COVID-19 IMMUNITY TASK FORCE

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

NOVEMBER
2022

CITF MONTHLY REVIEW

The CITF launches its **Databank**!

Over 80% of young adults have had COVID-19

COVID-19 in **2SLBGTQ+** communities

The CITF Databank is now accessible

The COVID-19 Immunity Task Force has launched the CITF Databank, a data repository that aims to further enhance the impact of its funded studies.

"The CITF Databank provides the research community, in Canada and around the world, with ready access to standardized data from epidemiological and serological studies about COVID-19," explains Dr. David Buckeridge, Scientific Lead for CITF's Data Management & Analysis team. "The data include individual questionnaire responses and serology values – usually linked – and cell-mediated immunity values for some studies, all of which can be accessed and used for any research that supports the CITF mandate."

"It's rare to have such a large compilation of data from so many studies and even rarer to have open access," adds Dr. Tim Evans, Executive Director of the CITF. "Our team has worked hard over the past two years to bring the CITF Databank to fruition and set the bar higher for sharing research data around the world."

"The data in the CITF Databank include individual characteristics, context including social demographics, and serology data," explains Dr. Buckeridge. "The research questions addressed by the original studies funded by the CITF aimed to tackle a wide variety of subjects related to immunity to SARS-CoV-2 in Canada. The CITF Databank allows other researchers to tackle new questions or broaden the research to other populations."

The CITF Databank is now up and running but is not yet "full". An initial five studies have provided data and over the coming months we expect to receive data from another 65 studies.

» EXPLORE THE DATABANK


The CITF Databank can be used for:
Comparing the contribution of cell-mediated immunity versus humoral immunity to protection against disease in individuals or different populations
Estimating seroreversion and vaccine effectiveness in individuals or different populations
Defining the natural course of immune boosting events (vaccination or infection events) in individuals or different populations
CITF Databank
Identifying the effect of various population characteristics to vaccine uptake, infection burden or immune response
Linking symptomatic profiles to levels of immune protection in individuals or different populations
...and more...
Conducting measurement and methodology validation studies

Data in the CITF Databank

INDIVIDUAL-LEVEL DATA

The CITF Databank includes individual-level data from the many CITF-funded studies in which study participants have consented to have their data deposited in the Databank and the lead researcher and their institution have signed a data sharing agreement with the CITF.

Data available:

- Socio-demographic characteristics: individual identity (age, sex, gender, ethnicity, education, etc.), location of residence and living conditions, general health, and occupation.
- COVID-19-related characteristics: participant behaviours, travel history, symptom history and infection status.
- Participant vaccination history.
- Serological and cell-mediated immunity assay results.

The CITF data team harmonizes the individual-level data deposited in the CITF Databank to create a standardized database. Harmonization is facilitated by using CITF Core Data Elements (CDE), a set of questionnaire responses and laboratory measurements that were created for use by CITF-supported studies to capture essential information related to COVID-19 in a consistent manner.

AGGREGATE DATA

The CITF Databank also includes statistical aggregates from some studies in the form of seroprevalence estimates, with some estimates stratified by characteristics such as geographical region and age group.

» DISCOVER

70
studies with data coming

14
studies have submitted data

Now in the CITF Databank...

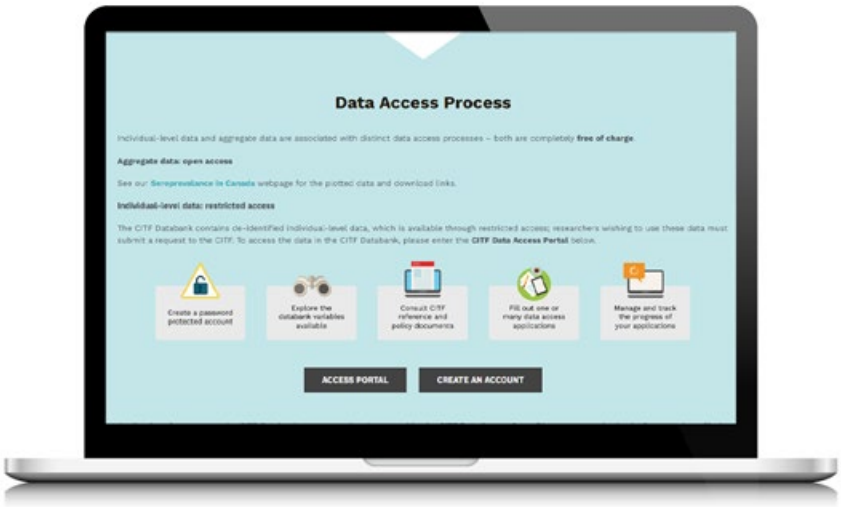
5
studies harmonized

14,700
participants with both questionnaire data and serology data

44,000
participants with questionnaire data only

42,000
participants with serology data only

...and we anticipate adding harmonized data from more studies each week.



