week of April 27, 2022, the number of positive SARS-CoV-2 tests decreased by 43.3%. Between April 19 to 25, 2022, the number of people admitted to hospital with COVID-19 decreased by 23.6% compared to the previous 7 days.

England: As of April 1, 2022, free universal symptomatic and asymptomatic testing is no longer available to the general public in England, which will impact epidemiological trends from Pillar 2 testing (swab testing for virus in the wider population, through commercial partnerships, either processed in a lab or more rapidly via RATs). Case rates and test positivity from Pillar 1 testing (swab testing for virus in UK Health Security Agency (UKHSA) labs and National Health Service (NHS) hospitals for those with a clinical need, and health and care workers) shows a decrease in the week of April 17, 2022. According to UK general practitioner sentinel swabbing schemes, the overall positivity around the same time was 10.5%. Overall, COVID-19 hospitalizations decreased the week of April 17, 2022. There was no updated UKHSA
VOC and variants under investigation (VUI) report for England since the last PHO Risk Assessment update.

**United States (US):** According to NOWCAST modelling projections, the US Centers for Disease Control and Prevention (CDC) estimated that for the week ending April 23, 2022, 100% of SARS-CoV-2 cases were Omicron (68.1% [95% PI 61.3-74.2%] BA.2, 28.5% [95% PI 22.3-36.0%] BA.2.12.1, 2.8% [95% PI 2.3-3.3%] BA.1.1). As of April 27, 2022, the 7-day moving average of daily new SARS-CoV-2 cases (53,133) increased 25.2% compared to the previous week’s 7-day moving average (42,427). The 7-day daily average hospitalizations for April 20 to 26, 2022, was 1,889, which is an 18.5% increase from April 13 to 19, 2022 (1,594).

**Genomic Features and Evolution**

Understanding the evolution of Omicron and its sub-lineages can provide insight into the risk of another “Omicron”-type variant. The high transmissibility of the Omicron variant combined with other co-circulating VOCs, incomplete vaccination coverage and waning immunity, can result in Omicron evolution and recombination events. A few studies are highlighted below:

- Ou et al., reported that circulating Omicron subvariants originate in part through recombination with other variants. Through scanning high-quality completed Omicron spike (S) gene sequences, 27 core mutations were identified in BA.2. BA.2 shares six amino acid mutations in the S protein with most VOCs, including three mutations found in Alpha, three mutations in Beta, three mutations in Gamma, and two mutations in Delta, which were identical in BA.2 and BA.1. BA.1 and BA.2 share 21 S amino acid mutations: one in the N-terminal domain (NTD), twelve in the receptor binding domain (RBD), four in the S protein underpinning subdomain near the S1/S2 cleavage site, and four in the S protein S2 subunit. Of the 21 mutations, 15 are specific to Omicron. The mutations in the BA.2 S gene result in 31 amino acid substitutions. Revertant mutations were rare in BA.2, as compared to BA.1, the exception being a three amino acid deletion (LPP) found at amino acids 24–26. Based on their overall analysis (including BA.1), the authors conclude that co-infection and subsequent genome recombination play important roles in the ongoing evolution of SARS-CoV-2. Variant co-infections, including BA.2 co-infections, are also reported elsewhere.

- Atkulwar et al. investigated the evolution of Omicron variants based on 564 SARS-CoV-2 genomes (n=92 BA.2) and their phyldynamic and phylogenomic traits. The authors estimated a reproduction number (R0) of 2.445 (HPD=1.525-3.761) for BA.2. A maximum likelihood based phylogenetic tree showed clustering of the dataset into two clades (BA.1 and BA.2), but the clustering was not tight and showed emergence of some sub-sub-lineages in the form of short and long branches radiating from within BA.1 and BA.2 clades. Both BA.1 and BA.2 exhibited a high number of major haplogroup, including sub-haplogroups and associated singleton haplogroups, which the authors conclude further confirms rapid evolutionary rate of recombination in both lineages.
Transmissibility

Since the last PHO BA.2 Risk Assessment, additional studies have added to the literature describing the BA.2 growth advantage over other SARS-CoV-2 variants. It remains unclear to what extent the increased transmission of BA.2 compared to BA.1 or BA1.1 is due to inherent characteristics of this sub-lineage (i.e., viral load, enhanced ability to infect cells, tissue tropism) or due to immune evasion or antibody waning, but growing evidence suggests higher viral load plays a role.27-29

