

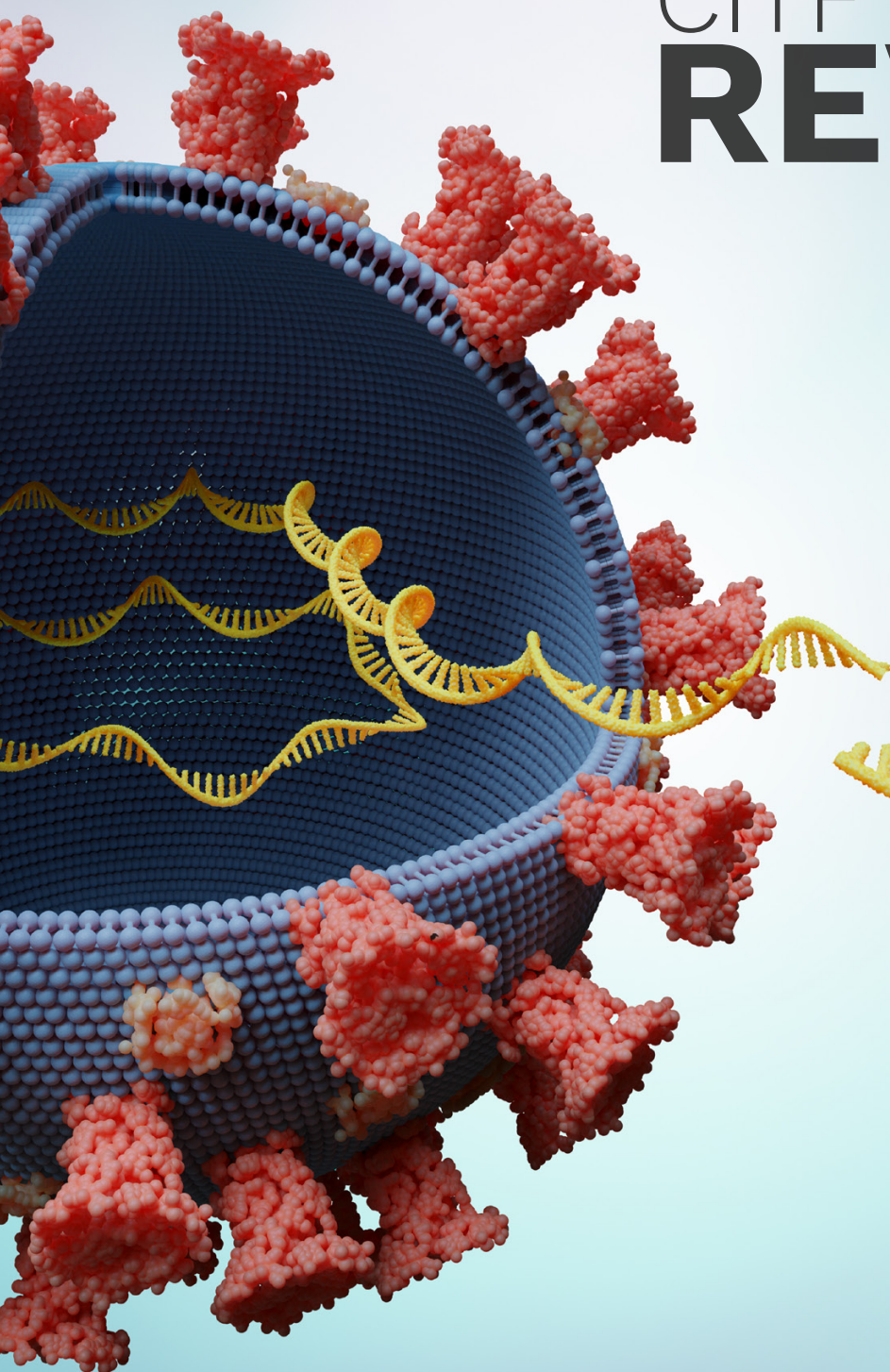


COVID-19  
IMMUNITY  
TASK FORCE

GROUPE DE TRAVAIL  
SUR L'IMMUNITÉ  
FACE À LA COVID-19

FEBRUARY  
**2022**

# CITF MONTHLY **REVIEW**



Vaccine effectiveness  
against **Omicron**

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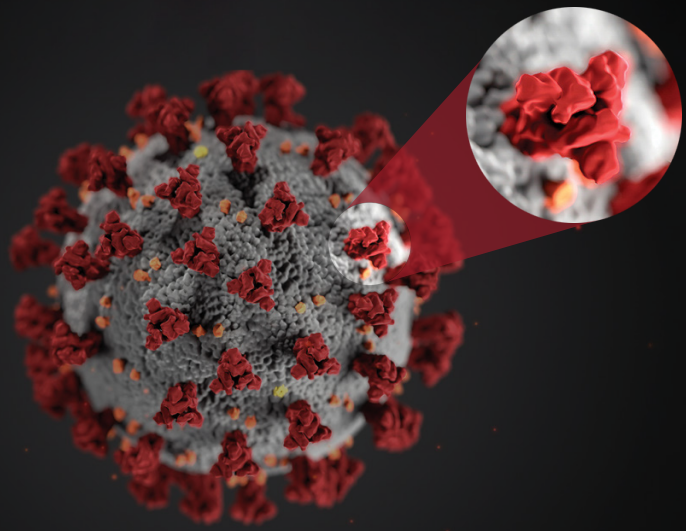
Reviewing what we know  
about **long COVID**

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**Answers** about boosters,  
rapid antigen tests  
and more!

# Original SARS-CoV-2 VS. Omicron variant

Since its emergence in 2019, the SARS-CoV-2 virus has spread through billions of people, allowing it to evolve to be fitter. Variants that perform better will quickly outcompete other strains to become the dominant strain.



## Number of spike protein mutations in variants

Alpha ●●●●●●●●●●

Beta ●●●●●●●●●●

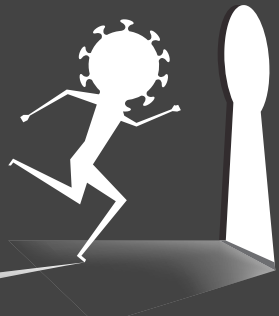
Delta ●●●●●●●●

Gamma ●●●●●●●●●●

Omicron 

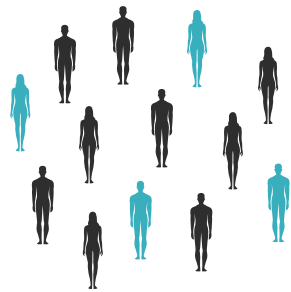
**36** The number of mutations in the **spike protein** Omicron harbours compared to the original strain.

The substantial number of new mutations in Omicron's genetic makeup has enabled it to **behave and look very differently** from the original strain of SARS-CoV-2 as well as the other variants of concern. Some of these mutations are linked to more efficient cell entry, immune evasion, and increased infectivity.

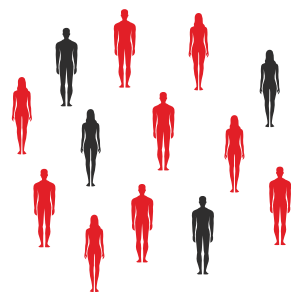


Omicron is up to **3X** more transmissible than the Delta strain.

Omicron is up to **3X** **more transmissible** than the Delta strain.



Delta



Omicron

Information in this article was accurate at the time of original publication. Because information about COVID-19 changes rapidly, we encourage you to visit the websites of the Public Health Agency of Canada (PHAC), Health Canada, the World Health Organization (WHO), and your provincial/territorial and local governments for the latest information.