The CITF Data Access Office and Committee

Accessing the CITF Databank is fully explained on our website. Applications for access are accepted and assessed by the CITF Data Access Committee on an ongoing basis. Once you have filed an application for access, your request is sent for administrative review by the Data Access Office. Once the application is deemed complete, it is reviewed by the Data Access Committee, which will determine if your application is accepted.

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Mathematical modelling to quantify and estimate immune response

Researchers from the CITF Modelling Group, led by Drs. David Buckeridge and Jane Heffernan, are launching a project that makes use of data collected through CITF-funded research to demonstrate the utility and power of robust data-informed mathematical modelling. This modelling study aims to:

- quantify outcomes of immunity from infection and/or vaccination;
- estimate correlates of protection from infection and severe disease, according to age, sex, ethnicity, employment group, types of vaccines utilized, and infection status.

"The CITF Databank will be a very important resource for mathematical modellers," says Dr. Heffernan, Scientific Advisor to the CITF and Professor of Mathematics & Statistics at York University. "By fitting the mathematical models to data, new knowledge regarding the immune system can result, including estimates of antibody waning from different types of vaccines; quantifying the protective capacity of immunity gained from vaccination and/or infection; and understanding the effects of monovalent and bivalent vaccine booster doses on antibody, B and T cell immunity."

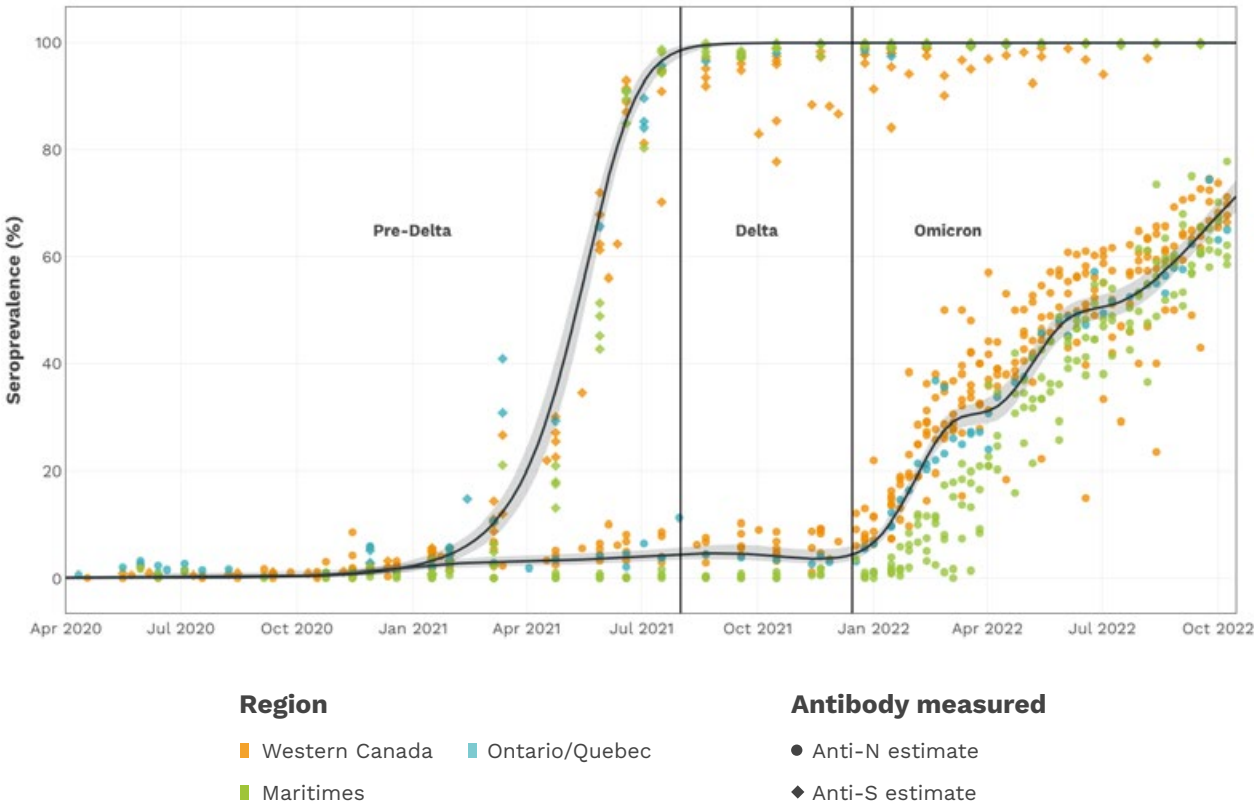
The modelling work will use a data set from research about older Canadians and younger healthcare workers. This research cohort was developed when the first COVID-19 vaccines were being administered in December 2020 by a group led by Drs. Marc Romney (University of British Columbia) and Zabrina Brumme and Mark Brockman (Simon Fraser University).

