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Characteristics of immunisation support programmes in Canada: a scoping review and environmental scan

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ABSTRACT

Objective To identify, characterise and map the existing knowledge about programmes that provide immunisation support to Canadians and barriers and facilitators to their delivery.

Design Scoping review and environmental scan.

Introduction Vaccine hesitancy may be associated with unmet support needs of individuals. Immunisation support programmes that provide multicomponent approaches can improve vaccine confidence and equitable access.

Inclusion criteria Canadian programmes that focus on providing information about immunisation for the general public, but excluding articles targeting health professionals. The primary concept involves mapping the characteristics of programmes and our secondary concept examines barriers and facilitators to programme delivery.

Methods The Joanna Briggs Institute (JBI) methodology guided this review, reported using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews. A search strategy was developed and translated for six databases in November 2021 (updated October 2022). Unpublished literature was identified through the Canadian Agency for Drugs and Technologies in Health Grey Matters checklist and other relevant sources. Stakeholders (n=124) from Canadian regional health authorities were also contacted by email for publicly accessible information. Two independent raters screened and extracted data from identified material. Results are presented in tabular form.

Results The search strategy and environmental scan resulted in 15,287 sources. A total of 161 full-text sources were reviewed after applying eligibility criteria, resulting in 50 articles. Programmes were delivered in multiple Canadian provinces, focusing on various vaccine types. All programmes aimed to increase vaccine uptake and were mostly provided in person. Multidisciplinary delivery teams based on collaborations among multiple entities were credited as a facilitator to programme delivery across settings. Limitations on programme resources, attitudes of programme staff and participants, and systems organisation were identified as barriers to delivery.

Conclusions This review highlighted characteristics of immunisation support programmes across various settings and described multiple facilitators and barriers. These findings can inform future interventions that aim to support Canadians in making decisions about immunisation.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Our team was composed of individuals with expertise in the Canadian healthcare system.7 Misinformation is associated with COVID-19 cases and deaths among Canadians, which would have been mitigated by vaccine uptake and greater adherence to public health protocols.7 Misinformation may have disproportionately impacted individuals with right-wing political

INTRODUCTION

One of the most valuable tools in the battle against disease transmission is immunisation.1 The resurgence of vaccine preventable diseases in recent decades, however, has led the World Health Organization to name vaccine hesitancy as a major threat to global health.2 Ensuring the timely uptake of vaccines and improving vaccine confidence requires consideration of potential barriers to immunisation experienced by individuals, including health literacy.3 4 Over half (60%) of Canadian adults do not possess sufficient health literacy to meet their health needs.5 Such a lack of understanding can affect an individual’s ability to appraise health information. Moreover, complex topics such as those which focus on immunisation are susceptible to misunderstanding.6

The COVID-19 pandemic highlighted the significant impact that vaccine-related misinformation has on public health and the Canadian healthcare system.7 Misinformation is associated with COVID-19 cases and deaths among Canadians, which would have been mitigated by vaccine uptake and greater adherence to public health protocols.7 Misinformation may have disproportionately impacted individuals with right-wing political...
ideology and those who encountered incorrect information repeatedly through online sources. A preliminary search of MEDLINE, the Cochrane Database of Systematic Reviews and JBI Evidence Synthesis was conducted and no current or underway systematic reviews or scoping reviews on the topic were identified. This review was conducted in accordance with an a priori protocol, but with the addition of environmental scanning methods to identify unpublished programmes.

Findings from this review will inform the development of an immunisation support programme in Prince Edward Island (PEI), Canada, to increase COVID-19 vaccine confidence among families. This review represents one phase in a larger project to improve vaccine confidence and reduce barriers to vaccination. Specifically, our programme aims to promote knowledge translation about immunisation, and especially the COVID-19 vaccine, to increase vaccine-related knowledge and decrease barriers to vaccination. Through a partnership with CHANCES, a charitable organisation that provides programming and support to PEI children and their families, we aim to provide informational, emotional, and structural support to PEI residents to increase COVID-19 vaccine confidence. Findings from this scoping review will inform the development of a framework for our programme using lessons learnt and best practices from similar programmes.

**Review questions**

1. What are the characteristics of immunisation support programmes in Canada that provide evidence-based information about vaccines and reduce barriers to immunisation?

2. What are the perceived barriers and facilitators to the implementation and delivery of immunisation support programmes (including interventions and other strategies) in Canada?

**Inclusion criteria**

**Participants**

This scoping review focused on immunisation support programmes or interventions that target various cohorts within the general public, including parents/guardians, infants, children, adolescents and other adults (eg, school administration, seniors). Members of the general public will be inclusive of any segment of the population (eg, Indigenous, minority, urban and rural populations); however, we will exclude papers that target health professionals (eg, physicians, nurses, pharmacists).