Want to know **more?**



## Common symptoms



Disease severity

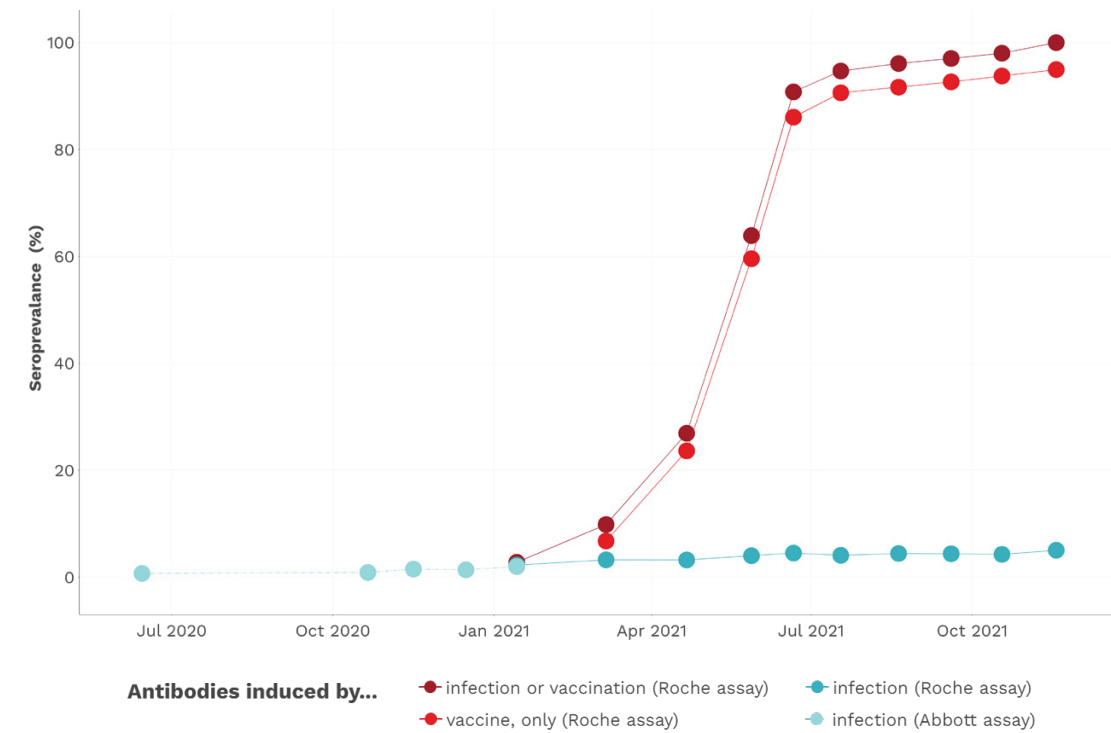


## Vaccines

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## NOVEMBER REPORT

## Uptick in infections prior to Omicron surge



Remarkably, nearly all Canadian Blood Services blood donors sampled in November tested positive for antibodies against the SARS-CoV-2 spike protein. While this was mainly due to vaccination with at least one vaccine dose, seroprevalence from a prior infection with COVID-19 stood at 5.1%, higher than what was seen in previous months.

In a subset of repeat donors, new infections occurred mostly in individuals not yet vaccinated. Breakthrough infections, on the other hand, remained infrequent during this period. These data were collected prior to the Omicron variant sweeping across Canada.

As was the case in the previous report, the concentration of antibodies against the spike protein of SARS-CoV-2 has declined further. This concentration – which rose dramatically with the widespread roll-out of vaccines in July – was expected to drop over time following vaccination. While this antibody concentration is still high, it has waned the most in those 70 and older, the group that was among the first to be recommended to receive a third (booster) dose, which was administered late in 2021. Boosters will help to elevate the concentration of spike antibodies.

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# Canadian Blood Services Report



## Boosters offer older Canadians best protection from SARS-CoV-2

*Older Canadians, particularly residents of long-term care homes, have been disproportionately affected throughout the COVID-19 pandemic. A variety of factors contribute to this: they are likely to have comorbidities, they have weaker immune responses, their vaccine-induced immunity to SARS-CoV-2 wanes more quickly, and viruses spread quickly in congregate settings like nursing and retirement homes. Several CITF-funded studies have provided results on various aspects of infection, immunity and vaccine effectiveness in this population including these two:*

Drs. Andrew Costa and Dawn Bowdish of McMaster University published a study in *JAMDA* showing that a third vaccine dose increased antibodies that neutralize COVID-19 to much higher levels in residents of retirement and nursing homes than what was achieved following a second dose. People in retirement homes were found to have equal neutralizing antibodies to nursing home residents – despite the latter being generally more frail than the former.