- Zhang et al., compared BA.2 replication in cell culture and an animal model to replication of other prevalent SARS-CoV-2 variants.30 Cell-cell fusion assays showed BA.1 and BA.2 to have somewhat lower fusion to angiotensin converting enzyme-2 (ACE2)-expressing cells compared to variants with G614. When an untransfected cell line expressing a minimal level of endogenous ACE2 was used, unlike the other variants that still exhibited significant fusion activity, BA.2 had a barely detectable activity and only at the last time point. The authors suggest this could mean BA.2 may not infect host cells with very low levels of ACE2. When the levels of ACE2 were increased, BA.1 and BA.2 were slower to bind than other variants, and required more ACE2 to achieve the same level of fusion activity as other variants; but, BA.2 was significantly more fusogenic than BA.1 at mid-range ACE2 levels. Overall, the authors conclude that BA.2 S has a slight advantage in its membrane fusion capability compared to BA.1, but is slightly less fusogenic compared to other VOCs. Infection in mice expressing human ACE2 revealed the viral loads in lung tissues infected with Delta, BA.1 or BA.2 were 2 to 3 orders of magnitude higher than those infected by the G614 virus. Using bio-layer interferometry showed that BA.2 bound an ACE2 monomer or dimer only slightly more than BA.1, which may indicate the different mutations of the RBD between BA.1 and BA.2 have little impact on their relative receptor binding affinities. In terms of neutralization, BA.2 was almost completely resistant to all NTD-1, NTD-2, RBD-3 and RBD-2 antibodies except for C98C7. BA.2 retained some sensitivity to RBD-1 antibodies.

Vaccine Effectiveness (VE) and Reinfections

Genomic evidence indicates that BA.2 is as genetically different from BA.1 as Alpha, Beta and Delta VOCs were from each other, which makes monitoring of BA.2 VE and reinfections important for assessing the risks associated with a BA.2 wave in Ontario. A review of VE evidence before the BA.2 wave shows that a primary series and one booster dose of COVID-19 vaccine exhibits less waning against severe outcomes, including hospitalization and death, than for symptomatic infection.31 Evidence on VE and reinfections will continue to be confounded by differences in public health measures and vaccination programs, history of infections, and recentness of booster programs across jurisdictions. New studies that emerged since the last PHO Risk Assessment are described below:

- Assawakosri et al., reported the SARS-CoV-2 immunity from 30 individuals who received two doses of Oxford-AstraZeneca vaccination and had no previous or current COVID-19 infection, and then received a Moderna booster vaccine at 5 to 7 months after the second dose of Oxford-AstraZeneca.32 Before the booster, neutralizing antibodies against BA.1 and BA.2 were undetectable. At 28 days post-booster, the geometric mean titre (GMT) increased from 16.6 (95% CI: 13.2, 21.0) and 11.0 (95% CI: 9.6, 12.6) to 548 (95% CI: 415, 723) and 324 (95% CI: 214, 492) for BA.1 and BA.2, respectively. The authors conclude that their preliminary results indicate that a heterologous booster with an mRNA vaccine in Oxford-AstraZeneca-primed individuals could induce a robust antibody response that can cross-neutralize both BA.1 and BA.2.
• Handayani et al., reported that sera from individuals (n=84) with no history of SARS-CoV-2 infection and who received two Pfizer-BioNTech vaccinations and a booster, had serum neutralizing titres of GMT 36.44, 95% CI: 30.53–43.50 two weeks after the booster, which is a significant increase from the pre-booster, GMT of 1.18, 95% CI: 1.09–1.27, p<0.0012. The authors conclude their results indicate that a booster vaccine could induce neutralizing immunity against BA.2, and that a booster dose of Pfizer-BioNTech vaccine induces a high cross-neutralizing response against SARS-CoV-2 variants. They suggest that this may indicate that booster vaccination is an approach to suppress the BA.2 pandemic wave and can activate memory B cells that produce neutralizing antibodies able to recognize epitopes conserved among SARS-CoV-2 variants.