**Concept**

The main concept of this review was to identify the characteristics of immunisation support programmes that were intended to engage the general public about immunisation. This study defines immunisation support programmes or interventions as those that aimed to...
educate or communicate with the public about immunisation using multiple strategies (eg, provision of material resources; class-based sessions; online engagement). Immunisation programmes of interest in this review were those that extended the message beyond the provision of information typically provided through the informed consent process when becoming vaccinated. Specifically, we are interested in programmes that provide direct and ongoing support to Canadians and provide an opportunity for dialogue and support. As part of the inclusion process, programmes that provided evidence-based resources about immunisation as an online resource (eg, website) or through mass communication (eg, webinar) were not selected in the final review. While these interventions represent resources for the general public and health professionals, our interest was on programmes that were intended to provide informational, emotional and/or tangible (eg, structural) support directly to participants in practice. Programmes or interventions of interest in this study focused on any vaccine preventable disease.

The secondary concept of this review process was to identify barriers and facilitators to the implementation and delivery of immunisation support programmes in Canada. However, papers did not need to report on barriers and/or facilitators to be included in this review.

Context
Immunisation support programmes in all settings, including (but not limited to) clinics, community health centres and school settings. We considered all methods of delivery (eg, phone, videoconferencing, in person). The overall focus of this review process was limited to programmes in Canada.

Types of sources
This review considered all quantitative and qualitative articles and unpublished literature. We excluded all reviews, such as systematic and scoping reviews, and meta-analyses. Due to resource limitations, only sources published in English were included.

METHODS
This scoping review was conducted in accordance with the Joanna Briggs Institute (JBI) methodology for scoping reviews. This scoping review used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews checklist (26) to ensure rigour during the planning, organisation and reporting of this review.

Search strategy
The search strategy aimed to locate both published and unpublished articles, as described in Kelly et al. (25) A three-step search strategy was developed by a research librarian (KM) in consultation with other members of the research team to identify published articles. First, an initial limited search of CINAHL (EBSCOhost) and Academic Search Complete (ASC) (EBSCOhost) was undertaken to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles, and the index terms assigned to the articles were used to develop a full search strategy (online supplemental appendix A). The search strategy, including all identified keywords and index terms, was adapted for each included database and/or information source. The reference list of all included sources of evidence was also screened for additional studies. Specifically, references examined included those reported in other types of reviews and relevant articles.

The third step of the search strategy included a search for details about immunisation support programmes published in sources other than journals. This search consisted of a broad scan on the first 10 pages of Google and Google Scholar. The search included literature using the Canadian Agency for Drugs and Technologies in Health (CADTH) Grey Matters checklist (SOURCE). Relevant organisational, governmental and healthcare association websites were also reviewed, including the Public Health Agency of Canada, the Government of Canada (eg, National Advisory Committee on Immunization statements and publications), Immunize Canada, Indigenous Services Canada and Infection Prevention and Control Canada. A full list of databases used to search the unpublished literature and corresponding keyword searches is available in online supplemental appendix A.

Only articles available in English were included due to time and resource limitations. There was no cut-off date built into the database searches; papers from any time period were considered. Searches for relevant articles were completed in November 2021 and updated in October 2022 in six electronic databases: CINAHL via EBSCOhost, APA PsycINFO via EBSCOhost, ASC via EBSCOhost, Scopus, MEDLINE via EBSCOhost and EmCare via Ovid. The syntax for the search strategy in MEDLINE via EBSCOhost is outlined in online supplemental appendix A.

Environmental scan of programmes
To complement the systematic online searches, we also conducted an environmental scan of programmes by inquiring with relevant stakeholders through the Canadian provincial chief public health offices and regional health authorities. Environmental scanning involves the collection of information from multiple sources to inform evidence-based planning. (29) (30) Specifically, 124 stakeholders were contacted by email and asked to provide publicly available information about existing or previous immunisation support programmes. Stakeholders were contacted by a member of our research team (SD) from September to October 2022.

Study selection
Following the search, all identified citations were collated and uploaded into Covidence, an online review management platform that facilitates article screening and data
extraction (COVIDENCE), and duplicates removed. Following a pilot test, titles and abstracts were then screened by two independent reviewers (KJK, JL) for assessment against the inclusion criteria for the review. Potentially relevant sources were retrieved in full and their citation details imported into Covidence. The full text of selected citations was assessed in detail against the inclusion criteria by the same independent reviewers. Any disagreements that arose between the reviewers were resolved through discussion with a third reviewer (WM).

