

IMPACT

Canadian Immunization Monitoring Program, ACTive
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.

Welcome new team members

A warm welcome to the following new IMPACT team members:

- Dr. Shaun Morris, investigator at Toronto SickKids
- Dr. Manish Sadarangani, investigator at Vancouver BC Children's Hospital
- Christine Massicotte, backup monitor at CHU Sainte-Justine, Montreal

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Surveillance update – recent presentations

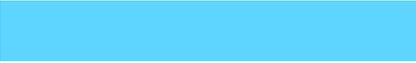
The following presentations were given by IMPACT team members and trainees at the 12th Canadian Immunization Conference (CIC) in Ottawa from December 5-8, 2016: www.cic-cci.ca

Posters:

FHBP variant diversity and level of surface expression among invasive *Neisseria meningitidis* serogroup B isolates from Canada (2006-2012)—Julie Bettinger

(Julie Bettinger also presented this poster at the XX International Pathogenic *Neisseria* Conference in Manchester, England, from September 5-9, 2016)





Main findings:

MenB is the major cause of meningococcal disease in Canada, in both children < 19yrs and adults. Factor H binding protein (fHBP), a meningococcal outer membrane protein and virulence factor, is an antigen component of two MenB vaccines (bivalent rLP2086 and 4CMenB). Two subfamilies of fHBP variants (designated A and B based on amino acid sequence similarity) exist as immunologically distinct antigen subfamilies.

Bivalent rLP2086 contains two fHBP antigens, one representative from each subfamily. In Canada, nearly 38% of MenB isolates express fHBP variants from subfamily A, 62% from subfamily B.

The 10 most prevalent fHBP variants among Canadian MenB strains are also common in the Extended MenB SBA strain pool (isolates from Europe and the US), representing nearly 79% and 75% of the respective collections.

Analysis of MenB epidemiology, fHBP variant distribution and surface expression predicts that Canadian IMD isolates will be susceptible to bivalent rLP2086 immune sera and suggests that the vaccine will provide broad coverage against MenB disease in Canada. Continued surveillance of circulating invasive MenB isolates is critical to predict and then monitor vaccine efficacy.

Impact of conjugate vaccines on Haemophilus influenzae type b (Hib) and Streptococcus pneumoniae in children with cancer: A report from the Canadian Immunization Monitoring Program Active (IMPACT)—Joanne McNair, Karina Top

Main findings:

Among children with cancer receiving chemotherapy or who were post-hematopoietic stem cell transplant, invasive Hib and invasive pneumococcal disease (IPD) occurred predominantly in children ≥5 years of age and were associated with morbidity and mortality.

Six of 13 cases of invasive Hib were age-appropriately immunized and considered vaccine failures. This finding may suggest the need for booster Hib immunization in children with cancer.

Review of encephalitis and encephalopathy cases following immunization reported to the Canadian Immunization Monitoring Program ACTIVE (IMPACT) from 1992-2012—Jennifer Tam, Karina Top

Main findings:

Encephalopathy/encephalitis remains a rare but serious adverse event following immunization (AEFI). Sixty-one cases were identified via active surveillance across 12 Canadian pediatric centres over a 20-year span. Most cases had another more likely etiology than vaccination. Continued diligent monitoring and analysis of AEFI is paramount to reassure vaccine providers and the public about the safety of immunization programs.

Adverse events following immunization in active paediatric surveillance: From case identification to reporting. Recent experience in an IMPACT hospital—Sophie Bouchard, Marc Lebel, Marie-Hélène Lavergne

Main findings:

Active surveillance for adverse events following immunization is a complex and time-consuming process.

In medical charts, it is difficult to find complete immunization history. Most of the time, immunization is written “up-to-date,” with few details. Vaccination booklets are often not available. Obtaining immunization records from vaccinators is time-consuming (obtaining written permission from parents, then making contacts with the vaccine provider).