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A pre-print, not yet peer-reviewed, from Drs. Mark Brockman and Zabrina Brumme of Simon Fraser University and Dr. Marc Romney from the University of British Columbia, showed that a booster dose elevated the levels of antibodies and their neutralizing capacity above that of two doses in all individuals, including older adults.

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## Vaccination is more effective at neutralizing variants of concern than prior infection

Drs. Sharon Straus, Allison McGeer, and Anne-Claude Gingras, all at the University of Toronto, are among the contributors to a pre-print, not yet peer-reviewed, showing that previous infection alone does not create sufficient levels of neutralizing antibodies to protect against the Omicron variant. Triple vaccination, however, was associated with greater levels of neutralizing antibodies against several variants of SARS-CoV-2, including Omicron.

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*We assembled our experts to offer responses to some of the most pressing questions regarding the current state of the pandemic. From the startling emergence of the Omicron variant to the use of rapid antigen tests to the recommendation and timing of third dose booster vaccines, the evidence collected by CITF-funded research so far has helped to inform healthcare and public health decisions with regard to the ever-changing situation. We hope that it will help you to make informed choices regarding your health and to stay safe.*

### **If my child has had Omicron, should they still get vaccinated against COVID-19?**

If a child has had a SARS-CoV-2 infection, regardless of the variant, the National Advisory Committee on Immunization (NACI) recommends that they still receive two doses of vaccine at the recommended eight-week interval, if currently eligible, once symptoms have resolved and the child is no longer considered infectious ...

### **If I got Omicron, should I delay my booster?**

It is highly recommended that adults get a third (booster) dose, even after an infection with Omicron. This should be given a minimum of eight weeks after the COVID-19 infection ...

### **How severe is COVID-19 due to Omicron?**

Reports worldwide have described infection with Omicron to be mild to moderate in most cases. Nevertheless, some people – including those who are older, have underlying health conditions, and/or are immunosuppressed – may have a higher risk of more severe disease, including life-threatening illness. Likewise, the impact on healthcare systems will be significant due to the sheer number of cases and increased transmissibility of the new variant. In addition, we are experiencing the Omicron wave after the vast majority of Canadians have been vaccinated, which may also account for the milder disease symptoms experienced by many who have been infected ...

### **If I had COVID-19 in the third or fourth viral wave, can I still get infected with Omicron?**

Yes, the Omicron variant has been associated with an increased risk of reinfection, that is, new infections with SARS-CoV-2 in previously recovered individuals ...

### **How do rapid antigen tests work and when should I use them?**

Viral proteins are generally detectable by some rapid antigen tests during the first five days of symptoms. After this initial period, rapid antigen test performance decreases quickly as viral protein loads decline and the infection clears ...



Find the **full answers** to these questions and others on our website, including:

How to use a rapid antigen test **properly?**

Which rapid antigen tests are **best?**

**» LEARN MORE**



# How long does immunity to COVID-19 last?

## Waning immunity, boosters, and dosing intervals

CITF-funded research presented at our fourth **CITF/CanCOVID Seminar: Research Results & Implications Series** explored the duration of immunity and correlates of protection, the effectiveness of boosters, the effects of Omicron on immunity and vaccine effectiveness, and the interval between doses that optimize protection in healthy, older, and immunocompromised people. The findings from our research teams presented here are preliminary and, for the most part, unpublished and have not yet been peer-reviewed.