**Data extraction**

Data were extracted from papers by four independent reviewers working in teams of two (KJK, JL, LM, GM) using a data extraction tool (online supplemental appendix B) developed by the research team (KJK and BBJ) and implemented in Covidence. This tool was pilot tested in a subset of articles (10 total) prior to data extraction. Information extracted from articles included: (1) characteristics of the article, including: author(s), year of publication, publication journal, study design, study objectives (including aims/purpose), research question(s), methodology (including philosophical perspective); and (2) characteristics of the programme/intervention, including: programme name, programme description, target population and participant details, delivery format, programme delivery personnel and team format, setting (eg, community, clinical), context, geographical location, vaccine type(s), data analysis, outcome measures, reported barriers/facilitators to intervention implementation and/or delivery, author’s conclusion (ie, key findings), implications, identified gaps/future directions, reviewer’s comments.

**Data analysis and presentation**

The extracted data are presented in tabular form with headings consistent with the items in the extraction tool in a manner that aligns with the objectives of this scoping review. A narrative summary accompanies the tabulated results and describes the characteristics of immunisation support programmes in Canada, including identified barriers and facilitators to delivery.

**Patient and public involvement**

No patients or public were involved in the study.

**RESULTS**

**Study inclusion**

A total of 3753 studies were identified through our search strategy in the academic databases (ASC, n=733; APA PsycINFO, n=101; CINAHL, n=727; EmCare, n=568; MEDLINE, n=1318; and Scopus, n=306). After removal of duplicates, 2266 studies underwent title and abstract screening, from which a further 2137 were excluded. Many of these studies described the attitudes or perceptions of immunisation or did not describe an immunisation programme (eg, focused on vaccination intent). After full-text screening, another 94 studies were excluded, resulting in 35 studies included in the review.

A total of 11532 sources from unpublished databases were identified (Google Scholar, n=23; Google, n=47; CADTH Grey Matters, n=6152; government websites, n=5296; environmental scan, n=14). Title and abstract screening led to the exclusion of 11500 sources, resulting in 32 sources. After full-text screening, another 17 sources were excluded, resulting in 15 unpublished sources included in the review. Combining academic studies and unpublished sources, a total of 50 sources were included.

The majority of identified unpublished sources that were excluded during the title/abstract stage of study selection were not relevant to this review. Many of the search engines found on web-based databases in the unpublished literature do not allow for refined searches (eg, Boolean strategy), with the exception of Google. Moreover, sources in the unpublished literature were mostly excluded during the title and abstract screening as this process involved clicking links and immediately assessing for eligibility. Figure 1 provides an illustration of sources at each stage of the selection process.

Programmes identified through the environmental scan were included in the tally of unpublished sources above. A total of 124 stakeholders from across the Canadian provinces and territories (eg, public health officials and representatives from regional health authorities) were contacted through our scan of immunisation support programmes. This scan resulted in the identification of 14 relevant programmes, from which eight were excluded as they did not meet the a priori inclusion criteria (see figure 1).

**Characteristics of included studies**

A wide range of study designs were identified in academic studies. From the 35 included academic articles, n=17 were categorised as observational descriptive studies (eg, cross-sectional studies and case reports); n=10 were observational analytical studies (eg, cohort and observational studies); n=5 were experimental studies (ie, randomised controlled trials); n=1 was expert opinion (ie, editorials); and n=2 were quasiexperimental studies. From the unpublished sources included in the review, n=10 were identified through web pages. Information from remaining unpublished sources (n=6) was derived directly from stakeholders.

Studies were published in 16 journals, with the Canadian Journal of Public Health (n=8) and Vaccine (n=8) cited most often. This was followed by two studies each in the following five journals: Canadian Pharmacists Journal, Human Vaccines & Immunotherapeutics, Journal of Obstetrics and Gynaecology Canada, Journal of School Health and Paediatrics & Child Health. Included studies were published between 1991 and 2021. Five (n=5) studies were published in 2019, followed by n=4 in 2018 and n=3 in 1998.
Review findings

The following section provides results pertaining to the two research questions. The first section describes the characteristics of immunisation support programmes identified through this review, and the second summarises findings related to facilitators and barriers to programme implementation and/or delivery. A full list of the programmes included in the review and their characteristics is available in online supplemental appendix C.

Characteristics of immunisation support programmes

Setting and geographical location of programmes
Among the programmes, n=12 were based in Ontario (ON), followed by n=11 in Quebec (QC) and n=6 in British Columbia. Four (n=4) programmes were based in PEI, n=3 in Nova Scotia and n=4 were provided across all of the Canadian provinces and territories. Three (n=3) programmes were delivered in Alberta, and n=5 programmes across multiple provinces. One programme targeted an ‘urban-rural region of 450,000 individuals’ but was not specific as to the geographical location. Finally, n=1 programme each were delivered in Newfoundland and Labrador and Saskatchewan.

