



COVID-19
IMMUNITY
TASK FORCE

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

DECEMBER
2021

CITF MONTHLY **REVIEW**

The rationale for **vaccinating 5-11-year-old children**

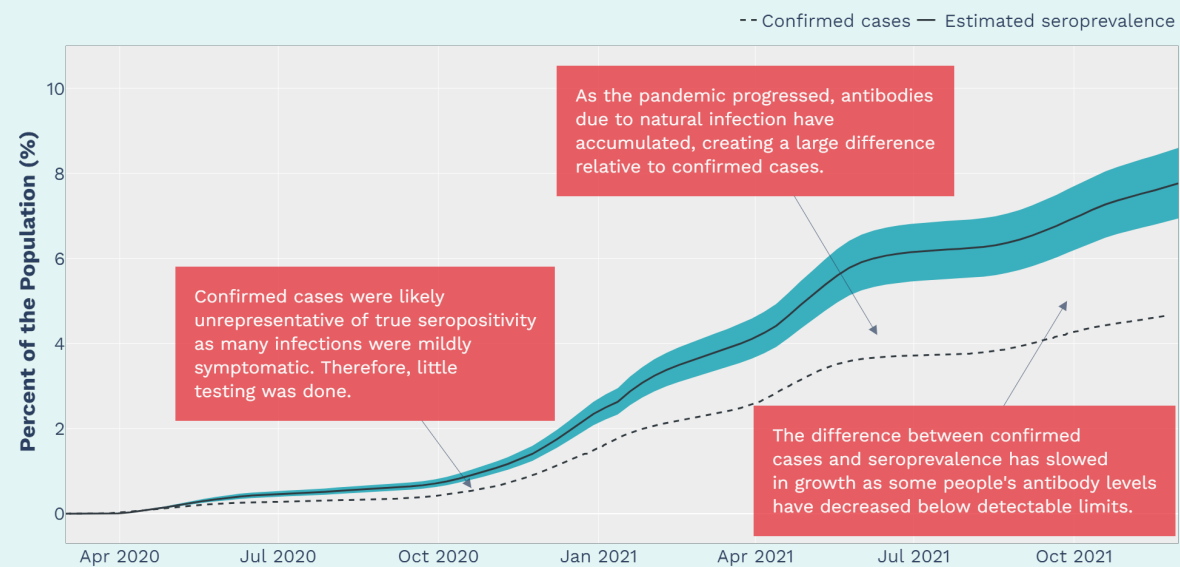
Not all chronic diseases are the same: Antibody responses in people with **HIV & chronic kidney disease**

The science behind recommending **third vaccine doses** for older Canadians



NOVEMBER REPORT

Immunity from infection remains low, highlighting the importance of vaccination



A serosurvey measures antibodies among a group of people, similar to how a thermometer measures the outdoor temperature. The temperature is useful, but to really know how we will feel outdoors, a formula or model is used to combine temperature readings with other environmental data, such as wind in the winter and humidity in the summer. In the case of serosurveys, the CITF has developed a statistical model to combine antibody results with other epidemiological data, such as confirmed cases and vaccine coverage, so that we can know how many Canadians have protection from COVID-19.

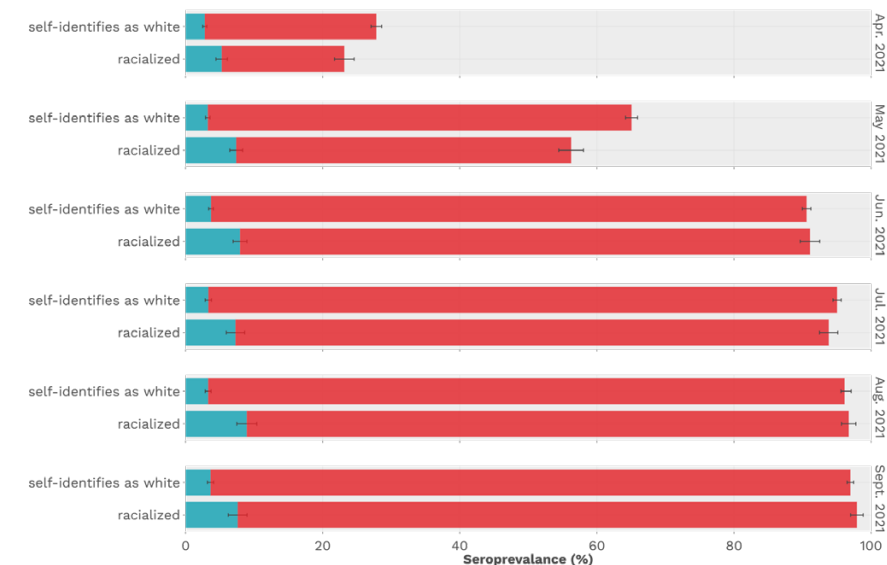
CITF modelling uses serosurveys from CITF-supported research groups and published serosurveys documented by **SeroTracker**. Our latest analysis included over 150 provincial or regional estimates from 35 studies.

