



Canadian **I**mmunization **M**onitoring **P**rogram, **A**CTive
 Programme canadien de surveillance active de l'immunisation

IMPACT, Canada's Immunization Monitoring Program ACTIVE, is a national surveillance initiative managed by the Canadian Paediatric Society (CPS) and carried out by the IMPACT network of infectious disease specialists and nurse monitors. Surveillance is supported primarily by the Public Health Agency of Canada (PHAC). The information collected complements existing national surveillance systems; supports public health action; informs policy dialogue with federal, provincial and territorial governments and other national stakeholders; and assists in meeting Canada's international immunization commitments. Please share this newsletter, you can also subscribe at www.cps.ca/en/impact

Surveillance updates

Respiratory Syncytial Virus (RSV) surveillance:

IMPACT began conducting RSV surveillance from 2017-2018 to 2019-2020 with the goals of obtaining a better understanding of RSV burden among children admitted to 12 IMPACT hospitals, and to better assess the high variability that can be seen in RSV seasons in preparation for RSV vaccine in development. In January 2022, the IMPACT network re-initiated a retrospective/prospective RSV surveillance project in pediatric sentinel hospitals from June 2020 (retrospective) to June 2022 (prospective) to provide additional information on the effect of the COVID-19 pandemic on RSV. Surveillance was expanded to include a 13th center, the McMaster Children's Hospital in Hamilton, Ontario. This expansion provides improved population representation of tertiary care admissions in Ontario. This project will contribute to better understanding the burden of RSV hospitalizations in Canada, detect which populations are experiencing surges in RSV cases, and which at-risk communities would benefit most from RSV countermeasures, such as vaccination, and what effects the COVID-19 pandemic had on RSV epidemiology. This data will also contribute to global and domestic RSV surveillance knowledge and to Canada's RSV vaccine readiness initiatives.

COVID-19 surveillance:

Since April 2020, surveillance of paediatric COVID-19 hospitalizations has been conducted via the Canadian Paediatric Surveillance Program (April 2020-May 2021) and the IMPACT network (June 2021-December 2022). The IMPACT network is also conducting surveillance for multisystem inflammatory syndrome in children (MIS-C), as well as myocarditis and febrile seizures after COVID-19 vaccination.

In our preliminary results, we have identified over 1300 children hospitalized with COVID-19 at IMPACT hospitals between April 2020 and May 2022. Overall, about one quarter experienced severe COVID-19, defined as admission to intensive care, requirements for ventilation or vasopressors, select organ system complications, or any COVID-19-related death.

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Future analyses on the complete data set will compare the demographic and clinical profiles of children with COVID-19 during different waves of SARS-CoV-2 variants, the impact of vaccination on disease severity, and outcomes related to MIS-C, myocarditis, and febrile seizures.



Publications and presentations

IMPACT is now in its 31st year of surveillance. The IMPACT team has produced an impressive list of peer-reviewed publications (79) and scientific presentations (138) presented nationally and internationally. The most up-to-date list is available at <https://www.cps.ca/en/impact>. Over the past 31 years, the team has also participated in many other knowledge translation activities that are not on the official list, including mentoring other international IMPACT-like groups.

Recent publications and presentations

Yousif Murad, Te-Yu Hung, Manish Sadarangani, Shaun K. Morris, Nicole Le Saux, Otto G. Vanderkooij, James D. Kellner, Gregory J. Tyrrell, Irene Martin, Walter Demczuk, Scott A. Halperin, Julie A. Bettinger; for the Members of IMPACT. Clinical Presentations and Outcomes of Children in Canada with Recurrent Invasive Pneumococcal Disease from the IMPACT Surveillance Network. *Pediatr Infect Dis J.* 2022; doi: 10.1097/INF.0000000000003454
https://journals.lww.com/pidj/Fulltext/2022/04000/Clinical_Presentations_and_Outcomes_of_Children_in.28.aspx

This retrospective study reviewed recurrent invasive pneumococcal disease cases from the Canadian Immunization Monitoring Program, ACTIVE (IMPACT) between 1991 and 2019. The decrease in recurrent invasive pneumococcal disease due to vaccine-covered serotypes has been offset by an increase of non-vaccine serotypes in this sample of Canadian children.