Programmes were primarily offered regionally (n=19) and provincially (n=16), with some programmes delivered in a specific location (eg, school, hospital or community location) (n=10). One programme was restricted to First Nations communities and n=5 were offered nationally.

Most programmes took place in the school setting (n=14), followed by within the community (n=12). Remaining programmes took place in the hospital setting (n=5), online or virtually (n=5), community and health settings (n=4), primary care clinics (n=4), workplaces and schools (n=3) and pharmacies (n=2).

Vaccine focus of programmes
Most of the programmes from the academic literature focused on the human papillomavirus (HPV) vaccine (n=8). This was followed by programmes focusing on the influenza vaccine (n=6) and hepatitis B (n=5). Three programmes aimed to encourage the uptake of all vaccine types, including the COVID-19 vaccine; a further n=3 focused specifically on all routine childhood vaccines. Remaining articles focused on varicella (n=3); diphtheria, tetanus and pertussis (DTaP) (n=1); DTaP, polio and Haemophilus influenza type B, and measles, mumps and rubella (MMR) (n=1); hepatitis A and B (n=1); influenza, pneumococcal and hepatitis A and B (n=1); meningococcal (n=1); MMR (n=1); and pneumococcal polysaccharide vaccine (n=1).

Within the unpublished sources, the majority of the programmes focused on COVID-19 vaccines (n=10), followed by all vaccines (n=2), all regular childhood vaccines (n=2) and COVID-19 and HPV vaccines (n=1).

Objectives of programmes
The primary objective of most programmes was to increase vaccine uptake across a wide range of vaccine types (eg, COVID-19, influenza, pneumococcal, varicella) (n=27). Some programmes generally aimed to increase
vaccine confidence (n=6) and educate individuals about immunisation (n=6), for example, regarding the safety of vaccines in specific populations (eg, pregnant or lactating persons). Four (n=4) programmes specifically aimed to decrease barriers to vaccination, while others aimed to improve on-time vaccination (n=3). Remaining programmes (n=3) broadly aimed to reach universal immunisation to minimise the burden of illness within specific geographical boundaries (eg, provincially or regionally).

Target population of programmes
The majority of programmes focused on students (n=14), including children enrolled in a public school among grades 4–9 (n=12), high school (n=1) and university (n=1). Thirteen (n=13) programmes were delivered to reach members of the general public. Remaining programmes served racialised and underserved populations (including Indigenous persons and street youth) (n=6), pregnant and postpartum persons (n=6), high-risk populations (n=5), parents of young children (n=4) and employees (n=2).

Type of support provided
All programmes (n=50) reported providing informational support to participants, some of which specifically noted the inclusion of navigational support to various health-related services and programmes (n=6). Informational support included brochures, pamphlets and leaflets, consultations with knowledgeable persons (eg, public health nurses, pharmacists), educational videos and sessions, online resources, education packages, fact sheets, information hotlines, videos and town halls.

Eleven programmes incorporated structural support within their delivery model by providing transportation, vaccine clinics, decision aids and peer support (eg, community ambassadors). Three programmes reported an emotional support component to their programme through the incorporation of peer support counsellors and immunisation counsellors.

Delivery format and modality of programmes
Twenty-seven programmes were offered in person, followed by 11 programmes that used a combined delivery approach of in person and online (eg, social media or web-based delivery). The remaining programmes that were identified indicated that they were either delivered online, by telephone (n=3), email (n=1), in person and telephone (n=1), mail (n=1), online and telephone (n=1) and telephone and in person (n=1). Eight programmes identified through the unpublished literature were delivered through a hybrid approach (ie, online and in person), while three programmes were identified through the academic databases.

Method of participant recruitment
Within programmes identified in the academic databases, 14 recruited participants through the school system (eg, public schools). Six programmes recruited through existing client lists in a health centre or clinic (eg, pharmacy list, clients from an obstetrics and gynaecology clinic). Four programmes used media and community organisations to recruit, including through public health entities. Two (n=2) programmes each recruited through inpatients in a hospital, by mail and through purposive sampling (eg, in specific community locations). Each of the remaining programmes used a different approach to recruitment, such as employer lists (n=1), websites (n=1), a home visiting programme (n=1) and via telephone call after the birth of a baby (n=1).

Of the studies identified in the unpublished literature, only 15 provided details regarding how participants were recruited to programmes. In total, 10 of these programmes did not report their method of recruitment. However, three of the programmes reported using community outreach, whereas two programmes advertised their programme online using social media.

Programme delivery personnel and team format
The programme delivery personnel and team format varied across programmes. Over half of the programmes included two or more roles in the delivery of programmes using combinations of: school staff, interdisciplinary and multidisciplinary teams, web designers, administrative support, physicians and other clinicians, volunteers, peer supporters, counsellors, translators, medical residents, teachers and researchers (n=30).

