



COVID-19
IMMUNITY
TASK FORCE

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

Summary report # 6

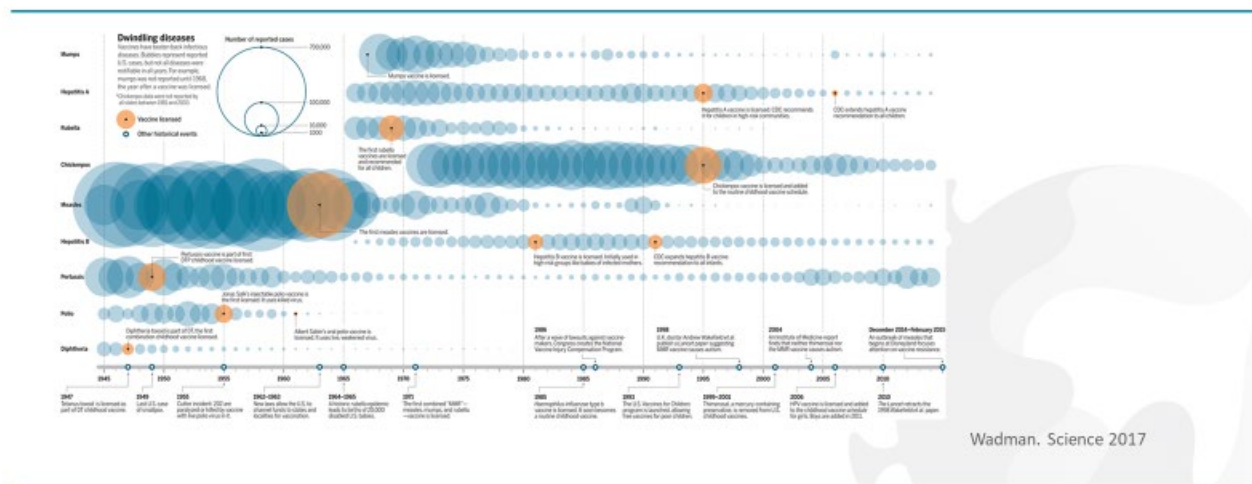
The importance of pediatric vaccination

Background

Mass immunization campaigns are recognized as one of the most important and cost-effective public health interventions available. Vaccine-preventable diseases have been radically reduced thanks to immunization around the world. The Public Health Agency of Canada estimates that immunization has probably saved more lives in Canada in the last 50 years than any other health intervention.

Understandably, parents have concerns when new pediatric vaccines are introduced. However, they should be reassured that COVID-19 vaccines have undergone rigorous clinical testing before being approved for use in children and to date they have shown themselves to be safe. The CITF funds several vaccine studies that continue to monitor safety for any indicators of adverse effects in children.

The most effective health intervention?



CAPTION: In communities where widespread pediatric vaccination has been adopted as a routine public health initiative, death from preventable childhood illnesses has dropped dramatically. **CLICK HERE FOR A HISTORIC TIMELINE OF VACCINE EFFECTIVENESS.**

In November 2021, Canada's National Advisory Committee on Immunization (NACI) recommended that children aged 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 in the context of the fast-spreading Omicron variant. Whereas over 2,000 children (aged 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.¹

Vaccination for 5 to 11 year-olds lags behind that of adolescents.²

- Among children between the ages of 5 and 11 years:
 - Fully vaccinated kids: 36%
 - Partially vaccinated: 21%
 - Unvaccinated kids: 43%
- Among children aged 12 to 17:
 - Fully vaccinated: 84%, with 11% of those boosted
 - Partially vaccinated: 4%

This begs the question whether children under the age of 11 can be adequately protected against SARS-CoV-2 at the current rate of vaccination, especially as most mandatory public health measures have been withdrawn across the country.

With this in mind, the COVID-19 Immunity Task Force (CITF) assembled a panel of experts to address what we know about pediatric vaccination against COVID-19 for the sixth in our monthly *Research Results and Implications* seminar series, in partnership with CanCOVID.