Khaled Alsager, Nirma Khatri Vadlamudi, Taj Jadavji, Julie A. Bettinger, Cora Constantinescu, Wendy Vaudry, Ben Tan, Laura Sauvé, Manish Sadarangani, Scott A. Halperin & Karina A. Top (2022): Kawasaki disease following immunization reported to the Canadian Immunization Monitoring Program ACTIVE (IMPACT) from 2013 to 2018, *Human Vaccines & Immunotherapeutics*, DOI: 10.1080/21645515.2022.2088215, <https://doi.org/10.1080/21645515.2022.2088215>

Since 2013, the Canadian Immunization Monitoring Program ACTIVE (IMPACT) has been conducting active surveillance for Kawasaki disease (KD) occurring within 42 d after immunization. This study characterized hospitalized KD cases following immunization in Canada that were reported to IMPACT from 2013 to 2018 and met the Brighton Collaboration case definition (BCCD). This study did not find evidence of a safety signal between vaccination and KD. Ongoing surveillance for this serious AEFI and analysis for evidence of associations with vaccination remains important to maintain confidence in the safety of immunization programs.

Leah J. Ricketson, Julie A. Bettinger, Manish Sadarangani, Scott A. Halperin, James D. Kellner, for the Canadian Immunization Monitoring Program, Active (IMPACT) Investigators, Vaccine effectiveness of the 7-valent and 13-valent pneumococcal conjugate vaccines in Canada: An IMPACT study, *Vaccine*, Volume 40, Issue 19, 26 April 2022, <https://doi.org/10.1016/j.vaccine.2022.03.048>

In this study, an indirect cohort method was used to examine the VE of PCV7 and PCV13 for invasive pneumococcal disease (IPD) in Canada in children younger than 60 months of age. PCV7 VE in children with vaccination up to date for their age was 96% (95% CI: 67–99%) after a single dose and 95% (95% CI: 92–97%) after 2 doses. PCV13 VE in children with vaccinations up to date for their age was 55% (95% CI: 28–72%) after 2 doses. The lower VE of PCV13 may be due to a combination of low effectiveness of the PCV13 against serotypes 3 and 19A and the change in dosing schedule from 3 + 1 to 2 + 1 with the introduction of PCV13 in Canada combined with moderate vaccine uptake of 80%.

However, PCV13 still provides the benefit of protection against more serotypes than PCV7, and good VE against all serotypes except 3 and 19A.

Julie A. Bettinger, Manish Sadarangani, Nicole Le Saux, Shaun K. Morris, Karina A. Top, Scott A. Halperin and Raymond Tsang on behalf of the members of the Canadian Immunization Monitoring Program, Active (IMPACT). Update of IMPACT Invasive Meningococcal Surveillance, 2016-2020. CPS Annual Conference 2022, Montreal, Quebec.

Meningococcal conjugate vaccine (MCV) programs in Canada began in 2002. This poster presentation examined the most recent surveillance data to describe the current Canadian epidemiology of invasive meningococcal disease (IMD) and the effect of MCV programs. Conclusions included: Meningococcal immunization programs are highly effective, with virtually no serogroup C or Y disease in children or adolescents. Serogroup W cases still occur in children and adolescents, but the largest proportion are in adults. About half of meningococcal disease in children is caused by Serogroup B, which is not included in provincial vaccination programs.

Updates

Canada Communicable Disease Report

The latest issue can be found at the following link:

<https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr.html>

Influenza updates

FluWatch provides Canadians with a weekly update on the status of the Canadian influenza season. The 2022-23 national influenza surveillance started on Sunday, August 28, 2022 and will end on Saturday, August 26, 2023:

<https://www.canada.ca/en/public-health/services/diseases/flu-influenza/influenza-surveillance/weekly-influenza-reports.html>

Immunization updates

National Advisory Committee on Immunization (NACI): Statements and publications

<https://www.canada.ca/en/public-health/services/immunization/national-advisory-committee-on-immunization-naci.html>

<https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-26-covid-19-vaccine.html>

Canadian immunization guideline updates

[https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-1-key-immunization-information/page-2-immunization-in-canada.html?](https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-1-key-immunization-information/page-2-immunization-in-canada.html?hq_e=el&hq_m=2188358&hq_l=1&hq_v=a83fa949f7)

[hq_e=el&hq_m=2188358&hq_l=1&hq_v=a83fa949f7](https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-1-key-immunization-information/page-2-immunization-in-canada.html?hq_e=el&hq_m=2188358&hq_l=1&hq_v=a83fa949f7)

