



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

MARCH
2022

CITF MONTHLY **REVIEW**

The importance of **pediatric vaccination**

Canadian Blood Services data shows the **impact of Omicron**

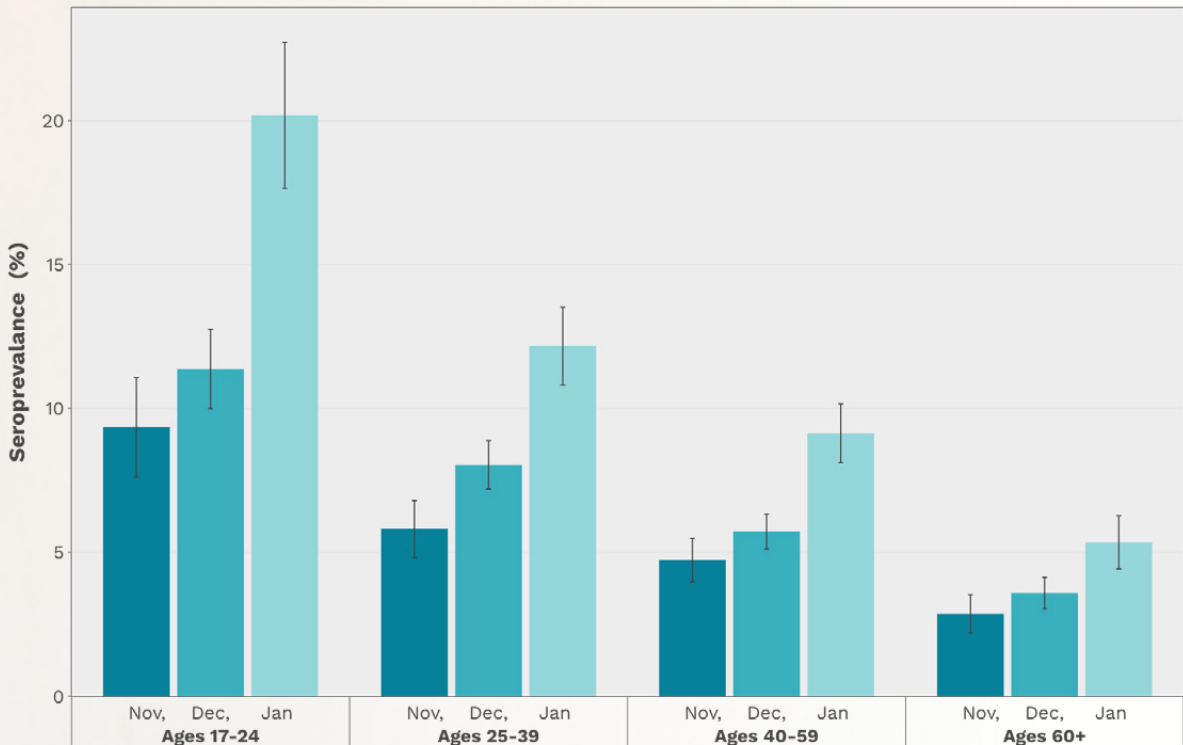
Omicron and variants of concern: Finding our way forward





EARLY JANUARY REPORT

Omicron most evident among 17- to 24-year-olds and racialized blood donors



The latest Canadian Blood Services report revealed the extent to which Omicron made inroads across the country. While nearly all blood donors tested positive for the spike (S) protein, primarily due to vaccination, infection-acquired seropositivity climbed 35% - from 7.5% to 10.1% between December 25, 2021 and January 15, 2022. This rate is roughly double the monthly average for 2021. Infection-acquired seropositivity increased across all provinces (excluding data from Quebec, which is not part of the Canadian Blood Services data collection).

As illustrated in the graph above, although all age groups showed an increase in anti-S antibodies (probably attributable to both the number of boosters administered and the Omicron-driven fifth wave), younger donors (aged 17 to 24) have the highest infection-acquired seropositivity rate, at 20.2%, continuing the trend seen throughout 2021. Inequities persist among racialized donors, who are consistently twice as likely to have infection-acquired antibodies compared to white donors (16.8% and 8.6%, respectively).

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Many Canadians may not respond optimally to vaccines for a variety of reasons including age, comorbidities, or health conditions. To determine the extent of this problem and to be able to better protect them, it is important to study immune responses to vaccination. More than 15% of Canadians are over the age of 65 and may therefore experience reduced vaccine effectiveness compared to younger Canadians. This can also predispose them to more severe cases of COVID-19 if they do get the disease. Approximately 3% of Canadians may be immune-compromised, whether due to disease (e.g. HIV/AIDS) or conditions that are treated with immune-suppressive drugs (e.g. solid organ transplant recipients, cancer patients). The CITF funds numerous studies of these populations, including these three looking at the immune response to vaccines:

Immune responses in immune-deficient patients

A recent pre-print, not yet peer-reviewed, by Drs. Anne-Claude Gingras, Tania Watts, and Vinod Chandran of the University of Toronto, studied the antibody and T cell responses to SARS-CoV-2 mRNA vaccines in patients with a variety of immune-mediated inflammatory diseases (IMID) who were receiving immunomodulatory maintenance therapy. Most patients showed increased antibody and T cell responses after the first and second dose of mRNA vaccine, but those responses significantly decreased three months after the second dose. The study provides evidence of the need for a third (booster) dose and for continued monitoring of immunity over time in this patient population.