Researchers and CITF-funded studies included

Focus	Lead researcher(s) and affiliation	Research population	Location of study
Vaccines in children – CITF-funded SPRING study	Dr. Manish Sadararangani University of British Columbia	Children / young adults	British Columbia
COVID-19 vaccine safety in children	Dr. Jim Kellner University of Calgary, CITF Pediatric Network Chair	Children under 12	Canada / International
COVID-19 Study of Children & Families CITF-funded TARGETKids!	Dr. Jonathon Maguire University of Toronto	Children and their parents	Toronto, Montreal, Kingston
CITF-funded EnCORE Study	Dr. Kate Zinszer Université de Montréal	Children aged 2 - 17	Montreal

At a glance: key findings from CITF-funded research

The findings in this summary are preliminary and, for the most part, unpublished, and have therefore not yet been peer-reviewed. Details about these findings are found below.

COVID-19 vaccines are safe for children

- The vast majority of children experience nothing more than local temporary symptoms at the injection site – redness, swelling, pain.
- Also common are short-term, generalized symptoms – flu-like symptoms, headache, fever, nausea, vomiting, diarrhea – most frequently experienced following a second dose.
- Severe cases like anaphylaxis can occur, but are very rare ~5 cases/million doses, at all ages.

COVID-19 can cause severe illness in children

- Since the Omicron wave, more children have become infected with COVID-19, with a concomitant rise in pediatric hospitalization¹.
- The risk of myocarditis (inflammation of the heart muscle) and pericarditis (inflammation of the lining of the heart) is 6 times higher after COVID-19 infection than after vaccination among adolescents and young adults.³

COVID-19 infections are trending upward among age groups that are unvaccinated. As public health mandates, such as masking and limits on the number of people admitted to confined spaces, are lifted, vaccination becomes an even more important tool for protecting oneself and one's children.

Some parents continue to be hesitant about vaccinating their children. Factors include:

- Safety concerns
- Failure to understand the importance of vaccination
- Believe that children won't become seriously ill if infected.

¹ [COVID-19 daily epidemiology update - Canada.ca](#), March 11, 2022

More in depth

A child's immune system is different from that of an adult

Dr. Manish Sadarangani, a pediatrician and Director of the Vaccine Evaluation Centre at the BC Children's Hospital Research Institute, points out that children are not the equivalent of small adults and, therefore, their immune responses are fundamentally different and in a dynamic state development. Thus:

- Children experience diseases differently than adults, hence the risks posed by SARS-CoV-2 infection are different and not fully appreciated.
- Vaccine regimen and dosing requirements are different.
- Childhood vaccination for other diseases have proven to be highly durable, effecting a lifetime of protection.

Seropositivity among children (due to COVID-19 infections)

- From November 2020 until May 2021, the SPRING cohort in British Columbia lead by Dr. Manish Sadarangani determined these percentages when looking at infection-acquired seropositivity in different age groups, from infancy to young adulthood:
 - 3.17% of 0-4 year-olds
 - 4.09% of 5-19 year-olds
 - 3.24% of 10-14 year-olds
 - 3.84% of 15-19 year-olds
 - 7.22% of 20-24 year-olds
- The infection-acquired seropositivity in the age groups of 0-4 years and 5-9 years increased to 7.65% and 5.72%, respectively, between June 2021 and March 2022, indicating that children under 11 were getting increasingly infected.
- The EnCORE study in Montreal, lead by Dr. Kate Zinszer, found that 5.8% of children ages 2 to 11 had infection-acquired seropositivity between October 2020 and March 2021, but that percentage increased to 10.1% between May 2021 and August 2021, and further to 10.8% between November 2021 and February 2022.² Their data further revealed that infection-acquired seropositivity increased in all age groups during the recent months.
- Dr. Zinszer further highlighted that unless vaccinated, on average, following 100 children over 1 years, more than 12 will go from testing negative for SARS-COV-2 infection to testing positive.

² This lower than expected increase in seropositivity could reflect seroreversion or waning immunity, or the fact that most recent data does not capture the Omicron wave in early 2022.

- Dr. Zinszer studied that seroreversion can occur in kids of all age groups approximately 6.5 months after infection.