Seasonal influenza vaccine

<https://www.canada.ca/en/public-health/services/publications/vaccines-immunization/canadian-immunization-guide-statement-seasonal-influenza-vaccine-2022-2023.html>



Resources

Canadian websites, recent updates and professional development opportunities

- **Public Health Agency of Canada (PHAC):**
www.canada.ca/en/public-health/topics/immunization-vaccines.html
- **Immunize Canada** (all resources are available online, they will be kept free and can be printed for promotional use): www.immunize.ca
- **Canadian Association for Immunization Research and Evaluation (CAIRE):** www.caire.ca
- **Canadian Immunization Research Network:** www.cirnetwork.ca
- **CANVax** presents several podcasts featuring Canadian experts. These podcasts offer various perspectives about emerging issues in immunization and the initiatives that aim to combat them: www.canvax.ca
- **The Can Immunize App** has many resources available to help you track and give you further information: www.canimmunize.ca/en/home

Canadian Paediatric Society

- **IMPACT:** www.cps.ca/en/impact
- **Canadian Paediatric Surveillance Program (CPSP):** www.cpsp.cps.ca
- **Pedagogy** – online Education – The CPS provides online education modules to health care providers to help improve decision making about child and youth health. Visit the list of modules available at: <https://cps.ca/en/pedagogy>
- **Canadian Paediatric Society (CPS):** www.cps.ca
- **CPS Grand Rounds for 2022** (every first Tuesday of every month)
<https://www.cps.ca/en/sections/grand-rounds>
- **CPS Annual Conference will be held in Halifax from May 25-27, 2023**
- **Education Program for Immunization Competencies (EPIC)** (4th edition) is now available on the CPS website. This course was revised and redesigned to help health care professional provide accurate and complete information on immunization: <https://cps.ca/en/epic>
- **CPS COVID-19 information and resources for health care professionals:**
<https://www.cps.ca/en/tools-outils/covid-19-information-and-resources-for-paediatricians>

International

- **United States: Centers for Disease Control and Prevention**
www.cdc.gov/vaccines/index.html
- **Immunization Action Coalition**
www.immunize.org
- **World Health Organization**
<https://gvs-aefi-tools.org/>
<https://vaccine-safety-training.org/investigation>
- **Australia**
National Centre for Immunization Research and Surveillance: <https://ncirs.org.au/>
The Paediatric Enhanced Disease Surveillance (PAEDS). The network celebrated their 15 year anniversary in November 2022: <https://paeds.org.au/>
- **New Zealand**
<https://www.globalvaccinatedatanetwork.org/>

Welcome

New team members

A warm welcome to the following new IMPACT team members:

Dr. Kescha Kazmi as new co-investigator (The Hospital for Sick Children in Toronto)
Dr. Jared Bullard as new lead investigator (Health Sciences Centre in Winnipeg)
Gabrielle Desnoyers as new backup monitor (Le Centre Mere-Enfant Soleil CHUQ in Quebec City)
Sherri Loney as new back-up monitor (Health Sciences Centre in Winnipeg)
Marie-France Gagnon as new backup monitor (CHU Sainte-Justine in Montreal)
Aisha Shire as new lead monitor (McMaster Children's Hospital in Hamilton)
Emily Shallhorn as new back-up monitor (Montreal Children's Hospital in Montreal)
Lee Greiner as new data scrutineer (Vaccine Evaluation Center in Vancouver)
Lisa Blackwell as new data scrutineer (Vaccine Evaluation Center in Vancouver)

With great appreciation to

Congratulations to Dr. Wendy Vaudry and Dr. Joanne Embree on your retirement. We would like to thank you both for your significant contributions to IMPACT over many years.

Dr. W. Vaudry was the lead investigator in Edmonton since 1995 as well as being one of the Network's Co-Principal Investigators from 2007 to 2020. She was the co-data captain for 2 of our surveillance target working groups, namely influenza and RSV.

Dr. J. Embree was the lead investigator in Winnipeg since 2005, as well as serving as the RSV co-data captain for our RSV surveillance target.



IMPACT members would also like to thank Engy Grove for her contributions over many years at the Data Center.

Centre site update

Diane Delli Colli has taken on the lead monitor role in Montreal at the Montreal Children's Hospital in July 2022.

Annual meeting (2022)

The next meeting of the IMPACT Investigators and Nurse Monitors was combined and took place virtually on November 1, 2022. It was a great opportunity for investigators and nurse monitors to receive updates and network with their colleagues from across Canada.