From the total of 50 observed programmes, 21 included public health nurses in the programme delivery model and only two of these programmes were derived from the unpublished literature. Moreover, 16 programmes incorporated researchers in the delivery of programmes, and five programmes included pharmacists and pharmacy technicians. One programme included intergenerational educators, specifically Elders from the local community as part of the programme delivery team.

Facilitators and barriers to programme implementation and/or delivery
The second research question aimed to identify the facilitators and barriers associated with implementation and delivery of identified programmes. This information was most often reported as a discussion point in academic studies. None of the unpublished sources identified through web-based sources reported facilitators or barriers. However, relevant information from four of the programmes identified through the environmental scan was reported by stakeholders. These reported facilitators and barriers are summarised in the next two sections. A full summary of the findings from this review, including programme characteristics and facilitators and barriers to implementation and delivery, is available in table 1.

Facilitators to programme implementation and/or delivery
Public health nurses were cited as an important facilitator of immunisation support programmes; in particular, the enthusiasm of nurses promoting and administering the
### Table 1  Summary of findings related to the characteristics of immunisation support programmes and barriers and facilitators to their implementation and delivery

#### Characteristics of immunisation support programmes

<table>
<thead>
<tr>
<th>Characteristics of programmes</th>
<th>Details</th>
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| **Primary objective of programmes** | ► To increase vaccine uptake (n=27, 54%).  
► To increase vaccine confidence (n=6, 12%) or vaccine-related knowledge (n=6, 12%). |
| **Location** | ► Most were offered regionally or provincially (n=35, 70%). |
| **Setting** | ► Provided primarily in school and community settings (n=26, 52%).  
► Some (n=9, 18%) were provided through health-related environments, including clinics and hospitals, and only 10% (n=5) were virtual. |
| **Target vaccine** | ► Wide range that included: HPV; influenza; diphtheria, tetanus and pertussis; polio and *Haemophilus influenza* type B; measles, mumps and rubella; pneumococcal; hepatitis A and B; pneumococcal polysaccharide vaccine; and COVID-19. |
| **Target population of programmes** | ► Half of identified programmes broadly targeted the general public (n=13, 26%) and students (children and youth) (n=12, 24%).  
► Remaining programmes targeted specific groups, including:  
  - Racialised and underserved populations (n=6, 12%).  
  - Pregnant and postpartum persons (n=6, 12%).  
  - High-risk populations (n=5, 10%).  
  - Parents and guardians of young children (n=4, 8%). |
| **Type of support provided** | ► All programmes provided informational support (eg, system navigation, education, etc) (n=50, 100%).  
► Some (n=11, 22%) provided structural support (eg, provision of transportation, vaccine clinics, etc).  
► Few provided emotional support (eg, counselling) (n=3, 6%). |
| **Delivery format of programmes** | ► More than half offered in-person delivery (n=27, 54%), followed by a hybrid of in person and virtual (eg, web-based communication) (n=11, 22%).  
► Few delivered programmes exclusively through the telephone (n=3, 6%) or email (n=1, 2%). |
| **Method of participant recruitment** | ► Programmes recruited participants through the school system (n=14, 28%), existing clinic lists (n=6, 12%) and in partnership with media or community organisations (n=4, 8%).  
► Remaining programmes recruited through hospital inpatients (n=2, 4%), employer lists (n=1, 2%), websites (n=1, 2%), a home visiting programme (n=1, 2%) and via telephone after the birth of a baby (n=1, 2%). |
| **Programme delivery team** | ► More than half of identified programmes included two or more roles in the delivery team format.  
► Many programmes included public health nurses (n=21, 42%), researchers (n=16, 32%) and pharmacists or pharmacy technicians (n=5, 10%) in programme teams. |
| **Programme facilitators** | ► Participation and enthusiasm of public health nurses in programme delivery.  
► Provision of training to teachers may increase participation of students in school settings.  
► Use of pharmacists to deliver programmes may increase accessibility and patient favourability.  
► Collaboration, support and cooperation between schools, community-based organisations, government, researchers and health professionals.  
► Improving convenience for participants to engage with programmes, such as through drop-in clinics in convenient locations (eg, workplace, pharmacies) or the opportunity to connect to support virtually (eg, mobile applications).  
► Use of a multicomponent intervention involving peer support to provide individualised support to participants about vaccination. |