Having access to a Quebec vaccine registry would greatly help to obtain complete immunization history in a timely fashion, and would help to better categorize if adverse events could potentially be associated to having recently received a vaccine or not. Access to the registry, for example, would definitely decrease the number of charts that needed to be screened for a potential adverse event if the immunization status of the child was known.

Admissions for potential AEFI remain infrequent: 0.2% of all hospitalizations at HSJ (CHU Sainte Justine). Of events temporally associated with immunization (174 cases), 56% were found to have a cause other than vaccine. With more thorough investigation during admission, more potential AEFI may be categorized as having a proven other cause.

Oral presentations:

Rotavirus Hospitalizations: A decade (2005 to 2015) of surveillance documenting vaccine success—Nicole Le Saux

Co-authors: Scott Halperin, Wendy Vaudry, David Scheifele and Julie Bettinger (*Tuesday December 6, 2016*)

Main findings:

There has been a 66% reduction in overall hospitalized rotavirus at IMPACT hospitals in the last 10 years, reaching rates as low as two per 1,000 admissions at sites with programs since 2012. Similar reductions are seen for hospital acquired rotavirus infections. Sustained decreases have been seen at IMPACT sites that have had rotavirus immunization programs since 2012 compared to sites that had no or later programs. Children under the age of two years have had the greatest decrease in number of admissions. The seasonal peaks have been attenuated in sites where rotavirus immunization programs were in existence for the prior three years.

The epidemiology of invasive diseases caused by *Haemophilus influenzae type a* (Hia): A report from the Canadian Immunization Monitoring Program ACTIVE (IMPACT) – Ben Tan

Co-authors: Athena McConnell, Julie Bettinger, David Scheifele, Joanne Embree, Laura Sauvé, Natalie Bridger, Wendy Vaudry, Scott Halperin, Shalini Desai and Raymond Tsang (*Thursday December 8, 2016*).

Main findings (contributed by Dr. David Scheifele):

IMPACT has the largest Hia case series to date, with over 100 cases identified, including many of the cases that arise in the Territories where attack rates are highest. Meningitis, sepsis, pneumonia and skeletal infection are prominent among affected infants, resembling Hib disease in severity. Most cases are under two years of age, adding to the challenge of early diagnosis and treatment. IMPACT data is helping to inform the design of future Hia vaccination programs.

The current listing of all of IMPACT presentations and publications over the past 25 years can be accessed at www.cps.ca/en/impact

IMPACT: Giving back to the international community

Over the past 25 years of surveillance, IMPACT has given back to the international community. Various international groups have turned to IMPACT over the years for organizational advice and support. Featured below are some of these groups from when they initially approached IMPACT for support, and where they are now:

New Zealand:

In 2004, New Zealand developed a hospital-based surveillance program for vaccine safety monitoring and disease surveillance in response to their epidemic of Group B meningococcal disease. Two members of the New Zealand Ministry of Health attended the IMPACT nurse monitor meeting in Victoria in 2002, to gather some advice and helpful hints for the development of their program.

Update:

<http://www.health.govt.nz/our-work/preventative-health-wellness/immunisation/immunisation-programme-decisions/meningococcal-b-immunisation-programme-and-menzbtm-vaccine>

In the late 1990s, New Zealand scientists noted an increasing number of cases of meningococcal disease linked to one particular strain of the meningococcal B bacterium. A vaccine, MeNZB™, was developed to protect young people (those at highest risk) against this strain, which was called “the epidemic strain.” This vaccine offered no protection against the other types of meningococcal bacteria which can also cause meningococcal disease (including groups A, C, Y, W135, and other strains of group B). The MeNZB vaccine was introduced as a short-term measure to reduce risk during an epidemic, as it was not expected to provide life-long protection. Between 2004 and 2006, New Zealand offered free MeNZB vaccination to anyone under the age of 20. Routine immunization for babies and preschoolers continued until June 2008. The last phase of this program, immunization for people with a high medical risk, ended in March 2011. In all, more than 1.1 million young New Zealanders received the MeNZB vaccine during this immunization program. The number of people developing meningococcal disease due to the epidemic strain of meningococcal B has significantly decreased—from over 300 cases in 2001 to less than 30 cases in 2010. The MeNZB vaccine was developed specifically to curb the epidemic of this particular strain of meningococcal disease and is no longer available in New Zealand.