Current team contacts

Centre	Lead/Backup Nurse Monitors	Investigators/ Investigators	Co-
IWK Health Centre Halifax, N.S.	Andrea Hudgin	Dr. Karina Top Dr. Scott Halperin (Network Co-PI)	
Le Centre Mère-Enfant Soleil Québec City, QC	Lynn Poirier/Gabrielle Desnoyers	Dr. Roseline Thibeault	
The Hospital for Sick Children Toronto, ON	Suganya Lee/Kim Simpson	Dr. Shaun Morris Dr Kescha Kazmi (Co-Inv)	
Health Sciences Centre Winnipeg, MB	Kristal Sneesby/Sherri Loney	Dr. Jared Bullard	
B.C. Children's Hospital Vancouver, B.C.	Ivor Chee/Jasmine Wong	Dr. Manish Sadarangani (Network Co-PI) Dr. Laura Sauvé (Co-Inv)	
Children's Hospital of Eastern Ontario Ottawa, ON	Chantal Bergeron/Jennifer Bowes	Dr. Nicole Le Saux	
Alberta Children's Hospital Calgary, AB	Shannon Pyra/Eileen Pyra	Dr. Taj Jadavji Dr. Cora Constantinescu (Co-Inv)	
The Montreal Children's Hospital Montreal, QC	Diane Delli Colli/Emily Shallhorn	Dr. Jesse Papenburg	
Eastern Health Janeway St. John's, NL	Debbie Harnum	Dr. Cheryl Foo Dr. Natalie Bridger (Co-Inv)	

Current team contacts (continued)

Centre	Lead/Backup Nurse Monitors	Investigators/ Co-Investigators
CHU Sainte-Justine Montréal, Que.	Sophie Bouchard/Lise-Angela Ouellet/Marie-France Gagnon	Dr. Marc Lebel Dr. Fatima Kakkar (Co-Inv)
Stollery Children's Hospital Edmonton, AB	Barb Neufeld/Chris Bon	Dr. Catherine Burton
Jim Pattison Children's Hospital Saskatchewan	Shauna Richards	Dr. Rupeena Purewal Dr. Rupesh Chawla (Co-Inv)
McMaster Children's Hospital Hamilton, ON (meningococcal surveillance, COVID/MIS-C surveillance and RSV surveillance)	Aisha Shire	Dr. Jeffrey Pernica

Other contacts:

Public Health Agency of Canada (PHAC): Kimberley Hutchings (Manager, Vaccine Safety Division); Lisa Landry (Acting Director General, Centre for Immunization and Respiratory Infectious Diseases, Infectious Disease Programs Branch); Christina Bancej (Chief, Influenza and Emerging Respiratory Infectious Diseases Section); Kristyn Franklin (Manager, Vaccine-Preventable Diseases)

Canadian Paediatric Society (CPS): Marie Adèle Davis (Executive Director); Melanie Laffin Thibodeau (Manager, Surveillance)

IMPACT Data Centre: Dr. Julie Bettinger (Epidemiologist & Data Centre Chief); Kim Marty (Data Manager and interim Data Coordinator); Kelly Simmons, Lee Greiner, Lisa Blackwell (Data Scrutineers); Matthew Marty (Data Research Assistant); Mistin Wilkinson (Administrative Assistant).

McGill University Vaccine Study Centre: Annick Audet (IMPACT Nurse Monitor Liaison)
To connect with an IMPACT centre, please contact Annick Audet by email at Annick.Audet@MUHC.MCGILL.CA

Traduction Le bout de la langue, inc.: Dominique Paré (French translator)

Funding

IMPACT is a surveillance program conducted by the Canadian Immunization Monitoring Program Active (IMPACT) network of paediatric investigators and managed by the Canadian Paediatric Society (CPS). CPS receives ongoing funding from the Public Health Agency of Canada's (PHAC's) Centre for Immunization and Respiratory Infectious Diseases (CIRID).

IMPACT received funding from the CITF to conduct surveillance of paediatric COVID-19 hospitalizations, multi-system inflammatory syndrome in children (MIS-C), as well as myocarditis/pericarditis and febrile seizures after COVID-19 vaccination.

In 2022, funding to conduct meningococcal surveillance was provided through unrestricted grants by Pfizer Canada Inc and Sanofi Pasteur.