Continued on September 24, 2023 by guest. Protected by copyright.
vaccine may have improved public perception of the overall immunisation programme.32 35 Having a public health nurse located in the school setting was viewed in some programmes as increasing vaccine-related knowledge and uptake during school immunisation programmes.33–35 Specifically, the presence of nurses in the school setting may have led to the development of rapport among teachers, volunteers and students, in turn increasing parental engagement with regard to immunisation.35 In one programme, the training of teachers to deliver vaccine education materials was shown to be as effective as nurses and may have been more effective at obtaining consent.36 The employment of intergenerational educators within minority or racialised communities may result in the provision of information that goes beyond traditional communication methods (eg, written and video resources).37

Similarly, use of pharmacists to deliver evidence-based vaccine information and support was reported to facilitate vaccine uptake due to high accessibility and patient favourability.38 Incorporating the scope of practice of pharmacists into programmes may also facilitate success in immunisation support programmes. For example, one programme39 provided influenza vaccinations to persons presenting in the emergency department. Since hospital-based pharmacists were already providing this vaccine in that setting, the implementation of this programme was facilitated by scaling up the existing practice to provide a wide and accessible coverage.

Collaboration, support and cooperation among entities involved in the implementation and delivery of immunisation support programmes was cited as an important factor to promoting success in some programmes. For example, cooperation and communication between schools and day cares in offering a programme40 41 and among government departments, research networks and the media42–46 may promote programme success. In one programme,47 participants obtained prescriptions for a vaccine which were often lost. This programme used a direct transfer between clinician and pharmacy to reduce the likelihood of vaccine prescriptions becoming lost and promoting programme completion from education to vaccination.48

Providing convenience in programme participation facilitated the success of some programmes46; for example, through the availability of on-site (ie, drop-in), free vaccine clinics47 (ES1, personal communication) in convenient locations (eg, workplace, pharmacies and schools).14 40 42 48 Similarly, vaccine support programmes that are provided in a timely manner without requiring effort from the participant may promote participation.49 In a programme that used the mail for communication, providing pre-stamped, pre-addressed return envelopes to receive appropriate vaccine-related support (eg, pamphlets) increased programme participation.50 Finally, programmes that do not require a large time commitment from both those delivering the programme and participants may be more successful in their objectives.51

Online participation in some programmes (via mobile application) was credited as a facilitator to programme implementation and delivery due to ease of accessibility52 and ability to connect asynchronously in real-world settings.53 In one case, a programme was provided through a mobile application that had an existing large number of users.54

Finally, a peer support or coaching model can also be used to empower participants to make evidence-based and informed decisions about immunisation.55 Peer volunteers provide an opportunity to connect with participants; this multicomponent intervention may have facilitated the success of the programme.

### Barriers to programme implementation and/or delivery

Multiple barriers to the implementation and delivery of programmes were reported. While the positive behaviour of nurses and teachers involved in the delivery of a programme can facilitate the success of a programme,32 33 negative attitudes and perceptions may pose a barrier.56 Moreover, inadequate vaccine literacy in those delivering the programme may hinder success of communicating the benefits of vaccination.42 Pre-existing negative perceptions and lack of understanding about the importance

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**Table 1 Continued**

**Characteristics of immunisation support programmes**

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<th>Programme barriers</th>
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<tr>
<td>► Negative attitudes of programme delivery team personnel.</td>
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<td>► Inadequate vaccine literacy of delivery team personnel.</td>
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<td>► Limited programme resources (eg, personnel, cost and supply).</td>
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<td>► Logistical issues (eg, communication barriers).</td>
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<td>► Public health restrictions associated with pandemics.</td>
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<td>► Polarising political landscapes amplified by antivaccine sentiments.</td>
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<td>► Variations in digital literacy and access to technology.</td>
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<td>► Functional limitations and low socioeconomic status of participants.</td>
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<td>► Lack of equity, diversity and inclusion considerations.</td>
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HPV, human papillomavirus.
of vaccines (eg, HPV and influenza) in those delivering programmes may have prevented some individuals from choosing to engage with programmes.38 46

Limitations on programme resources (eg, personnel, cost and supply) and logistical issues (eg, collaboration with schools) were noted as a significant barrier in some programmes.44 45 47 58 One programme noted the necessity of organising personnel delivering the programme (ie, public health nurses) into permanent teams throughout the duration of the programme.58

Barriers posed by public health restrictions in previous pandemics (ie, COVID-19 and H1N1) may have inadvertently prevented participants from receiving support and immunisation against other vaccine preventable diseases.14 46 Moreover, prevalence of disease during pandemics (ie, COVID-19) prevented the successful deployment of in-person programmes and required a shift to smaller scale programming delivered virtually.15

Polarising political landscapes, amplified by antivaccine and antimandate sentiments, posed a barrier to the successful and safe delivery of at least two programmes13 (ES6, personal communication). Persuading individuals who are vaccine hesitant to participate in a programme about immunisation, particularly in areas with high levels of hesitancy, is a challenge for programmes.59 Finally, variation in participants’ digital literacy and technology readiness was a significant barrier associated with programmes that are offered through mobile applications.47

