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"I try to take all the time needed, even if i do not have it!": Knowledge, attitudes, practices of perinatal care providers in canada about vaccination

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ABSTRACT

Objective: Successful clinical conversations about vaccination in pregnancy (pertussis, COVID-19, and influenza) are key to improving low uptake rates of both vaccination in pregnancy and infancy. The purpose of this study was to understand Canadian perinatal care providers' knowledge, attitudes, and practices around vaccination in pregnancy.

Methods: Qualitative interviews with 49 perinatal care providers (nurse practitioner, general practitioner, registered nurse, registered midwife, obstetrician-gynecologist, and family physicians) in 6 of 13 provinces and territories were deductively coded using directed content analysis [1] and analyzed according to key themes.

Results: Participants detailed their professional training and experiences, patient community demographics, knowledge of vaccines, views and beliefs about vaccination in pregnancy, and attitudes about vaccine counselling. Providers generally described having a good range of information sources to keep vaccine knowledge up to date. Some providers lacked the necessary logistical setups to administer vaccines within their practice. Responses suggest diverging approaches to vaccine counselling. With merely hesitant patients, some opted to dig in and have more in-depth discussions, while others felt the likelihood of persuading an outright vaccine-refusing patient to vaccinate was too low to be worthwhile.

Conclusion: Provider knowledge, attitudes, and practices around vaccination varied by professional background. To support perinatal providers' knowledge and practices, clinical guidelines should detail the importance of vaccination relative to other care priorities, emphasize the positive impact of engaging hesitant patients in vaccine counselling.

1. Introduction

Canadian guidelines recommend vaccinations to protect against pertussis (whooping cough) (Tdap vaccine) and influenza for every pregnancy, to reduce both the parent's and infant's risk of disease. [2] More recently, COVID-19 and RSV vaccination is also recommended in pregnancy. [3–4] New vaccines to be administered during pregnancy, including for CMV and GBS, are in development and may be recommended in the future. [5–7] Uptake of vaccination in pregnancy remains low, relative to that of children and the elderly, [8] despite influenza and COVID-19 posing disproportionate risks to pregnant people, and pertussis carrying a risk of infant hospitalization and death. [9].

Expecting parents often have concerns about the importance and safety of pregnancy vaccination. Furthermore, pregnancy is a time when parents are solidifying attitudes on vaccination in general, [10] and vaccination during pregnancy is associated with higher infant vaccine uptake. [11] The term hesitant refers to parents who have significant concerns but vaccinate their child, while refusing refers to those who

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reject some or all vaccines. [12] Many parents are unaware of recommended pregnancy vaccines, and rely on healthcare providers for this information. A confident recommendation from a trusted healthcare provider is the most well-established determinant of vaccine uptake in pregnancy. [13–16]

Perinatal care providers' abilities to administer vaccines and provide vaccine counselling may vary, since they work in a wide variety of practice settings, models of care, and with differing professional training. [17–20] Providers' own vaccination status and knowledge of vaccines are known determinants of their intentions to recommend vaccination, which influences patient uptake. [13,21–22] Some perinatal professions are involved in vaccine advice and administration, while others may be more likely to refer questions about vaccines to another provider. Understanding how perinatal providers are oriented toward vaccination, and their past experiences and training, provides an opportunity to examine how uptake might be improved. The purpose of this study was to understand Canadian perinatal care providers' knowledge, attitudes, and practices around vaccination in pregnancy and childhood. At the time interviews were conducted, June 2018 to July 2019, Tdap vaccination in pregnancy was a relatively new recommendation. Questioning addressed both childhood and pregnancy vaccines.

2. Methods

2.1. Setting and Recruitment

Recruitment aimed to capture a broad variety of perinatal provider perspectives, including years of practice, diversity of profession, and practice setting. We recruited participants from 6 provinces out of a total 13 Canadian provinces and territories (British Columbia, Alberta, Manitoba, Ontario, Quebec and Nova Scotia), according to the following eligibility requirements: nurse practitioner, general practitioner, registered nurse, registered midwife, obstetrician-gynecologist, or family physician, currently providing care to pregnant people in one of the 6 provinces. As of 2019, the population of these 6 provinces combined was nearly 35 million, representing over 90% of the total population of Canada. We identified lists of potential participants in each province with the assistance of discipline- and province-specific collaborators.