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A study of hemodialysis patients

Drs. Michelle Hladunewich and Matthew Oliver from Sunnybrook Health Sciences Centre compared antibody responses after two doses of a COVID-19 mRNA vaccine in individuals undergoing hemodialysis. They found that 6 to 7 weeks after the second dose, those who received Moderna's Spikevax demonstrated higher antibody levels than those who received Pfizer-BioNTech's Comirnaty. Further, those vaccinated with Moderna sustained higher antibody levels 12 weeks after the second dose than did those who received Pfizer vaccine. The study is published in the *Canadian Medical Association Journal*.

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STOP-CoV study results highlights importance of completing primary vaccine series

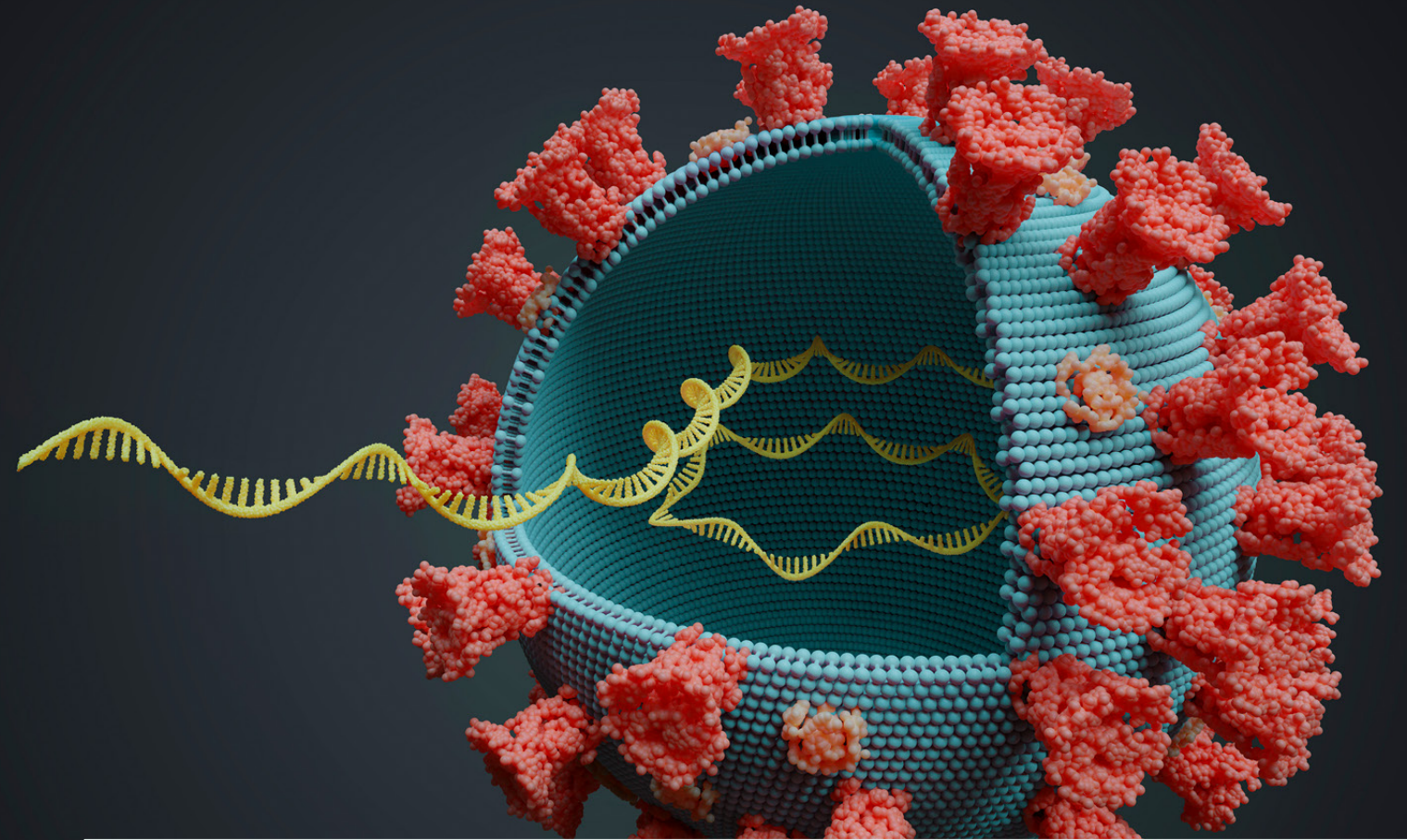
In a pre-print, not yet peer-reviewed, the team from the **STOP-CoV study**, led by Dr. Sharon Walmsley from the University Health Network in Toronto, described their most recent findings: younger adults (30 to 50) generate higher levels of vaccine-specific antibodies compared to older adults (70 and above) after both the first and second mRNA vaccine doses. They also found that receptor binding domain (RBD) antibody levels after the second dose were generally higher for people who received two doses of Moderna or a Moderna/Pfizer mix compared to those who received two doses of Pfizer or other vaccine combinations, irrespective of age. Regarding reactions to vaccines, their data show that younger adults are more likely to experience temporary minor adverse events following immunization than the older cohort.