The meningococcal B epidemic waned faster than would have been expected if there had been no intervention; however, it is important to remember that even though there are now fewer cases, the disease has not entirely disappeared.

Australia:

Source: previous contribution from Dr. David Scheifele—Issue #28 Fall 2009 IMPACT newsletter

In 2009, Dr. David Scheifele (co-founder of IMPACT) coached Australian researchers who had recently completed a pilot phase multi-hospital surveillance study. The researchers wanted advice in preparing their application for next-phase funding. There was an interesting dialogue about the pros and cons of seeking informed consent. The Australians did so in the pilot phase. On one hand, obtaining informed consent added value to selected surveillance tasks (for example by ensuring that cases of acute flaccid paralysis had stool cultures done to rule out polio). On the other hand, it was very difficult for the part-time monitors to meet parents to seek consent, which meant opportunities were missed. As is the case with IMPACT, the Australian pilot study included varicella admissions as an example of severe outcomes surveillance. Access to the nationwide immunization registry made it easy for researchers to determine the immunization status of cases.

Editorial Note: This group is quite similar to IMPACT; however, unlike IMPACT, they are very fortunate to have access to a nationwide immunization registry, clearly enhancing the timeliness and data collections of their surveillance.

Update:

IMPACT keeps in contact with this group called the Paediatric Active Enhanced Disease Surveillance. They are celebrating their 10th anniversary year in 2017. You can read their latest newsletter at the following web site: <http://www.apsu.org.au/surveillance-systems/paeds>.

Costa Rica:

Source: Dr. David Scheifele—Issue #28 Fall 2009 IMPACT newsletter

In 2009, Dr. Scheifele was invited to speak at a workshop in Costa Rica attended by paediatric infectious diseases specialists from the tertiary care paediatric centers of six Latin American countries. The workshop participants were keenly interested in learning how to organize surveillance systems for vaccine-preventable infections. They ultimately agreed to form a surveillance network, tentatively named the Central American Pediatric Infectious Diseases Network (CAPIDN). The network essentially linked the national paediatric hospitals of Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua. Initial projects were limited in scope, in order to demonstrate feasibility to potential funders. Tentative targets included pneumococcal/pneumonia/empyema, varicella admissions and vaccine-preventable deaths. The leader of the CAPIDN group Rolando Ulloa-Gutierrez of San José, Costa Rica is a former trainee of Dr. Scheifele and an active collaborator with Dr. Halperin on the pertussis vaccination of new parents. Ongoing consultative support was anticipated between CAPIDN and IMPACT.

Resources

Canadian

- IMPACT: www.cps.ca/en/impact
- Public Health Agency of Canada (PHAC): www.phac-aspc.gc.ca
- Canadian Paediatric Society (CPS): www.cps.ca
- Canadian Paediatric Surveillance Program (CPSP): www.cpsp.cps.ca
- Immunize Canada: www.immunize.ca
- Canadian Association for Immunization Research and Evaluation (CAIRE): www.caire.ca
- Canadian Immunization Research Network: www.cirnetwork.ca
- Vaccine safety quarterly reports: www.phac-aspc.gc.ca/im/safety-securite-eng.php

International

- Centers for Disease Control and Prevention: www.cdc.gov
- Immunization Action Coalition: www.immunize.org
- Global Alliance for Vaccines and Immunization: www.gavi.org
- Voices for Vaccines: www.voicesforvaccines.org

Vaccine safety video

<https://www.canada.ca/en/public-health/services/video/vaccine-safety.html>

National Immunization Awareness Week (April 22-29, 2017)