### KEY FINDINGS:

- 1 The scientific evidence of waning antibody levels clearly supports the **need for adults to receive 3<sup>rd</sup> dose boosters** to provide adequate and longer lasting protection against COVID-19.
- 2 Although protection against infection tends to decline with time, vaccine effectiveness (VE) after 2 doses has remained **high against severe outcomes**, even with the Omicron variant.
- 3 A booster was found to give **excellent protection** against hospitalization and death, whether the infection was due to Delta or Omicron.
- 4 VE against symptomatic infection from Delta was good 8 months after a 2<sup>nd</sup> dose and any lost VE was restored **7 days after a booster**.
- 5 Protection against **symptomatic infection from Omicron** was lower than against previous variants after 2 doses and increased after a booster.
- 6 The immune response was much greater in a group of younger, healthy adults who received their 2<sup>nd</sup> dose of mRNA vaccine **8-16 weeks after the first**, compared with those who received it 3-6 weeks after the first.
- 7 Among residents of long-term care (LTC) homes, **boosters restored neutralization**, but the pattern of decline post-3<sup>rd</sup> dose resembles the waning trend already observed.
- 8 Both antibodies and neutralizing antibodies **declined significantly** in LTC residents within 4-6 months of their 2<sup>nd</sup> dose.
- 9 Antibody quality and quantity were **higher and lasted longer** among LTC residents who received the Moderna vaccine vs. those who received Pfizer.
- 10 Following a booster dose of Moderna, solid organ transplant recipients had **improvements in all parameters of immunity** against Alpha, Beta, and Delta variants.

» FULL SUMMARY



## An overview on post-COVID condition

While most people infected with SARS-CoV-2 recover within two to four weeks with limited complications, some adults and children continue to face persistent symptoms long after the initial infection. This condition, commonly referred to as “long COVID,” is of critical concern due to the sheer number of affected individuals, the significant health challenges it places on those affected, and the impact it has on health systems and economies.

According to the World Health Organization (WHO), long COVID, or post-COVID-19 condition, manifests as a variety of symptoms persisting in individuals with a confirmed case of COVID-19:

- ▶ Symptoms continuing (or starting again) three months after the initial SARS-CoV-2 diagnosis;
- ▶ The symptoms last at least 2 months; and
- ▶ Symptoms which cannot be explained by an alternative diagnosis.

Commonly reported symptoms include persistent loss of smell/taste, fatigue, shortness of breath, chest pain, cognitive disturbances or “brain fog”, anxiety, and depression. The wide range of reported symptoms reflects the impact this disease may have on multiple organ systems. While the underlying cause remains largely unknown, it is evident that this condition can affect individuals of all ages and is not predicated on how severe the initial COVID-19 case was. Early evidence suggests that vaccination may have a protective effect against developing long COVID.

It is now estimated that nearly one in 10 people affected by COVID-19 (hospitalized and non-hospitalized individuals) may develop long COVID, which amounts to a global burden of over 16 million people.

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*Members of our Leadership Group, Working Parties, and Secretariat, as well as our funded researchers, have been prolific throughout the pandemic. We are proud to acknowledge the contributions they make, above and beyond what the CITF funds, to aid in the world’s efforts to fight COVID-19. Here are some highlights from over the past month.*