"Our team has been collecting and analyzing immune response data in near real time, and rapidly communicating our research findings to CITF and to health decision makers," explains Dr. Romney. "Our findings, along with those from other CITF-funded teams and researchers from around the globe, were used to support the decision to prioritize long-term care residents and older Canadians for third vaccine doses."

"The requirement for standardized data collection and sharing was very forward-thinking on CITF's part, and I am delighted that the data from our study will be among the first to be leveraged by mathematical modellers to deepen our understanding of the nature and predictors of immune responses," adds Dr. Brumme.

SEROPREVALENCE IN CANADA | MID-OCTOBER RESULTS

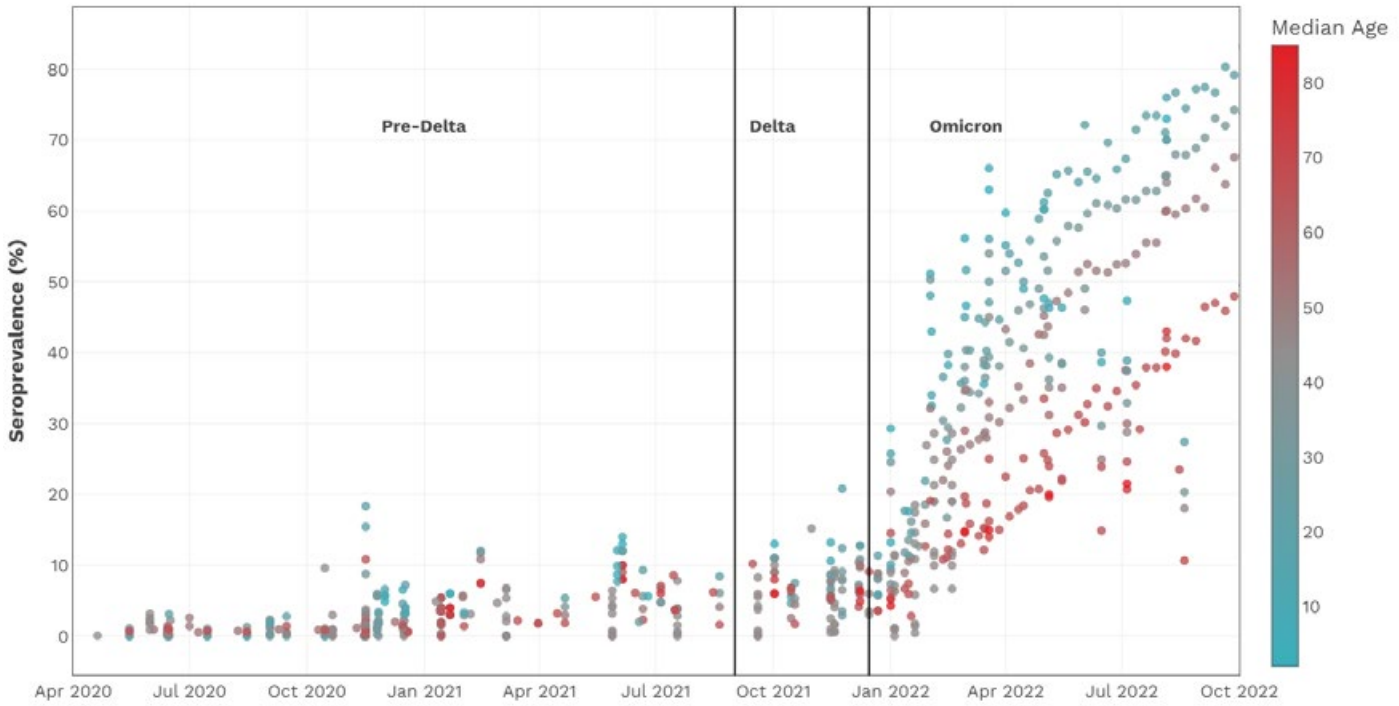
Percentage of Canadians with infection-acquired antibodies over 70%