Invitations were sent via email or ground mail (in French in Quebec and English in the other 5 provinces) on a rolling basis to collect a maximally diverse sample with regard to clinical discipline, practice setting (urban/suburban/rural), province, and population served, including the general population, patients at high and low medical risk, Indigenous patients, and patients of low socioeconomic status. Quebec is a majority French-language speaking province, while English is the language of majority in the other 5 provinces. Participants provided online consent, and eligibility criteria were reviewed before the interview to confirm eligibility. Recruitment ended when no new themes were being identified, and we were no longer adding meaningful diversity to the study population. Acceptance rate was not tracked. All participants provided informed consent.

2.2. Data collection

We conducted 30–60-minute telephone or in-person interviews with 49 perinatal care providers from June 2018 to July 2019 in English or French (depending on participant preference). Participants completed a demographic questionnaire online in response to the study invitation, before the interview was scheduled or at the time of the interview. A semi-structured interview guide developed based on a literature review, covered the participants' professional training and experiences, patient community demographics, knowledge of vaccines, views and beliefs about vaccination in pregnancy, and attitudes about vaccine counselling. Interviews were audio recorded, transcribed, and de-identified to protect participant privacy. Participants were invited to review their own transcripts for accuracy.

2.3. Data analysis

Interviews were deductively coded using directed content analysis [23] by a research assistant with training in qualitative methodology to identify passages relevant to the research question. WP and DG reviewed the coding and collated passages involving key themes relating to provider knowledge, attitudes and practices about vaccination. The study team met to discuss patterns identified in the codes, grouped statements into themes to relay participants' knowledge and experiences as they relate to vaccination in pregnancy, and discussed any major themes not captured by the existing codebook. Interview transcripts and collected documents were managed and coded in NVivo software (QSR International).

2.4. Ethics approval

This study received approval from the research ethics boards of the IWK Health Centre (1023724), the Centre de recherche du Centre hospitalier universitaire de Québec-Université Laval (2018–4019), University of Alberta (Pro00083629), University of Calgary (REB18-1855) and the University of British Columbia (H17-02263).

3. Results

We interviewed 49 participants from six provinces, with a diverse range of education, expertise, and community setting (see Table 1).

3.1. Knowledge

Participants described actively updating their vaccination knowledge using peer-to-peer knowledge exchange, referring to published

Table 1
Participant Characteristics.

	Total N = 49 (%)
Province	
British Columbia	13 (27)
Alberta	5 (10)
Manitoba	7 (14)
Ontario	8 (16)
Quebec	11 (23)
Nova Scotia	5 (10)
Practice area type	
Major metropolitan area	7 (14)
Large urban center	24 (49)
Medium town (30 000 to < 100 000 inhabitants)	3 (6)
Small town (1000 to < 30 000 inhabitants)	11 (23)
Rural (< 1000 inhabitants)	4 (8)
Clinical discipline	
Family doctor/general practitioner	15 (31)
Registered Midwife	13 (27)
Obstetrician Gynecologist	11 (22)
Other type of Nurse	8 (16)
Nurse Practitioner	2 (4)
Years of experience	
<10	18 (37)
10-19	19 (39)
20-29	6 (12)
30-39	3 (6)
≥40	2 (4)
Opted to skip the question	1 (2)
Number of pregnant patients at interview time	
<20	2 (4)
20-49	12 (24)
50-99	6 (12)
≥100	16 (33)
Opted to skip the question	13 (27)

public health resources, and sometimes seeking out scientific conferences or articles. They also emphasized the importance of both medical training on immunization and continuing education opportunities for developing and maintaining that knowledge.

3.1.1. HCP colleagues

Participants discussed receiving and sharing information with colleagues via a broad array of networks and tools, including Twitter, listservs, clinical rounds, journal clubs, UpToDate, and local health authority bulletins. Some knowledge exchange activities took place in-person within the practice such as one perinatal nurse working in Manitoba, who participated in monthly "lunch and learns," and discussed any new updates or bulletins from the local health authority during the group "morning huddle." As a family doctor in British Columbia described, exchanges with colleagues could also take place via online multidisciplinary forums. "I'm also part of the [online] Maternity Care Discussion Group, which is put out by [local doctor], and that's also an excellent forum [….] where a bunch of professionals are getting together and discussing current issues, and then will post a paper or discuss it further." Others, such as those who were not affiliated with academic institutions, reported feeling more isolated.