• Arora et al., compared BA.1, BA.2, and BA.3 pseudoviruses for sensitivity to neutralization by antibodies induced by infection and vaccination. Convalescent sera neutralized viral particles with the ancestral B.1 S protein (B.1 pp) very well, but neutralization of BA.2pp was diminished (9.2-times less than B.1pp; p=0.0020), but not as diminished as neutralization of BA.1 and BA.3. Similarly, neutralization of BA.2pp was 9-times reduced (p=0.0020; compared to B.1) using antibodies from individuals who received two doses of Pfizer-BioNTech. Individuals who received three doses of Pfizer-BioNTech exhibited modest evasion of Omicron S protein neutralization (BA.1 2.5-times, p=0.0039). Antibodies from individuals who received three doses of vaccines and had a breakthrough infection during the Delta wave exhibited the most potent neutralization, though still 9- to 12-times less efficient than B.1pp (BA.1 p=0.0020; BA.2 p=0.0039; BA.3 p=0.0039). The authors conclude that Omicron subvariants BA.1, BA.2 and BA.3, all evade neutralization by vaccine-induced antibodies with comparably high efficiency, suggesting that increased antibody evasion is not the reason for the expansion of BA.2 in several jurisdictions.

• Suntronwong et al., reported neutralizing antibodies against BA.1 and BA.2, and T-cell responses, following boosting with Pfizer-BioNTech (n=55), Moderna (n=52) or Oxford-AstraZeneca (n=60) after a heterologous CoronaVac/Oxford-AstraZeneca primary series (N=167). The authors reported a 5.9-fold drop in anti-RBD IgG within 4 to 5 months after the CoronaVac/Oxford-AstraZeneca primary series. Boosting caused anti-RBD IgG to peak 14 days later, with Moderna-boosted individuals achieving a 23-fold increase (126.9 versus 2921 BAU/mL), Pfizer-BioNTech achieving a 15.8-fold (152.1 versus 2404 BAU/mL) increase, and Oxford-AstraZeneca a 2.5-fold (142 versus 360.8 BAU/mL) increase. Although not statistically significant, anti-RBD IgG levels were negatively correlated with age in Moderna-boosted individuals. At 28 days post-boost, all individuals restored neutralizing activity to Delta by more than 90%. Individuals boosted with Oxford-AstraZeneca, Pfizer-BioNTech, and Moderna had neutralizing potential restored to 20% (6/30), 83% (25/30), and 90% (27/30), respectively. Before boosting, 80% (24/30) and 43% (13/30) of vaccinated individuals had neutralizing antibodies to BA.1 and BA.2, respectively. After 28 days post-boost, titres against BA.2 in Oxford-AstraZeneca, Pfizer-BioNTech, and Moderna groups were 59.27, 130.7, and 235.3, respectively, which achieved a 2.43-, 4.63- and 19.67-fold induction compared to pre-boost. Compared to BA.1, neutralizing titres to BA.2 were 1.47-fold higher in the Oxford-AstraZeneca group and 1.31- and 1.15- fold lower in the Pfizer-BioNTech and Moderna groups, respectively. The authors conclude that booster vaccination with mRNA and adenoviral-vectored vaccines could increase neutralizing antibody titres against BA.1 and BA.2; and, individuals boosted with Moderna or Pfizer-BioNTech vaccines could induce humoral and T-cell responses higher than those boosted with Oxford-AstraZeneca.
Public Health Measures

Since the last environmental scan on public health measures in select international jurisdictions, France, Norway, and the Netherlands expanded eligibility for a second booster dose,\textsuperscript{35-37} while Denmark announced that it will be suspending its mass vaccination campaign effective May 15, 2022.\textsuperscript{38} This means that they will not send invitations to individuals that are eligible for a vaccine (e.g., individuals 18 years and older who are eligible for a booster dose); however, individuals still have the opportunity to get the vaccine if they choose.