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Omicron and other variants of concern: Finding our way forward

Beginning in November 2021, the Omicron variant of SARS-CoV-2 began to spread around the globe, quickly becoming the dominant form of the virus. Omicron has proven to be highly transmissible and virulent. This change in the pandemic landscape raises urgent questions about the continued mutation of the virus and the prospect that new, and perhaps even more troublesome, variants of concern (VOCs) will emerge in the future. In an effort to address these issues, the CITF and CanCOVID, in collaboration with the **Coronavirus Variants Rapid Response Network** (CoVaRR-Net), convened a panel of experts for a discussion about Omicron and the future of VOCs.



KEY POINTS:

- 1 We have passed the point where we can reasonably expect COVID-19 to be fully eradicated. It will be with us, in one form or another, for a **long time to come**.
- 2 Variants of concern emerge as a result of **constant and unpredictable mutations** of the virus as it spreads and replicates. These variants are termed variants of concern (VOCs) when they demonstrate: 1) more transmissibility (spread more easily), 2) immune system evasion (whether from vaccination or previous infection), and 3) greater virulence (cause more severe disease).
- 3 Mutations that are favourable to the virus risk becoming newly dominant VOCs with novel characteristics that could **prolong the pandemic**. However, mutations may also make the virus less transmissible or virulent. The dominant variant may ultimately prove to cause **less severe disease** and become endemic, meaning that it circulates at a predictable and manageable level.

- 4 **Novel vaccine technologies** are under development, including intranasal applications that deliver vaccine to the upper airway where SARS-CoV-2 infection takes hold. Their intended effect would be to prevent infection and transmission, as well as severe illness. Since Omicron, current intramuscular vaccines have been far more effective at preventing severe illness than staving off infection.
- 5 Nasal sprays would have the benefits of being **self-administered** without the need of qualified healthcare professionals giving injections thus making vaccination more **comfortable**, especially for children.
- 6 **Widespread vaccination**, including booster doses, remains the best defense against COVID-19 in all its forms.
- 7 The emergence and spread of VOCs demonstrate the urgency of **global vaccine equity**. So long as SARS-CoV-2 has the opportunity to circulate unimpeded through communities, it will mutate. Public health is not a confined local issue and no population can be fully protected until everyone is afforded protection.

» **FULL SUMMARY**

Childhood vaccination is critical for Omicron and beyond

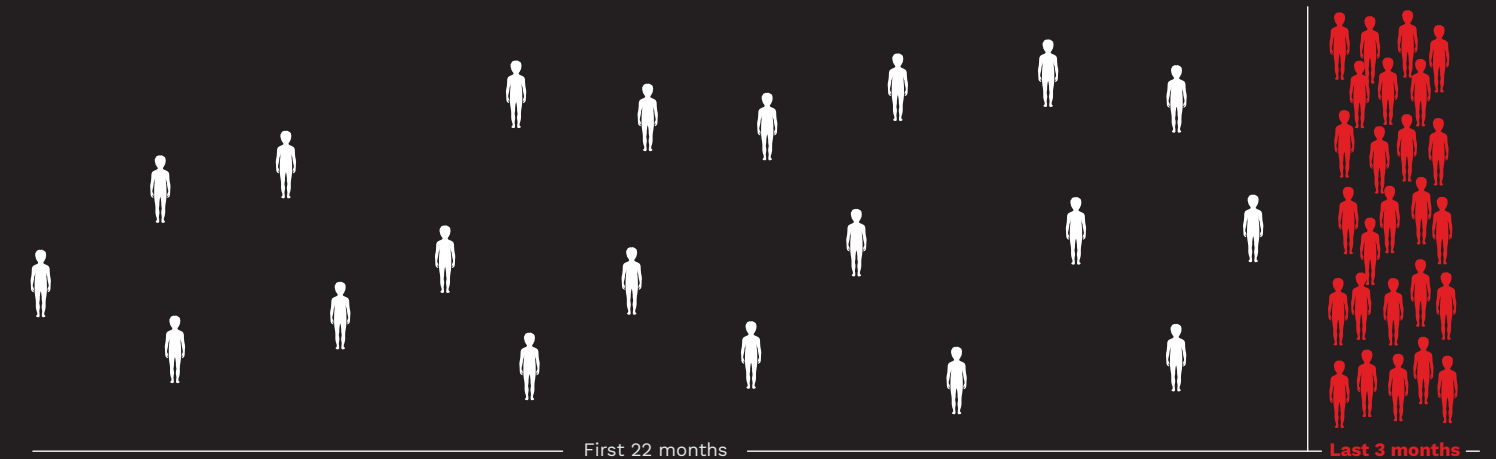
In November 2021, Canada’s National Advisory Committee on Immunization (NACI) recommended that children 5 to 11 get vaccinated. While there has been good progress in vaccine uptake in this age group – roughly 57% have received at least one dose – it has been insufficient to protect children sufficiently in the context of the fast-spreading Omicron variant. Whereas over 2,000 children (0 to 19) had been hospitalized in Canada within the first 22 months of the pandemic, over 2,500 were hospitalized in the **last three months alone**, up to March 4, 2022, during the Omicron wave.