3.1.1. Public health information

Public health information and resources published by local and federal public health were also key to knowledge seeking and sharing. For referring patients to vaccine information, pregnancyinfo.ca, Healthy Families BC, and other patient-facing resources written in accessible language were cited as helpful tools. As an obstetrician gynecologist from Manitoba explained, "I usually recommend Pregnancyinfo.ca by SOGC [Society of Obstetricians and Gynecologists of Canada], [and say], 'This is the place to go. Not 'Dr. Google.'" For their own reference, providers cited resources such as the *Protocole d'immunisation du Québec* (PIQ) book, and direct emails from their local health authority, as being helpful for staying abreast of updates. Some providers noted that available materials were not sufficient, or not available in accessible lay language for sharing with patients.

3.1.1. Scientific sources

Several providers mentioned taking time to review recent scientific vaccine literature directly, either via journals, health authority-hosted resources such as Immunize BC, and academic and professional conference meetings to keep their vaccine knowledge current. "Occasionally I'll just take a look at the Society of Obstetricians and Gynecologists' website," explained a midwife practicing in Nova Scotia, "[to] see the newer issues of their journal and see what sort of new information is there." Time was a significant barrier to several participants, who felt their busy schedules prevented reviewing scientific literature. Providers who did not administer vaccines within their own practice, were less confident in their vaccination knowledge. "The public health nurse does everything, and so I do feel a little bit disconnected," explained a British Columbia-based obstetrician. Although they had been well-versed in the vaccine schedule and side effects during their residency, they now focused on making a referral instead. "I know when they're supposed to go, but I have to look it up all the time because I can't ever really remember because I don't do them in the clinic."

3.1.1. Clinical training and continuing education

Participants mentioned the importance of their clinical training, including the fact that such training now seemed to have increasingly covered vaccine and immunity, but noted that some providers received more vaccine training than others. "[Medical students] do get a couple of hours of that now…," explained a family practitioner in British Columbia, "I'm pretty sure we did not get that when I went through." Continuing education presented opportunities for providers to brush up on their knowledge. "We do the [British Columbia Centre for Disease Control] Immunization Competency program," explained a nurse practicing in rural British Columbia, "and then we are skill tested by a nurse who is certified to do that. And then we enrolled in the FNHA [First Nations Health Authority] Immunization Competency program." An Alberta nurse in a large urban centre felt they hadn't been trained enough. "My sister's a public health nurse and the amount of training she got on vaccinations was just way above and beyond what we got… Because we're [Community Health Nurses], [and] they're trying to cram a bunch of different information into us, so I'm not always as confident."

3.2. Attitudes

Participants' overall philosophies of care varied, but with regard to vaccination most stressed the importance of balancing evidence-based recommendations with respect for patients' own autonomy. The importance of taking adequate time to relay information and to incorporate wellness or lifestyle recommendations was emphasized.

3.1.1. Overall care philosophy

One family physician in British Columbia, paid particular attention to their care philosophy with patients and families whose values and beliefs about vaccination differed from the clinician's. In these cases, they explained, they would be extra mindful of not "layering on my belief system on top of everything else." A patient-centred philosophy often required a time-consuming cultivation of mutual trust with patients. "I try to make the patients comfortable, to offer a safe environment so they can trust me and confide their problems to me," explained a gynecologist based in a rural area of Quebec, "I try to take all the time needed, even if I do not have it!"

Others emphasized balancing medical interventions with wellness recommendations. A family doctor practicing in a small population centre in Alberta explained they aim to balance strict adherence to professional guidelines and protocols with a focus on "lifestyle medicine and mental health," rather than a "pills for every ill, pharmacological approach." One nurse in a large urban centre in Ontario would strictly follow guidelines and protocols for higher-risk patients (e.g. diabetes, high blood pressure). But, if the client was not high risk, then they would "let them kind of take the driver's seat and I'm in the passenger seat, and I just help guide them through, you know, their experience."