Vaccines against COVID-19 are safe for children

Researchers take all intimations of adverse effects from vaccines seriously. CITF-funded, and other, studies continue to closely monitor vaccine safety. Myocarditis and pericarditis are one the more severe side effects associated with mRNA vaccines. Importantly, Dr. Jim Kellner, pediatric infectious disease specialist at the University of Calgary points out:

- Cases of these conditions associated with vaccination are milder than those associated with COVID-19 infection.
- They are 6 times more common following infection than following vaccination.³
- The effect is 5 times more likely among males than females.
- It is more common in adolescents and young adults, reaching its peak among those who are 16 to 17 years old.⁴

Safety concerns are among the factors contributing to vaccine hesitancy

Findings from TARGetKids!:

- Seropositivity in kids (due to infection and/or vaccination) was highly dependent on the seropositivity of the parents.
- More than 10% of parents felt that COVID-19 vaccines are not important and/or not safe for children.
- Parental beliefs about the importance and safety of COVID-19 vaccination for themselves were strongly associated with similar beliefs about COVID-19 vaccination for their children.
- That said, parents tended to feel that vaccination was less important for kids than for themselves (13% versus 7%) and were more concerned that vaccines do more harm than good for children than for themselves (30% had such reservations for children, against only 19% for themselves).

Findings from the EnCORE study:

- There's a correlation between a parent's vaccination status and the likelihood that they would vaccinate their children.

Both TARGetKids! and EnCORE found that lower parental education was associated with higher vaccine hesitancy.

- EnCORE showed that those with Master's degree or higher were almost two-thirds less hesitant than those without a university degree (6.8% compared to 18.5%).
- TARGetKids! showed that lower family income was associated with parents feeling that vaccines are not important and/or not safe for children.

- EnCORE found that members of ethnic minority groups were more than twice as hesitant as whites (27.4% compared to 8.4%).

Policy implications

The increased number of hospitalizations among children is indicative of the need to continue to promote vaccination in this age group. The reality is that other variants of concern will likely emerge and we have no way of knowing whether they will cause more severe disease. Vaccination has proven to protect against severe disease.

Although there have been cases of myocarditis/pericarditis among children following vaccination, there have been more cases – and more severe cases – in children who have had COVID-19.

Based upon ongoing surveillance and follow-up of myocarditis/pericarditis cases, Dr. Kellner offered the following recommendations to reduce the possibility of vaccine-associated myocarditis/pericarditis:

- Because the Pfizer vaccine has been associated with far fewer cases of myocarditis/pericarditis than Moderna, Pfizer is preferred for those under 30.
- So far the data that has come out of Pfizer clinical trials has suggested that the lower dose formulation for children under 12 is rarely associated with cases of myocarditis/pericarditis in this age group.
- A longer (more than 8 weeks) interval between doses as opposed to shorter (3 weeks) for all ages is a better option.⁵

Research, including the CITF-funded studies included in this summary, supports NACI's recommendation to vaccinate children 5 and over. Higher vaccination rates represent the best opportunity to:

- **protect** against severe outcomes of disease;
- **strengthen** immunity in children with a previous infection;
- allow for **normalcy** that supports healthy child development.

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**

In order to overcome lingering hesitancy, it is important to continue to promote public understanding of the safety and benefits of pediatric vaccination. The relaxation of other COVID-19 public health measures like use of masks and physical distancing makes it all the more important to encourage vaccination to protect children against severe illness.

References

- 1 <https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html>.
- 2 Official vaccination statistics from Canada, March 6, 2022: <https://health-infobase.canada.ca/covid-19/vaccination-coverage/>.
- 3 [CANVAS-COVID.ca](#), [Canada.ca Vaccine Safety](#), *JAMA* 2022;327(4):331-340. doi:10.1001/jama.2021.2411.
- 4 *JAMA* 2022;327(4):331-340. doi:10.1001/jama.2021.24110, [CDC presentation to ACIP Meeting Jan 5, 2022 \(slide 13\)](#).
- 5 Buchan et al. Preprint medRxiv Dec 2021 doi.org/10.1101/2021.12.02.21267156.