We combined seroprevalence results with data on confirmed cases to determine the proportion of Canadians previously infected with SARS-CoV-2. We found that as of November 30, 2021 approximately 1 in about 13 Canadians (8%) had detectable antibodies due to a previous infection. This proportion ranged from 1 in 55 (1.8%) in the Atlantic provinces to 1 in 9 (11%) in Alberta. The only ways to obtain antibodies that protect from COVID-19 are through previous infection and vaccination. So, the low level of immunity from infection amongst Canadians means that high rates of vaccination are needed to protect against COVID-19.

» DISCOVER OUR MODELLING PAGE

SEPTEMBER REPORT

Antibody wane being observed, but breakthrough infections rare



Canadian Blood Services reveals that 97% of blood donors sampled in September had evidence of antibodies against SARS-CoV-2 acquired through immunization with at least one vaccine dose and/or a past infection. This number was largely driven by vaccination. September results showed evidence of antibody wane in older adults supporting the need for boosters, but breakthrough infections in individuals who received at least one dose of vaccine were infrequent.

KEY RESULTS IN SEPTEMBER 2021:

- Antibodies to SARS-CoV-2 (from vaccines or infection) among blood donors were more prevalent in those residing in higher-income neighbourhoods (97.6%) than lower-income neighbourhoods (94.7%), as was the case in previous reports.
- Antibodies due to previous SARS-CoV-2 infection among blood donors:
 - › remained the same as in August (4.4%), and not much changed from July (4.1%) and June (4.5%);
 - › were highest among blood donors aged 17-24 (8.7%);
 - › were on average 2-times higher among racialized donors (7.6%) compared to self-declared white donors (3.7%) across all geographic areas sampled;
 - › increased in donors aged 60 and older in September (2.8%) compared to August (1.6%); the other age groups saw no change.

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The CITF is proud to fund 108 projects by Canada's leading researchers in immune science, seroprevalence studies, vaccine surveillance, and pediatric vaccination, among other related fields. Because of the nature of their work, many healthcare professionals are at high risk of coming into close contact with people infected with SARS-CoV-2. The CITF funds a number of studies to investigate infection, immunity and the effects of vaccination in this population, including the following on Canadian dentists and paramedics:

Low COVID-19 infection rate among Canadian dentists is reassuring to the profession

Dental care settings have the potential to be high-risk environments for the spread of COVID-19. However, a study conducted by Dr. Sreenath Madathil from McGill University and published in *The Journal of the American Dental Association* found that infection was lower among dentists than within the general Canadian population, likely due to pre-procedure screening of patients; adherence to rigorous infection prevention and control protocols; physical distancing; the use of personal protective equipment; and cautionary behaviors by dentists outside their workplace.

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Study of paramedics in Canada reaffirms that longer intervals between vaccine doses is better

New evidence emerging from a study on paramedics led by Drs. Brian Grunau and David Goldfarb from the University of British Columbia published in *Clinical Infectious Diseases* found significantly higher levels of antibodies in individuals who waited longer (6-7-weeks) between their two doses of mRNA vaccine, compared to paramedics who were vaccinated using the manufacturers' recommended dosing interval of 3-to-4-weeks. These findings have implications for the ongoing global vaccination effort as half the world's population has yet to be vaccinated.