Infection-acquired seroprevalence in Canada increased significantly between August 2021 and mid-October, 2022: from 4.4% (95% credible interval [CrI]: 3.4 to 5.6) in the pre-Delta wave to **71.2%** (95% CrI: 68.2 to 74.1) by mid-October 2022 – after 10 months with circulating Omicron variants.

We estimate this rise in seroprevalence during the Omicron phase of the pandemic corresponds to at least **25 million Canadians** (95% CrI: 24.4 to 26.7) being infected between December 1, 2021, and October 1, 2022. The actual number of newly infected (or reinfected) Canadians may have been higher because some people infected early in the Omicron phase of the pandemic may no longer have detectable anti-N antibodies. The infection rate over this 10-month period is equivalent to about **85,000 infections per day**.

Seroprevalence due to infection by age: Over 80% of young adults have had COVID-19



Conversion to infection-acquired (anti-N) seropositivity during Omicron increased in all age groups. In blood donors, the highest levels of seropositivity due to infection were observed in young adults (17–24 years), with approximately 81% seropositivity in mid-October. Estimates of seropositivity due to infection decreased with increasing age in mid-October: 25–39 years (75%), 40–59 years (68%), and 60+ years (50%).

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Data on our Seroprevalence in Canada webpage are updated at least once a month and can be visualized via interactive graphs.

Those looking for population-level data in Excel format can now find download buttons throughout the page (please note there are several tabs).

» DISCOVER

People living with conditions that compromise their immune systems have been particularly vulnerable to more severe outcomes from COVID-19 (see the summary of our latest seminar on the subject on page 14). Inflammatory bowel disease, one of the immune-mediated inflammatory diseases that affect more than 7 million Canadians, is among the conditions that CITF-funded researchers have studied. People living with HIV, of whom there are more than 62,000 in Canada, is another. It is advisable for these individuals to keep up to date with their vaccinations.

Antibody responses to the first four doses of SARS-CoV-2 vaccine in patients with IBD

A study published in *The Lancet Gastroenterology & Hepatology* by Drs. Gilaad Kaplan (University of Calgary) and Sasha Bernatsky (McGill University) on behalf of the STOP COVID-19 in IBD Research Group, showed a robust antibody response was achieved in individuals with inflammatory bowel disease (IBD) after the fourth dose of COVID-19 vaccine, similar in magnitude to that which followed the third dose. The research team also outlined predictors for vaccine-induced immune responses.

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Vaccine-induced immune responses are as durable in people living with HIV as in people without HIV

A preprint, not yet peer-reviewed, from Drs. Mark Brockman and Zabrina Brumme (Simon Fraser University and BC Centre for Excellence in HIV/AIDS), along with Drs. Aslam Anis and Marc Romney (University of British Columbia) showed that the antibody responses induced by a third dose of COVID-19 vaccine were as durable in people living with HIV who receive antiretroviral therapy (ART) as in individuals without HIV.

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Third mRNA vaccine dose induces strong antibody response against Omicron regardless of the interval between the first and second doses

A study by Drs. Andrés Finzi (Université de Montréal) and Renée Bazin (Héma-Québec), published in *Cell Reports*, showed that a third vaccine dose elicited strong antibody responses regardless of the interval between the first and second doses. Researchers conducted a deep dive into the antibody responses induced after doses two and three of mRNA vaccines. Early results from this group were the first to show that an increased interval, from three to four weeks to as long as 16 weeks, may have led to more mature and robust immune responses. However, the relative impact of this early advantage from prolonged interval dosing was unclear in the face of further booster doses.