California, Italy, Israel, and Portugal eased their mask mandates,\textsuperscript{39-42} while the CDC urged mask use in 37 counties in New York State due to high COVID-19 levels.\textsuperscript{43} Since the last risk assessment, Quebec has announced that they will be easing their indoor mask mandate on May 14, 2022. Masks will only be required in healthcare settings and on public transit.\textsuperscript{44}

Implications for Practice

The implications for practice remain largely unchanged from the previous PHO BA.2 Risk Assessment.\textsuperscript{3}

- In the current context of high case rates and percent positivity, population-level measures, particularly in essential indoor public settings, can minimize inequitable impacts on those at highest risk of severe disease (e.g., immunocompromised, older adults, racialized, and low income populations), those ineligible for vaccination (i.e., children less than 5 years) and those impacted by disruptions in educational settings (e.g., when individuals cannot attend due to being infected or symptomatic).

- Public health measures can mitigate COVID-19 transmission at a time when early epidemiological indicators have plateaued or have started to decrease, late indicators show early signs of plateau or decrease, and percent positivity remains high. Consideration should be given to the least restrictive measures to achieve pandemic response goals based on epidemiological trends. Due to limitations of individual public health efforts (i.e., vaccination, masking, measures to reduce contacts), an approach that layers various measures can be used to mitigate community spread.

- COVID-19 vaccination remains an essential component of public health response in the current context, with an emphasis on initiation and completion of a primary series in relevant, under-vaccinated populations, as well as first and second boosters for the eligible population. Groups at higher risk for severe outcomes should be prioritized.

- While vaccination is a key public health tool, because COVID-19 vaccination and previous SARS-CoV-2 infection do not provide sterilizing immunity, and because VE against infection wanes over time, a COVID-19 strategy that relies entirely on vaccination and previous infection will not contain transmissions in the context of variants that lower vaccine effectiveness (i.e., Omicron sub-lineage BA.2). Growing evidence shows variable antibody cross neutralization across SARS-CoV-2 variants after an infection, making it difficult to gauge the level of immunity against reinfection by future variants. High quality surveillance, learning from prior use and removal of public health measures, and efforts to increase vaccine equity can help prepare Ontario for the next stages of the COVID-19 pandemic.
To achieve the overarching pandemic response goals of minimizing morbidity and mortality (including PACS/long-COVID), as well as minimizing societal disruption, current public health responses could be augmented with interventions aimed at reducing SARS-CoV-2 transmission. Options include masking in indoor public settings, ventilation-including natural ventilation as the weather improves, and moving outdoors. Maintaining a cautious approach to isolation and quarantine requirements is another component of a layered approach, which, together with other measures, can help break chains of SARS-CoV-2 transmission.45

Ongoing risk communication to the population regarding high levels of SARS-CoV-2 transmission and COVID-19 disease risk may be helpful, especially in the context of decreasing case counts but high test positivity. Layers of protection, including getting vaccinated, staying home when sick or with symptoms of COVID-19, practicing physical distancing and avoiding crowded spaces, spending time outdoors or in well-ventilated indoor spaces, wearing a well-fitted mask, and practicing respiratory etiquette and washing hands should continue to be promoted for all.45 Enhanced and timely access to oral outpatient treatment may mitigate the impact of severe illness on the health care system and the individual.

There are gaps in surveillance data to inform timely public health action related to Ontario’s pediatric population. These relate to limited PCR testing eligibility among children,46 hospitalization as a lagging indicator and evidence from previous waves that the majority of children are at low risk of complications from acute infection. In the context of a highly transmissible BA.2-dominant wave in Ontario, and given the educational, social and health impacts of cumulative educational disruption for children and families,47,48 a cautious, temporary approach to less restrictive community-based public health measures can minimize disruption to in-person learning (e.g., due to staying home when infected or symptomatic). Optimizing layers of prevention in K-12 schools, including improved ventilation/air quality, masking indoors, avoiding congregation of large unmasked groups, and access to well-fitted, high quality masks can reduce the risk of in-school transmission and disruptions due to staying home when infected or symptomatic.48,49

The evidence that a new SARS-CoV-2 VOC could emerge and alter the course of the pandemic again, continues to grow.50-52 The emergence of the BA.2 sub-lineage when jurisdictions were experiencing the decline of the BA.1 and BA.1.1 waves, and the recent identification of BA.3 in Ontario, BA.2.12.1 in New York State,53 and BA.4 and BA.5 in South Africa,54 underscore the need for high quality surveillance. It is essential we learn from prior use and removal of public health measures, increase efforts toward vaccine equity, and continue to prepare for the next stages of the COVID-19 pandemic.
References


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