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'Made-in-Canada' assays perform well to measure seroprevalence

A unique made-in-Canada laboratory testing platform uses World Health Organization reference standards, allowing researchers to compare SARS-CoV-2 seropositivity samples worldwide. The process, designed by a team led by Drs. Anne-Claude Gingras (University of Toronto), Marc-André Langlois (University of Ottawa), and Yves Durocher (National Research Council of Canada), was described in a preprint, not yet peer reviewed. It has profiled over 150,000 unique serological assays to date, including those from more than half of CITF-funded serosurveys. This platform enables the simultaneous detection of IgG antibodies recognizing the SARS-CoV-2 spike (S) trimer, its receptor binding domain (RBD), nucleocapsid (N) proteins, and neutralization antibodies.

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The CITF is funding several studies on the effects of COVID-19 infection and vaccination on individuals at high risk due to other health conditions. Interim results from two of those studies were published this past month:

Antibody responses to COVID-19 vaccines in people living with HIV

Drs. Zabrina Brumme and Mark Brockman from Simon Fraser University determined that antibody responses following one COVID-19 vaccine dose are modestly lower in people living with HIV (PLWH) compared to other individuals. However, they report that the discrepancy disappears after the second dose. For most PLWH whose infection is well-controlled with therapy and whose CD4+ T-cell counts are in the healthy range, third COVID-19 vaccine doses may not be immediately required. That said, other factors such as older age, co-morbidities, type of initial vaccine regimen, and durability of vaccine responses will influence when individuals from this population may benefit from booster doses. The study is available in pre-print, therefore not yet peer reviewed.

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Poor antibody response to the first dose of the Pfizer-BioNTech vaccine for patients with chronic kidney disease

Drs. Michelle Hladunewich and Matthew Oliver of the University of Toronto report that many dialysis patients with chronic kidney disease have weak antibody responses 28 days after the first dose of the Pfizer-BioNTech vaccine. A second dose, however, induces a more robust response, suggesting that the second dose should not be delayed in these at-risk individuals. Furthermore, the study found the Pfizer vaccine to be safe. Some dialysis patients fail to mount a strong response to two doses, indicating that careful and ongoing monitoring of this patient population is imperative, particularly in light of the potential need for third ('booster') doses. The results appear in *JAMA Network Open*.

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The CITF currently funds 108 studies from across Canada, [learn more](#) about them.



Immune cells recognizing SARS-CoV-2 found in tissue predating the pandemic

Drs. Götz Ehrhardt and Mario Ostrowski from the University of Toronto discovered immune cells and antibodies in tonsils removed from children as far back as 2015 that recognize the SARS-CoV-2 spike protein. This finding, published in the *Journal of Immunology*, offers insights as to why children are better adept at clearing SARS-CoV-2 infection. These pre-existing antibodies likely arose in response to a different pathogen and acquired the ability to recognize SARS-CoV-2 as a by-product of the response to the initial immune challenge.

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Protecting Canada’s long-term care residents from COVID-19

The **CITF**, through the Government of Canada, supports over 100 studies to determine the extent of SARS-CoV-2 infection and immunity in Canada. Among them, seven recently offered strong scientific evidence to aid in protecting Canada’s long-term care residents, staff, and visitors. They shared this evidence with the National Advisory Committee on Immunization (NACI) earlier this fall, helping them shape their recommendation to make this vulnerable population eligible for a third dose of a COVID-19 vaccine. The seven study teams presented their results publicly at our second **CITF/CanCOVID Seminar: Research Results & Implications Series**.