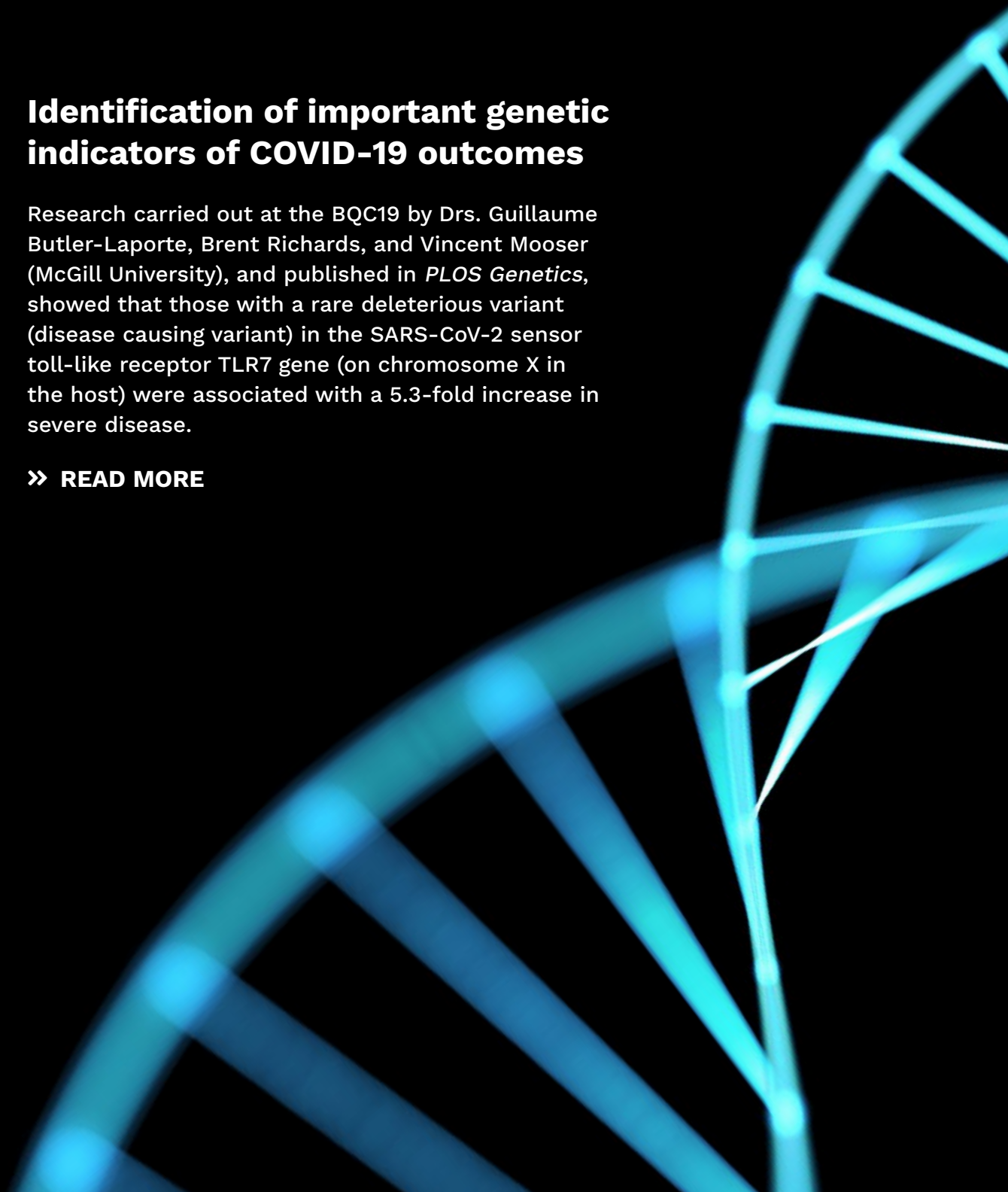
» READ MORE

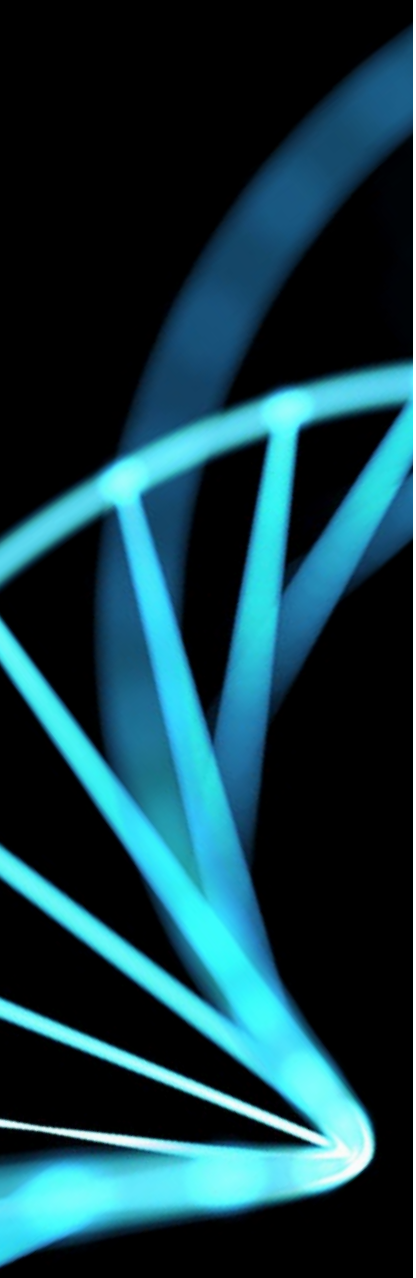
*The CITF-funded **Biobanque québécoise de la COVID-19** (BQC19) was established to ensure that scientists have access to the biological materials and data necessary for their research efforts on COVID-19. Researchers are using these resources to, as one example, gain a deeper understanding of the genetic indicators of COVID-19 outcomes. By doing so, they may provide additional insights into disease susceptibility and severity, thereby informing the development of novel therapeutics.*

Identification of important genetic indicators of COVID-19 outcomes

Research carried out at the BQC19 by Drs. Guillaume Butler-Laporte, Brent Richards, and Vincent Mooser (McGill University), and published in *PLOS Genetics*, showed that those with a rare deleterious variant (disease causing variant) in the SARS-CoV-2 sensor toll-like receptor TLR7 gene (on chromosome X in the host) were associated with a 5.3-fold increase in severe disease.

» READ MORE





Since this fall, Canadian pediatric hospitals have been inundated by a surge in cases of respiratory syncytial virus (RSV). CITF-funded research has looked at RSV infection among infants and toddlers in the context of the COVID-19 pandemic.

Timely surveillance of respiratory syncytial virus (RSV) cases in children showed recent increased circulation

In a preprint, not yet peer-reviewed, Dr. Pascal Lavoie (University of British Columbia) and colleagues found that children have been more vulnerable to RSV following a lull while protective measures were in place at the height of the COVID-19 pandemic. The median age of those infected with RSV was higher in 2020-21, compared to 2017-20, however the cases were not more severe.

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People at higher risk due to other health conditions & COVID-19

People with health conditions that affect their immune system have been more vulnerable to severe outcomes from COVID-19 than the general population. Moreover, the primary two doses of mRNA vaccines tended to be less robust and long-lasting in immunocompromised people.

For our 11th *Research Results & Implications Seminar*, we brought together CITF-funded researchers studying the effects of COVID-19 on people who suffer from health conditions and/or take medications that leave their immune systems compromised, including people with HIV, immune-mediated inflammatory diseases, inflammatory bowel disease, chronic kidney disease, and solid organ transplant recipients.

KEY POINTS:

1. **Two doses of vaccine are not enough** to protect immunocompromised people. Three doses are required to elicit an adequate immune response against COVID-19 and ought to be considered the primary regimen.

2. Because immunity decays three months after vaccination or infection, **keeping up to date with booster doses** is important to restore immunity. For most, this means a fourth dose will be required.

3. Evidence shows that COVID-19 vaccines are **safe for immunocompromised people**.

4. **Vaccines have worked well** at generating immune responses and warding off severe disease and death in various high-risk populations, even during the Omicron era.

5 Those who come in regular contact with immunocompromised people – **caregivers, family, friends** – need to be vaccinated.