## Cancer care and research: Lessons from the COVID-19 pandemic

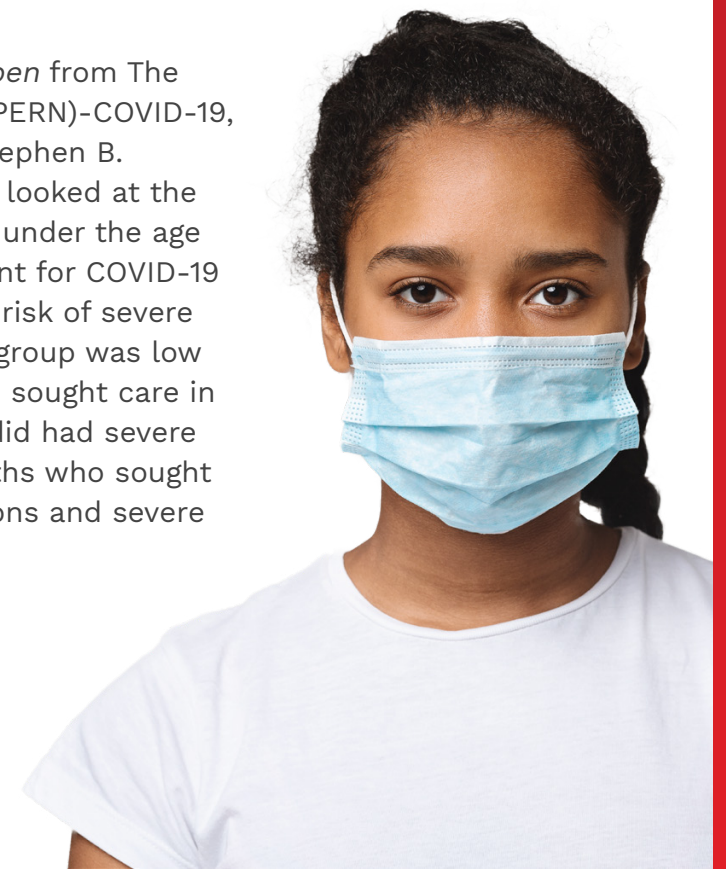
Cancer patients have faced severe challenges throughout the COVID-19 pandemic. In addition to being at higher risk of infection from SARS-CoV-2, the burden placed on the healthcare system has led to delays in cancer screening, diagnosis, and treatment, which have had grave consequences. A review article, published in *Cancer Discovery* and co-authored by CITF-funded researcher Dr. Donald Vinh from the Research Institute of the McGill University Health Centre, provides a comprehensive overview on the current state of knowledge about cancer and COVID-19 and the many obstacles faced in gathering evidence for cancer patients during the pandemic.

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## The outcome of SARS-CoV-2 infections among youths

A recent publication in *JAMA Network Open* from The Pediatric Emergency Research Network (PERN)-COVID-19, headed by CITF-funded researcher Dr. Stephen B. Freedman from the University of Calgary, looked at the profile and disease experience of youths under the age of 18 in 10 countries who sought treatment for COVID-19 in emergency departments. Whereas the risk of severe outcomes among youths within this age group was low – only 3% of SARS-CoV-2 positive youths sought care in an emergency department – those who did had severe disease. As with adults, many of the youths who sought emergency care had pre-existing conditions and severe manifestations of the disease.

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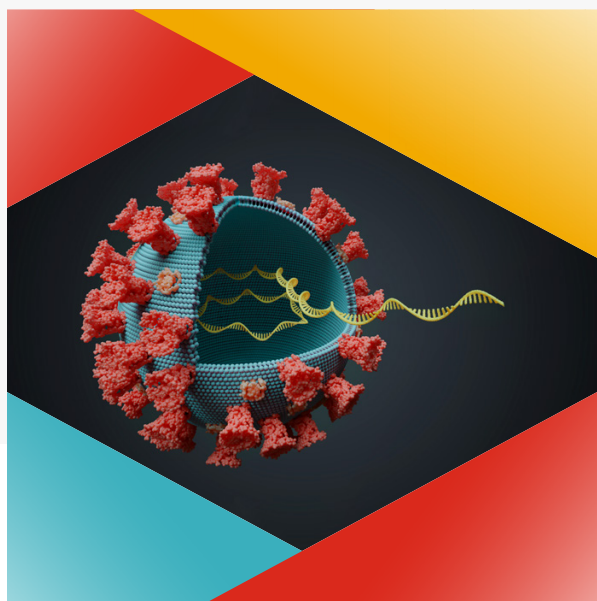


CanCOVID

in partnership with



CoVaRR-Net



Seminar Series | Panel Discussion

## Omicron and other variants of concern: finding our way forward

SAVE THE DATE

Wednesday, February 23, 2022

11:30 a.m. – 12:30 p.m. EST

Join us for a panel discussion with CITF-funded experts researching variants of concern (VOCs), held in collaboration with the Coronavirus Variants Rapid Response Network (CoVaRR-Net).

### Panelists



Anne-Claude Gingras, PhD



Jeff Wrana, PhD, FRSC



Mark Brockman, PhD



Ciriaco Piccirillo, PhD



Jun Liu, PhD



Marc-André Langlois, PhD

### Moderator



Catherine Hankins  
MD, PhD

[covid19immunitytaskforce.ca](https://covid19immunitytaskforce.ca)



The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.