



A new resource to summarize evidence on immunization from the Canadian Vaccination Evidence Resource and Exchange Centre (CANVax)

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Abstract

Scientific progress around the development, use and best practices for communicating the benefits of vaccines is rapid, and keeping up-to-date with the substantial body of evidence on these topics is challenging. However, the increase in the number of vaccines and decline in vaccine-preventable illnesses has often focused public attention more on the risks of vaccines rather than the risks of the diseases. In Canada and elsewhere, an increasing number of parents are choosing to delay and/or refuse some or all vaccines for their children, leading to declining community protection against vaccine-preventable diseases and an increase in the number of outbreaks of vaccine-preventable diseases. Evidence suggests that the concept of vaccine hesitancy contributes to a deeper understanding of vaccination decisions by moving beyond the traditional binary of pro- or anti-vaccine attitudes to recognize a spectrum of beliefs and associated behaviours that occupies the space between the two poles. At a time of growing antimicrobial resistance to infections, protection conferred by vaccination is more important than ever.

The Canadian Vaccination Evidence Resource and Exchange Centre (CANVax) is an online curated database of resources to support immunization and promotional activities aimed at improving vaccine acceptance and uptake in Canada. It includes both the identification of accurate and reliable resources and the creation of new resources by a group of multidisciplinary professionals.

This issue of the *Canada Communicable Disease Report* (CCDR) includes the first of a series of "CANVax Briefs" that have been developed by experts after conducting scoping reviews and environmental scans and assessing the most rigorous evidence. The aim of the CANVax Briefs is to bring attention to current and emerging issues by providing short summaries of the recent best available evidence to assist frontline public health and clinical care professionals in optimizing the immunization rate in Canada. CANVax Briefs will be published in CCDR throughout 2020.

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Introduction

Scientific progress around the development and use of vaccines has been rapid over the past 40 years (1). In Canada, the number of vaccines included in the publicly funded vaccination program for children from birth to 18 years of age has more than tripled since 1980, from eight to 17 antigens by 2019 (2). Not only has

the number of vaccines risen, but the number of immunizations given in a single visit has also increased. For example, up to four different vaccines may be given in a single childhood vaccination visit depending on the provincial and territorial vaccination program (3).

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As vaccine schedules grow increasingly complex so do the needs and expectations of patients and health care providers concerning vaccine safety and effectiveness. For some, the increase in the number of vaccines and decline in vaccine-preventable illnesses has focused more attention on the risks of the vaccines rather than the risks of the diseases (4). In Canada and elsewhere, an increasing number of parents are choosing to delay and/or refuse some or all vaccines for their children, leading to declining community protection against vaccine-preventable diseases and major outbreaks of those diseases (5–9). Sadly, reported uptake rates in Canada are falling short of national and international targets (10).

In Canada approximately 15% to 20% of parents are concerned about accepting vaccines for their children, with some deciding to delay, postpone or even refuse some or all vaccines (5,11,12). Given that vaccine-hesitant parents are not uniformly spread across the population but frequently cluster geographically due to common values and lifestyle, we now have fertile grounds for major outbreaks of vaccine-preventable diseases (7–9).

The recent increase in vaccine-preventable outbreaks occurred at the same time as rising rates of antimicrobial resistance. Antimicrobial resistance threatens the effective prevention and treatment of an ever-increasing number of infections (13). In 2019, the World Health Organization identified antimicrobial resistance and vaccine hesitancy as two of the top 10 threats to global health (14), making the optimization of vaccination rates more important than ever.

In this editorial, we identify vaccine hesitancy as including a number of concerns; describe the Canadian Vaccination Evidence Resource and Exchange Centre (CANVax), a new resource that provides curated information on vaccines for frontline public health and clinical care as well as other educational services; and introduce a series of CANVax Briefs that will be published in the *Canada Communicable Disease Report* (CCDR) throughout 2020, starting with this issue.

Vaccine hesitancy

Vaccine hesitancy, or the “delay in acceptance or refusal of vaccine despite the availability of vaccination services” (12), is receiving increasing international attention. The scope of vaccine hesitancy includes instances where “vaccine acceptance in a specific setting is lower than would be expected, given the availability of vaccination services” (12).

The concept of vaccine hesitancy contributes to a deeper understanding of vaccination decisions by moving beyond the traditional binary of pro- or anti-vaccine attitudes to recognize a spectrum of beliefs and associated behaviours that occupies the space between the two poles. A vaccine-hesitant person can delay, be reluctant but still accept, or refuse one, some or all vaccines.

Vaccination decisions are complex and multidimensional, and can be very vaccine-specific.

At the individual level, reviews have focused on factors associated with vaccine acceptance or refusal, identifying determinants such as:

- Fear of side effects
- Perceptions around health and prevention of disease
- A preference for “natural” health
- Low perception of the efficacy and usefulness of vaccines
- Negative past experiences with vaccination services
- A lack of awareness or knowledge about vaccination (4)

The World Health Organization summarizes the diverse factors leading to vaccine hesitancy into three broad categories (12):

- **Complacency:** Perceived risks of vaccine-preventable diseases are low and vaccination is not deemed necessary
- **Convenience:** The real and/or perceived quality of the service and the degree to which vaccination services are delivered at a time and place and in the cultural context that are convenient and comfortable
- **Confidence:** Trust in the effectiveness and safety of vaccines; in the system that delivers them, including the reliability and competence of the health services and health professionals; and in the motivations of the policy-makers who decide which vaccines are needed when and where

The growing interest in vaccine hesitancy—and vaccine acceptance more broadly—has generated an increasing number of publications. Keeping up-to-date with the substantial body of peer-reviewed research and major domestic and international reports relevant to vaccine acceptance and uptake that are being produced can be challenging.