6 **Bivalent vaccines may offer greater protection** than the first generation of vaccines. However, it is advisable to get whichever vaccine is being offered when one is eligible for a booster.

7 Because immunocompromised people are more at risk of severe COVID-19, they are advised to **continue being cautious**: wear masks, practice physical distancing, avoid crowded settings, and get regular boosters.

» **FULL SUMMARY & VIDEO**

COVID-19 and 2SLGBTQ+ communities

The COVID-19 pandemic has exposed vulnerabilities faced by many populations, including the Two-Spirit, lesbian, gay, bisexual, transgender, queer, non-binary, and sexual minority (2SLGBTQ+) communities. Although social and material wealth varies in 2SLGBTQ+ communities as it does among cisgender heterosexuals, 2SLGBTQ+ people have experienced inequitable effects of the pandemic compared with other people in Canada. This may be due to greater health disparities (such as cardiovascular conditions, poorer mental health, and/or greater substance use) and socioeconomic inequities, including a higher representation among low-income and housing-insecure people. Health inequities experienced by 2SLGBTQ+ communities must be understood as intersectional across axes of oppression and privilege.

Evidence presented by CITF-funded researchers Drs. Daniel Grace (University of Toronto) and Nathan Lachowsky (University of Victoria) focuses on a subset of 2SLGBTQ2+ communities in Canada, made up of gay, bisexual, queer, and other men who have sex with men. Because of the importance of socioeconomic diversity and the scarcity of research with the broader 2SLGBTQ+ communities, our research synthesis includes studies by other Canadian and international researchers to show the effects of the COVID-19 pandemic on the lives and well-being of members of these communities.

Our synthesis aims to address the following questions:

1. What are the main risk factors driving the social and economic vulnerabilities of people within 2SLGBTQ+ communities in Canada?
2. What has been the impact of the COVID-19 pandemic on the health and well-being of 2SLGBTQ+ communities in Canada?
3. How have the lives of 2SLGBTQ+ communities been affected by public health measures implemented during the COVID-19 pandemic?

» **READ MORE**

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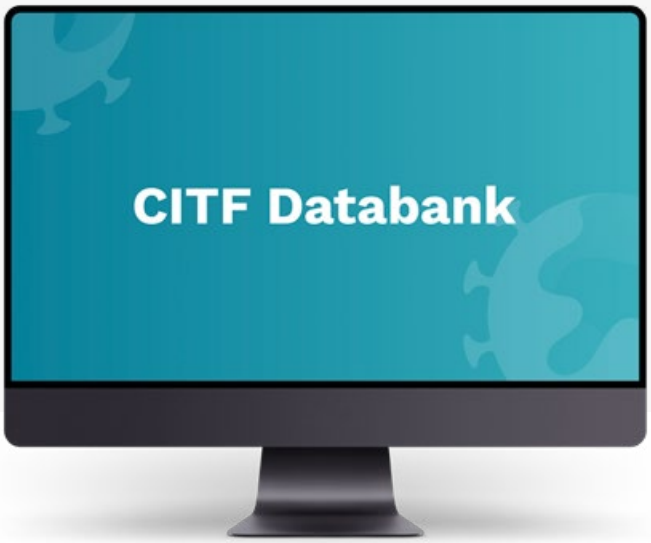

The CITF Databank

REGISTER NOW

THURSDAY, DECEMBER 15, 2022
3 P.M. TO 4 P.M. EST

The COVID-19 Immunity Task Force (CITF) has launched the CITF Databank to further enhance the impact of the studies we fund. Canadian and international researchers can request access to the data held in the CITF Databank free of charge. The Databank will store archived and harmonized data from over 70 epidemiological and immunological studies of COVID-19 in Canada.

The datasets include individual-level responses to standardized questionnaires and SARS-CoV-2 serology and cell-mediated immunity assay results. Using a **web portal**, researchers can submit a data access request, which must include a research protocol aligned with objectives within the **CITF mandate** and approval for the research from a research ethics board.

Join our seminar to learn more about the CITF Databank, including currently available data and the application process.

Presentation led by

DAVID BUCKERIDGE, MD, PhD, FRCPC

Scientific Lead, Data Management & Analysis, CITF
Professor, Department of Epidemiology and Biostatistics, School of Population and Global Health, McGill University

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