<http://www.immunize.cpha.ca/en/events/niaw.aspx>

CANImmunize app

<http://www.canimmunize.ca/en>

The CANImmunize (formerly ImmunizeCA) app provides Canadians with the ability to manage their families' vaccination records using their smart phones or mobile devices. Specifically, the app allows Canadians to keep track of their vaccinations; to receive automatic reminders to schedule their routine vaccinations based on relevant provincial or territorial schedules; and provides access to timely and trusted information about recommended vaccinations for children, adults and travelers. In a recent update, it now also includes activities for kids like games, videos, comic books, web sites; and for older kids and parents, videos and information. **Live in Ottawa?** You can submit your child's vaccination record to Ottawa Public Health from CANImmunize!



Education Program for Immunization Competencies (EPIC) (Toronto, April 1, 2017)

Earn 8.0 Maintenance of Certification (MOC) credit hours with the Education Program for Immunization Competencies, a one-day course for frontline immunization providers. Register at <http://www.cps.ca/en/epic-pfci>.

Current Team IMPACT contacts

| Centre | Lead/Backup Nurse Monitor | Investigator |
|---|---|--|
| IWK Health Centre Halifax, N.S. | Andrea Hudgin/Karen Branscombe Trish Smith | Dr. Karina Top (Lead) Dr. Scott Halperin (Co-PI) |
| Le Centre Mère-Enfant Soleil Québec City, Que. | Lynn Poirier /Marie-France Nolin/Louise Gosselin | Dr. Roseline Thibeault |
| The Hospital for Sick Children Toronto, Ont. | Jody Stapleton/Kim Simpson Suganya Lee (on 1-year leave) | Dr. Shaun Morris |
| Health Sciences Centre Winnipeg, Man. | Debbie Côté/Michelle Breton | Dr. Joanne Embree |
| B.C. Children's Hospital Vancouver, B.C. | Karen Kroeker/Ivor Chee | Dr. Manish Sadarangani Dr. Laura Sauvé (Co-Inv) |
| Children's Hospital of Eastern Ontario, Ottawa, Ont. | Chantal Bergeron/Jennifer Bowes | Dr. Nicole Le Saux |
| Alberta Children's Hospital Calgary, Alta. | Shannon Pyra/Eileen Pyra | Dr. Taj Jadavji (Lead) Dr. Rupesh Chawla (Co-Inv) |
| The Montreal Children's Hospital, Montreal, Que. | Annick Audet/Lina Moisan /Teena Marie Johns | Dr. Marie Astrid Lefebvre |
| Eastern Health Janeway St. John's, NL | Debbie Harnum/Krista Rideout | Dr. Natalie Bridger |
| CHU Sainte-Justine Montreal, Que. | Sophie Bouchard Christine Massicotte | Dr. Marc Lebel |
| Stollery Children's Hospital Edmonton, Alta. | Barb Neufeld/Chris Bon | Dr. Wendy Vaudry (Co-PI) |
| Royal University Hospital Saskatoon, Sask. | Chris Cadman/Brenda Andreychuk | Dr. Ben Tan (Lead) Dr. Athena McConnell (Co-Inv) |

Other contacts:

Public Health Agency of Canada (PHAC)

Jennifer Pennock (Director, Vaccine and Immunization Program Surveillance Division); Kerri Watkins (Chief Vaccine Safety); Christina Bancej (Chief, Influenza); Susan Squires (Chief, Vaccine-Preventable Diseases)

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

IMPACT Data Centre: Dr. Julie Bettinger (Epidemiologist & Data Centre Chief); Kim Marty (Data Manager); Emily Rousseau (Data Research Assistant); Sarah McCann (Data Nurse Scrutineer)

Canadian Center for Vaccinology (CCfV): Natalie Giorgis (newsletter formatting); Heather Samson (Nurse Monitor Liaison); Dr. Scott Halperin (Co-PI)

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