KEY FINDINGS:

- 1 Residents of long-term care (LTC) homes experience **waning antibodies** much faster than younger, healthier adults.
- 2 Fewer LTC residents have a **neutralizing antibody response** compared to younger adults.
- 3 Their neutralizing antibody levels diminish 3-6 months after the second vaccine dose, suggesting they benefit from a **third dose** of vaccine.
- 4 The rate of decline in antibody levels after a first dose of vaccine suggests that **16 weeks** is a reasonable upper limit of **time between doses**.
- 5 A two-dose series of the Moderna vaccine seems to elicit a **higher antibody response** than Pfizer in LTC residents, perhaps due to its higher mRNA concentration.
- 6 **Mixing-and-matching** mRNA vaccines is equally effective as receiving two doses of the same product.
- 7 Comorbidities are a factor in the endurance of SARS-CoV-2 antibodies, indicating that healthier people can have a **longer effective antibody response** against COVID-19.
- 8 **Understanding immune protection** = understanding the individuals and the environments in which they live.
- 9 Our **collective commitment to vaccination** is a key factor in protecting vulnerable populations.
- 10 Research has revealed **underlying structural factors** that allowed COVID-19 to be so devastating in LTC homes. Addressing overcrowding, poor ventilation, staffing levels, infection prevention and control will improve overall health for these individuals.

[» FULL SUMMARY & VIDEO](#)



Vaccinating children against COVID-19: the benefits outweigh the risks



As a safe and effective COVID-19 vaccine is now available for primary school-aged children, it is important to reflect on the multiple streams of benefits arising from their rapid roll out. Successful immunization campaigns protect children from severe disease, help lower community transmission of the virus, allow the re-establishment of social networks, support the continuance of in-class schooling, and permit the full resumption of extra-curricular activities. Not only can pediatric vaccines protect children's health, but they can also hasten the return to normal we have all been waiting for.

The initial strain of infection rarely resulted in severe sickness for children. But the Delta variant has led to an increased number of children getting infected, being hospitalized, and in some cases, even dying. Research is showing there is also a higher risk of myocarditis and pericarditis from COVID-19 than from vaccines and experts do not expect this to change in the 5-11 age group. In addition, the long-term effects of COVID-19 on children are unknown. Looking at the evidence, and considering Canada's strong vaccine monitoring programs, the benefits of vaccination outweigh the risks.

» READ THE FULL COMMENTARY

This commentary is based on the latest research from around the world and has been put together by:

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Dr. **Bruce Mazer**, Associate Scientific Director, Strategy, CITF Secretariat

Dr. **Tim Evans**, CITF Executive Director

The CITF Secretariat

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.

Not all in the same boat: A disproportionate amount of COVID-19 cases and deaths among essential workers in Toronto, Canada

Dr. Jeffrey Kwong from the University of Toronto contributed to a recent publication in the *Annals of Epidemiology* that illustrates the disproportionate toll COVID-19 has taken among individuals who self-identify as visible minorities and who live in the lowest income areas of Toronto. It revealed that per-capita rates of COVID-19 cases and deaths were 3.3-fold and 2.5-fold higher, respectively, in neighborhoods with the highest versus lowest concentration of essential workers.

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Mixed- and extended-dosing regimens for two-dose vaccines prove effective

Dr. Danuta Skowronski and colleagues from the BC Centre for Disease Control evaluated the real-world single-dose effectiveness (as opposed to the findings of clinical trials) of the Pfizer, Moderna and AstraZeneca vaccines. They demonstrated that even a single dose of these vaccines reduced the risk of hospitalization from COVID-19 by over 80%. A recent follow-up on this initial report showed that two doses, whether of the same vaccine or a mix-and-match approach, were associated with more than 95% efficacy against risk of hospitalization. Moreover, vaccine effectiveness was maintained above 95% against hospitalization through at least seven months post-vaccination and the Delta variant did not compromise vaccine effectiveness. The findings are available in not-yet peer reviewed preprint.

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CanCOVID



Seminar Series | Research Results & Implications

The impact of COVID-19 disease & vaccination on pregnancy and newborns

REGISTER NOW

Monday, December 20, 2021

11:30 a.m. to 1 p.m. EST

Globally, there are limited data on COVID-19 illness and vaccination during pregnancy to inform recommendations for pregnant people and their care providers and to guide public health policies. For that reason, the CITF and CanCOVID are eager to share the latest research from three CITF-supported studies on the impact of SARS-CoV-2 infection and COVID-19 vaccination on pregnancy and newborns.

Speakers:



Catherine
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Deborah Money,
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Deshayne Fell,
PhD



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