CANVax

CANVax is a new online curated database of resources to support immunization program planning and promotional activities aimed at improving vaccine acceptance and uptake in Canada (15). CANVax has been developed by the Canadian Public Health Association (CPHA) with funding from the Public Health Agency of Canada. It includes curated resources from Canada and around the world, interactive features, educational updates and new resources. CANVax is now a member of Vaccine Safety Net, the World Health Organization global network of vetted websites that provide reliable information on vaccine safety (16).

Curated resources

CANVax houses a collection of selected evidence-based products and resources to make it easier for public health professionals to access and gather resources to inform their planning and activities. It includes a large database that covers five broad areas: vaccine decision making; monitoring and surveillance; vaccine safety and development; program



planning and delivery; and policy. In each area there are multiple topics, and for each topic there are resources on background knowledge, implementation tools and evidence and key influencers or leaders in the field. (Table 1).

Table 1: Summary of the subject areas and topics in CANVax's curated database

Subject areas	Topics	Resources
Vaccine decision making	Vaccine hesitancy	Understanding hesitancy and vaccine decision making
		Misconceptions
		Complementary and alternative medicine
	Vaccine acceptance	Understanding vaccine acceptance and uptake
		Counselling and communication
		Anxiety and pain management
Monitoring and surveillance	Vaccine monitoring and surveillance	Vaccination coverage and goals
	Outbreaks and pandemics	Outbreaks
		Influenza pandemics
	Vaccine preventable disease surveillance	Provincial and territorial surveillance
		National surveillance
		Global surveillance
Vaccine safety and development	Vaccine safety	Vaccine safety
		Adverse events following immunization (AEFI)
	Research and development	Vaccine ingredients
		Vaccine development
Program planning and delivery	Promotion and communications	Marketing and campaigns
		Communications
	Program delivery and evaluation	Informed consent
		Clinics
	Vaccine management	Storage and handling
	Outbreak and crisis management	Crisis communications
Professional development	Education and training	
Policy	Immunization policies	Mandatory immunization and activities

Abbreviation: CANVax, Canadian Vaccination Evidence Resource and Exchange Centre

How does it work? CANVax is supported by a multidisciplinary group of experts with skills and knowledge in public health, infectious diseases, medical anthropology, paediatrics, internal medicine, sociology, information technology, social media and library science. This group reviews Canadian and international resources, products and tools prior to their inclusion on the CANVax website.

Interactive features

All users are able to download any resource. In addition, the following interactive features are available when a user registers with CANVax:

- Share – easily share a resource with colleague using social media or email
- Comment – provide feedback on resources you have used
- Save – bookmark the resource you need for easy and convenient access and save your search strategy for future reference

Educational services

In addition to posting curated resources, CANVax's monthly newsletter provides updates on new resources and highlight articles on emerging topics in immunization. CANVax's podcasts and webinars also focus on emerging topics, with experts from across Canada exploring emerging immunization issues and initiatives.

CANVax Briefs

CANVax is developing new resources to provide succinct summaries and highlights of key new research. "CANVax Briefs" are short evidence-based articles that aim to inform, engage and inspire readers by bringing attention to current and emerging issues in immunization, and by profiling initiatives and activities from across Canada that aim to improve vaccine acceptance and uptake.

In this issue, we begin a series of CANVax Briefs by focusing first on how vaccine hesitancy has been increasing with the availability of Web 2.0 and social media, that this hesitancy has been associated with an increase in outbreaks of vaccine-preventable diseases and then identify the best practices to address this (17). More Briefs will be published in subsequent issues of CDR in 2020.

Topics for the Briefs are identified by the CANVax team. The team consists of CPHA staff and immunization experts, Dr. Noni MacDonald and Dr. Eve Dubé. Experts on the chosen subject are then invited to contribute to the development of the brief. Short scoping reviews of evidence are conducted and reviewed by the CANVax Expert Review Panel, which is made up of external experts in immunization (18).

Conclusion

Enormous evidence-based progress has been made to address the declining community protection against vaccine-preventable diseases that has been seen around the world. CANVax was created to help frontline practitioners remain abreast of these developments in order to promote and maintain higher immunization rates in Canada. One of the strengths of the CANVax website is it is interactive. CANVax welcomes feedback



on its website and its products and is open to suggestions for specific topics to be covered in future CANVax Briefs and webinars. Check out the CANVax website for details.

Authors' statement

NM — Writing – original draft
ED — Writing – review and editing

Conflict of interest

Dr. MacDonald reports grants from the Public Health Agency of Canada, the Canadian Institutes of Health Research, Nova Scotia Health Authority, IWK Health Authority and the Canadian Immunization Research Network. Dr. Dubé reports grants from the Public Health Agency of Canada, the Quebec Ministry of Health and Social Services, le Fonds de la recherche en santé du Québec, the Canadian Institutes of Health Research, the Canadian Immunization Research Network, and the Social Sciences and Humanities Research Council of Canada. Both authors are members of the CANVax Team.

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