Severe individual functional limitations and low socioeconomic status38 48 60 including the cost of vaccines and lack of insurance coverage,61 54 61 are a barrier to programme delivery. In one programme, identifying street youth in need of vaccination was difficult due to the nature of their housing and activities.48 A significant barrier associated with the use of programmes offered through a mobile application is variation55 in participants’ digital literacy and technology readiness.53

Differences in how programmes are delivered across settings, particularly those with different socioeconomic statuses or languages (eg, English and French school boards), can impact successful programme delivery.35 36 One programme noted the exclusion of non-English speakers and lack of culturally appropriate and population-targeted (eg, by age) materials, which impacted participation.62 Insufficient planning and privacy concerns may also pose a barrier to the implementation and delivery of a programme.63

**DISCUSSION**

This review aimed to explore the characteristics of immunisation support programmes in Canada, including the facilitators and barriers to their implementation and delivery. A total of 50 articles were identified through the search strategies. Most immunisation support programmes were based in ON (n=12) and QC (n=11). No programmes were identified in the Northern Territories, and only one was delivered in First Nations communities. Programmes were primarily delivered in the school setting (n=12) and within the community (n=12).

Programmes identified through the published literature (ie, academic database) predominantly focused on the HPV (n=8) and influenza (n=6) vaccines; in contrast, programmes identified in the unpublished literature focused on the COVID-19 vaccine (n=10). This observation is likely due to delays associated with publication in academic journals.64 Over half of the programmes in this review (n=27) provided services in person, followed by a combined approach of online and in person (n=11). Only four programmes were exclusively delivered online. Most programmes (n=8) in the unpublished literature were provided through a combined approach of online and in person, likely owing to challenges associated with public health restrictions experienced during the pandemic.

Programmes identified through this review were heterogeneous in their characteristics and delivery models; however, most programmes operated with the goal of improving vaccine confidence and/or uptake. These differences may indicate an emphasis on the support needs of specific populations across settings and contexts. Most programmes targeted children and their caregivers, including pregnant persons, largely through school-based programmes and postnatal interventions; these programmes primarily aimed to improve universality in vaccination against specific diseases (eg, HPV). Despite the focus of many programmes on specific populations, 30% (n=15) of programmes broadly targeted members of the general public. Delivering an effective immunisation support intervention requires consideration of the specific needs and challenges of cohorts within the population.14 For example, an individual’s functional limitations, digital literacy, language requirements and low socioeconomic status can impact the participation of targeted populations in immunisation support programmes.35 58 Communication that is unclear or irrelevant may be a contributing factor to misinformation about vaccines,66 necessitating targeted interventions.17

All of the observed programmes provided informational support, some of which included navigational support to health-related services and programmes. Previous research has noted the influence of systemic barriers on low vaccine uptake due to siloed services and inadequate organisation (eg, supply).65 The provision of navigational support may offer an additional component to programmes to increase access to immunisation.20

From the total programmes (n=50), only 11 explicitly reported the provision of structural support within their delivery models, including participant transportation and vaccine clinics. The provision of structural support may be an important facet in reducing structural barriers to immunisation for some populations. Structural barriers are obstacles that disproportionately affect specific populations, including transportation, language, obtaining time off for appointments, access to technology and childcare.68 For example, inconvenient and limited clinic hours may be a barrier for caregivers of young children.
Future immunisation support programmes must strategically target underimmunised groups; provide education on best practices to health professionals; distribute clear and comprehensive information; educate the general public through tailored communication; and collaborate vertically and horizontally across jurisdictions.

Strengths and limitations
A strength of this study is that it attempted to map the characteristics of immunisation support programmes from a wide range of vaccine types, contexts and settings. This may also be a limitation of the study, as determining appropriate characteristics of programmes for specific settings and populations may be difficult from a wide lens. Significant efforts were made to cast a wide net to identify relevant programmes using scoping review and environmental scanning methods; however, it is likely that not every programme was identified through our search strategy. For example, we limited our inclusion criteria to papers published in English, which may have led to the exclusion of relevant papers in other languages (eg, programmes in QC). This language limitation will impact the generalisability of our findings. It is almost certain that relevant immunisation support programmes were not identified through our search strategy, which relied on publicly available information on the internet and through web-based communication. Our inability to identify all past and ongoing programmes may be due to a lack of widely accessible information provided by programme leads. For example, two of the programmes identified in this review derived from the environmental scan were publicly available information not available on the internet. Publication of information about immunisation support programmes, through academic and non-academic channels, would increase transparency and knowledge and would have been of value to the current review.

