

## Vaccine vigilance in Canada: Is it as robust as it could be?

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### Abstract

Canada has been known to have one of the better vaccine safety surveillance capacities in the world, but in the early 2000s, it was noted there was still room for improvement. How has Canada done over the last decade and is there more to be done? Canada has done well. First, there has been significant progress made by the Vaccine Vigilance Working Group to enhance the passive vaccine safety monitoring system and address potential issues arising from the review of surveillance data and cases or clusters of concern. Second, there has been an increased investigative capacity for clusters of adverse events and other vaccine safety issues, including an assessment and referral system for individuals with adverse events following immunizations (AEFIs). Third, the use of the Brighton Collaboration definitions and other international standards has facilitated international collaboration and represents the best standard of practice.

Despite all these improvements, however, there is more that could be done. The sensitivity of Canada's passive surveillance system still varies from one province and territory to another. The timeliness of the data exchange flow could improve. The AEFI Signal Response Protocol, which identifies the processes and required actions for timely management of any newly detected or emerging vaccine safety signals, is a critical piece of a robust vaccine safety system but it is still in the making. It is commendable that Canada has decided to expand its focus on evaluation research from influenza vaccines to vaccine-preventable diseases more broadly, with the establishment of the Canadian Immunization Research Network (CIRN). CIRN's newly developed Provincial Collaborative Network and the move toward record linkages is excellent. These new investments are welcome in light of the rich vaccine development pipeline, the increased pool of available vaccines, and the growing set of technologies for vaccines production, delivery, and safety monitoring. What would round this all out would be a stronger capacity to monitor the implementation of vaccination programs and vaccine coverage, and better documentation of the reduction of the disease burden attributable to vaccination programs. Canada's investment in vaccines for the health of all deserves no less.

### Introduction

This special theme issue on vaccine safety is indeed important and welcome. First, it is opportune to review the situation and progress in sustaining and further developing one of the critical elements of the National Immunization Strategy (1) 11 years after its establishment. Second, it is desirable to review how Canada is delivering on one of the key elements of the Global Vaccine Action Plan 2011–2020 of the Decade of Vaccines (2), approved by the World Health Assembly in May 2012, that highlights the importance to detect and promptly analyze serious adverse events following immunization (AEFI). Third, it is essential to inform health care professionals and the public about the processes and activities that are continuously in place to ensure vaccine safety, but often go unnoticed. Fourth, it is useful to consider if the current system is now optimal or if there is more to be done to fill the remaining needs and gaps.

## Background

The six papers presented in this supplement on vaccine safety (3,4,5,6,7,8) have been specially selected to collectively represent a series of complementary aspects of what goes into vaccine vigilance: monitoring, signal generation, investigation and response, together with the role of research networks that allow for quick implementation of vaccine research and clinical trials. They highlight the best assets of Canadian vaccine vigilance and provide examples of provincial/territorial resources, activities and capacity. Among the strengths of the Canadian vaccine vigilance program is its ability for crisis communication and informing health professionals and the public of emerging risks.

Although these papers identify quite a few of the elements needed to ensure vaccine safety, even more goes into this. There are additional elements that work to ensure vaccine safety in Canada. These include: the international norms and standards and processes for the development, production and quality control of vaccines; the role of the national regulatory authority; the role of the public health advisory bodies on decision making such as the National Advisory Committee on Immunization (NACI), the Canadian Immunization Committee (CIC), and provincial advisory bodies such as the Comité sur l'immunisation du Québec; the supply chain and health delivery infrastructure; and the role of pre- and post-curriculum training and standards set by professional bodies that lead to the following of best practices by health care professionals delivering immunization.

Canada strengthened its vaccine safety monitoring capabilities in the 1990s (9), with a passive surveillance system, the Immunization Monitoring Program, ACTIVE (IMPACT), signal generation, and the ability for public health response that included investigative ability and review/follow-up of AEFIs by the then Health Canada's Advisory Committee on Causality Assessment (ACCA) (10).

Indeed, Canada's vaccine vigilance was (11) and continues to be highly regarded at the global level. Canada is a major contributor to global vaccine safety not only through its surveillance systems and investigative capacity, but also through ongoing contributions by its vaccinology and vaccine safety experts to global vaccine pharmacovigilance activities, including the strengthening of the capacities of developing countries. The Global Vaccine Safety Blueprint highlighted in the Global Vaccine Action Plan calls for the establishment of a global vaccine safety support structure (12). There is no doubt that Canada has contributed vastly to this initiative; in turn, this global structure complements the Canadian vaccine vigilance program.