The increased number of hospitalizations among children is indicative of the need to continue to promote vaccination in this age group. Higher vaccination rates will also help to keep kids in school, encourage their social interactions, and get them into extracurricular and other activities, thus securing their mental and social well-being. In this piece, we offer the latest scientific research regarding COVID and vaccination in children. We also point to answers still being sought and how the CITF and its funded studies are trying to help answer those questions to broaden our understanding and improve our efforts to safeguard public health. The bottom-line messages from the experts are:

- 1 Evolving variants have **changed the game** for children
- 2 Vaccines can **protect children** against the worst effects of Omicron

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Information in this article and infographic 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.



56% of COVID-related **pediatric hospitalizations** have occurred in the past **three months**, during the peak of the Omicron wave.



Many people think COVID is harmless in children, but

COVID can have devastating effects for kids.

Children can develop **multisystem inflammatory syndrome (MIS-C)**, **myocarditis**, **pericarditis**, **long COVID** and can even **die** following a SARS-CoV-2 infection.



Despite these risks, pediatric vaccinations remain low across Canada.

Only 57%

of children between the ages of 5 and 11 have received at least one dose of the vaccine to date. In contrast, 88% of 12- to 17-year olds have received at least one dose.

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Protecting you and your newborn from SARS-CoV-2

Many people who are pregnant, or are thinking about getting pregnant, are concerned about COVID-19 vaccines. The scientific evidence, however, clearly supports the benefits of vaccination for the pregnant person and the newborn. New research by CITF-affiliated experts is contributing further to the literature on the subject:



Dr. Manish Sadarangani of the University of British Columbia and member of the CITF's Immune Sciences and Testing Working Party, published a review on vaccination against COVID-19 in pregnant people



Dr. Jesse Papenburg of McGill University and a Scientific Advisor to the CITF, released a pre-print (not yet peer-reviewed) on COVID-19 in infants



Drs. Sadarangani and Papenburg also collaborated, along with **Dr. Karina Top** of Dalhousie University, in an international study of disease severity among infants hospitalized for acute COVID-19 disease.

Because of the increased health risks to mother and child if the mother contracts SARS-CoV-2, current data suggests that vaccination should be carried out as early as possible in pregnancy, if the regimen wasn't already completed prior to conception. While data in infants shows that, prior to the Omicron wave, the majority of COVID-19 infections were generally mild, premature infants and those of younger age are at higher risk of hospitalization.

The evidence supports the safety of vaccines for the mother, as well as the fetus and newborns, while COVID-19 poses a significant risk to all three. Of 531 infants who had COVID-19 in Canada between April 8, 2020 and May 31, 2021, 199 (37.5%) were hospitalized, and of the latter more than 70% were hospitalized for COVID-19-related illness.

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CanCOVID



Seminar Series | Research Results & Implications

The importance of pediatric vaccination

SAVE THE DATE

Wednesday, March 23, 2022
11:00 a.m. to 12:30 p.m. EDT

The Public Health Agency of Canada estimates that immunization has saved more lives in Canada in the last 50 years than any other health intervention. Join us for our next *Research Results & Implications* seminar, where CITF experts will address 1) how vaccines and infection work in a child's immune system, 2) recent estimates of seroprevalence among children, 3) why COVID-19 can be serious for children, even if infected with the Omicron variant, and 4) vaccine safety among children.

Panelists



Tim Evans
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James
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Jonathon
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The views expressed herein do not necessarily represent the views of the Public Health Agency of Canada.