We attempted to be inclusive of articles and unpublished sources that identified programmes or interventions that fit our eligibility criteria, but some articles did not provide sufficient information about programmes to determine eligibility. For example, details about unpublished programmes were obtained through internet searches on government and organisational websites and direct queries with stakeholders; some of these searches resulted in fewer details about programmes than those published in academic articles (eg, recruitment process; number of participants; delivery model). Moreover, algorithms in unpublished databases (eg, Google) may have resulted in an overemphasis on COVID-19 vaccine programmes over other disease types due to changes in the way that technology companies are combating misinformation. The environmental scan involved contacting key stakeholders from regional health authorities across the Canadian provinces and territories. It is possible that additional programmes may have been identified by contacting non-governmental health organisations (eg, community non-profits).
Implications and future research

This is the first study, to our knowledge, that has attempted to map the typical structure and characteristics of immunisation support programmes/interventions, including facilitators and barriers to their delivery. Findings from this review were used to develop a province-wide immunisation support programme in PEI related to the COVID-19 vaccine. The Island Vaccine Support Program aims to provide informational, emotional and structural support to families with young children, with the goal of improving COVID-19 vaccine literacy. The present review provides an overview of immunisation support programmes across a wide range of vaccine types, settings and contexts; these findings may be useful to inform current and future programmes that aim to facilitate dialogue with Canadians about immunisation.

Programmes were included in this review if the delivery model included an opportunity for bidirectional communication and/or provided a multicomponent intervention (eg, webinar and peer support); therefore, programmes that provided one-way messaging to Canadians (eg, through media campaigns) were not included in this review. Our interest was limited to programmes that opened dialogue directly with participants about immunisation in an ongoing manner. It is possible that some programmes and/or interventions were excluded from the review due to lack of clarity regarding the nature of information dissemination. For example, social media-based interventions may have resulted in meaningful dialogue about immunisations beyond the publication of information, through communication on posts or direct messaging. Text messaging and website portals may impact vaccine confidence and uptake; however, research in this area is very limited.

Future research is needed to assess the reach and impact of social media, employing evidence-based communication, on vaccine confidence, particularly in younger generations. Moreover, a study of the characteristics and structure of social media-based campaigns related to immunisation is needed.

Indigenous peoples experience a disproportionate risk of severe outcomes associated with disease (eg, COVID-19) and significant socioeconomic marginalisation. Vaccine hesitancy within this population may be attributed to Canadian colonial policy, particularly in healthcare, which has resulted in mistrust. Low COVID-19 immunisation rates of Indigenous peoples in Canada and suggest the importance of in-depth, culturally appropriate programming to meet the support needs of this population. However, few programmes identified in this review targeted Indigenous peoples (n=3, 6%), despite a call to action to the Canadian government in 2012. Future programming must consider using a multicomponent intervention approach, developed in collaboration with and under the guidance of Indigenous peoples, to improve vaccine confidence in this population. This study broadly investigated programmes that target multiple audiences, with wide participant inclusion (eg, general public) and more narrow populations (eg, racialised persons living in a specific geographical location). Future research might consider examining similarities and differences in programmes that engage individuals about immunisation by target population and/or setting (eg, urban and rural). For example, previous research has noted inequities in current immunisation programmes for some populations, including immigrants.

Finally, this scoping review provided a mapping of immunisation support programmes in Canada that aim to increase vaccine uptake and/or confidence. While outside of the scope of this review, the effectiveness of such programmes on these outcomes may be warranted. For example, future research might include the completion of systematic reviews of immunisation support programmes in Canada and beyond on vaccine uptake, vaccine confidence and vaccine literacy.

CONCLUSIONS

Ensuring equitable access to evidence-based information about immunisation requires careful consideration of the support needs of all Canadians. This review highlighted the characteristics of immunisation support programmes delivered across Canadian settings and mapped the facilitators and barriers to their implementation and delivery. It is encouraging that this review identified many programmes aimed at disseminating evidence-based information about immunisation through dialogue-based formats; however, important gaps were also identified. The results from this review call for more empirical research focused on interventions supporting marginalised groups, particularly Indigenous peoples. While it is likely that such programmes may exist and have been missed by this review, we call on those running immunisation support programmes to publish information through academic and/or non-academic channels to improve scientific discourse and information sharing. Future work is needed to determine the impact that programme characteristics identified in this review may have on programme effectiveness. Using multiple modalities (eg, in person and social media) to engage Canadians, for example, may impact effectiveness of interventions in certain populations. Researchers, clinicians and decision-makers must invest resources to appropriately engage and support Canadians about immunisation to improve health outcomes.

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article screening) and gave final approval for the version to be submitted for consideration. BMJ critically revised the important intellectual content (i.e., developed and piloted the data extraction tool) and gave final approval for the version to be submitted for consideration.

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