Despite its strength, in 2003, the National Immunization Strategy (1) noted some limitations of the vigilance system and highlighted the need for it to be optimized to maintain professional and public confidence and address growing anti-immunization concerns. The National Immunization Strategy called for improvements in both the monitoring system and the public health response. So, how has Canada done?

## Progress to date

To date, Canada has delivered on some of the elements called for in the 2003 National Immunization Strategy. One major indicator of progress has been the formalization of a network of dedicated federal/provincial/territorial vaccine safety contacts in all jurisdictions Health Canada's Biologic and Genetic Therapies Directorate (the regulator) and the IMPACT network through the Vaccine Vigilance Working Group (3). This Working Group identifies potential issues through the review of surveillance data and cases/clusters of concern, enhancing the passive system of ongoing vaccine safety monitoring. This facilitates the production of timely national surveillance reports on adverse events following immunization. Second is the improvement of public health response with the establishment of a clinical assessment/referral system to assess and follow up with individuals who have suspected AEFIs (7). Third is the noticeable improvement of the investigative capacity both for clusters of adverse events and for vaccine safety issues that may emerge from surveillance signals through the various clinical and research networks (7,8). Finally, another positive development is the use of the Brighton Collaboration definitions

and harmonization of tools with international standards that not only facilitate international collaboration but also represent the best standard of practice in vaccine vigilance (6,13,14).

## Optimization

So is Canada's vaccine vigilance system optimal or is there more that could be done? Although robust, the current Canadian system could be improved further. Sensitivity still varies from one jurisdiction to another. Furthermore, despite the regular release of quarterly public safety postings, the timeliness of the data exchange flow could be improved (6, 15). Over the next three years, the plan for IMPACT to transition to electronic reporting will enable faster transmission and follow-up of information (5). While IMPACT captures approximately 90% of paediatric tertiary care beds in Canada, it would be useful to improve the representation in Ontario and, ideally, capture all paediatric admissions in the country (5). Finally, the work of the Vaccine Vigilance Working Group to create an AEFI Signal Response Protocol that will describe the critical processes and required actions for timely management of any newly detected or emerging vaccine safety signals is still ongoing, long after the establishment of the Working Group itself (3).

To date, there has been limited focus of active surveillance of the adult population. One welcome development is the transformation of the Public Health Agency of Canada and Canadian Institutes of Health Research Influenza Research Network (PCIRN), with its focus only on influenza, into the broader Canadian Immunization Research Network (CIRN) that has capacity for rapid clinical trials to investigate vaccine safety issues. The provincial collaborative network created under CIRN and its evolution to move toward record linkages is excellent (7). It is worth noting that in 2007 Belize, with Canadian technical assistance, deployed a country-wide fully integrated patient-centred health information system (which required vaccine bar coding) with embedded disease management for \$4 (CAD) per citizen with definite positive outcomes (16). The Canadian Paediatric Surveillance Program, established nearly 20 years ago, is one of the other tools that Canada enjoys and that was and could still be used for completing its vaccine vigilance armamentarium (17).

Vaccine safety is one of the elements of vaccination decision making and one must keep in mind the benefit-risk assessment that needs to be maximized. Given the focus of this supplement on vaccine safety, the IMPACT report does not do justice to the very valuable contribution of the network in assessing the reduction of the disease burden attributable to vaccination programs and complementing Canada's disease surveillance system. Of course this goes hand in hand with the monitoring of the implementation of the vaccination programs. A similar look into Canada's capacity for timely monitoring of vaccine coverage in all age groups would be of interest. It is clear from the articles presented in this supplement that vaccine vigilance in Canada has been strengthened over the last decade, but it could be even more robust.

## Conclusion

As a country, Canada has one of the best vaccine safety surveillance capacities in the world. So why should we continue to optimize our vaccine vigilance system? As Ward noted in 2000, we need a strong vaccine safety system that stays in step with the accelerating pace of vaccine development (18). Now, almost 15 years later, it is even more important that vaccine safety monitoring keep pace with the advances that have been made. There are an increasing number of vaccines currently in use, a rich vaccine development pipeline, and a growing set of technologies in place for vaccines production and delivery. Today, the total cost of all vaccines required to complete the national immunization schedule for one person is in excess of \$1,000 (CAD). This merits an optimal investment in a vaccine safety monitoring system—Canada's investment in vaccines for the health of all deserves no less.

## Declaration

The opinions expressed in this article are those of the author and do not necessarily represent the decisions, official policy or opinions of the World Health Organization. From 1989 through 1991, Philippe Duclos served as Head, Vaccine-Associated Adverse Event Section, Laboratory Centre for Disease Control, Health Canada; and from 1991 through 1998, served as Chief, Division of Immunization, Laboratory Centre for Disease Control, Health Canada, in Ottawa, Canada.

## Conflict of interest

None

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