3.1.1. Past experience with Patients/Parents

Two distinct types of experiences caring for patients also shaped participant attitudes about delivering vaccine-related care; building relationships with patients over time, and past experiences counselling vaccine-hesitant parents. Developing mutual trust was key. Poverty, poor housing and intergenerational trauma all served as barriers to the patients cared for by one nurse in Manitoba who emphasized the importance of patient-provider trust. "It's also about relationship building. Rather than sort of the walk-in clinic approach where it's 'in, out, I don't really care about you,' you know?"

Where providers had past experiences with vaccine hesitant patients, building trust was also central to their approach to vaccine counselling. Some providers described using strategies along the lines of 'myth busting' of any inaccuracies at the root of parent concerns, or would aim to underscore the risks associated with not vaccinating. As an obstetrician-gynecologist practicing in a large urban centre in British Columbia explained:

> "I do talk to them about flu vaccine. [If] they're all hesitant about it. I say, 'Listen, this is—this is about protecting your baby. It's not about just protecting you. Yes, there's a component of it for you, but your child is born with no immunity. If they're exposed to the influenza, they can die.'"

Others such as one family physician in Ontario had learned over time to encourage discussion over the course of multiple visits, and establish the mutual goal of protecting the child's health, an approach they felt was having a positive impact.

3.3. Practices

HCP vaccine-promotion practices were influenced by logistics such as the characteristics of their offices and clinical practice settings, as well as the timing of contact and conversations over the course of a particular patient/client's pregnancy and postpartum, and the degree of difficulty administering vaccinations in their own office versus referring elsewhere to receive vaccines.

3.1.1. Logistics

Logistics, such as practice characteristics, and temporal factors shaped perinatal providers' experience with vaccine counselling and provision. Administering vaccines at the point of care proved challenging for some participants. Others working in multi-disciplinary clinics, for example with a dedicated nurse practitioner, were provided vaccines on-site with fewer logistical challenges. Some suggested supports for procuring and storing vaccines would facilitate on-site vaccination in their practices.

A family doctor practicing in rural Quebec explained recent budget cuts and billing policy changes had forced them to let go of a nurse to hire a secretary, making vaccine provision more challenging. Before being let go, the nurse "was in charge of promoting vaccines, ordering the vaccines, giving them and then doing the side effects follow-up. Patients could call back if they had any concern and all that." As a result of the cuts, the doctor felt "patients now are not as well served, that is sure." Time constraints during appointment times were a significant constraint to many of the providers interviewed and some indicated that if vaccination should take higher priority in their care, they would like formal confirmation of this from their respective professional bodies.

3.1.1. Vaccine counselling approach

Approaches to counselling about vaccines varied by type of practice more so than provider type. One British Columbian public health nurse, felt well-equipped to respond to any concerns that might come up during the vaccine discussion. "So typically, our way […] would be to figure out what their fear is. Is it what their friends are saying? Is it the autism piece? Is it the pain response? So, we try and navigate whatever their understanding is and whatever their fears are, and then try and provide them the information that they're seeking." An obstetrician gynecologist practicing in a large urban centre in Nova Scotia would spread out their counselling over the course of care, particularly for hesitant patients, explaining, "I often touch base with patients later in pregnancy to find out if they've had it done [….] It is something where I do kind of try to push the dialogue a little bit further if I get pushback from patients." Several participants who did not administer vaccines themselves felt less connected to the topic and would refer patients with vaccine questions to another provider, such as a public health nurse.

In contrast, one British Columbian family doctor took a more hands-off approach and wouldn't pursue longer discussions with parents refusing vaccines. "People who do not want to immunize are not going to be changed by a ten-minute visit with me." This doctor might be convinced to prioritize vaccine discussions if there were clearer guidance stating this should be weighted more strongly relative to other health concerns. "How many patients are we going to make better or save or how much impact are we going to make by immunizing? That would encourage me to immunize more—We're expected to do everything, but we can't." A registered midwife practicing in a small population centre in Manitoba took a similarly neutral approach with clients refusing vaccination. "It's their choice, whether they're going to be doing it or not. But I really try not to sway them, other than telling them the stories of the kids that are coming in with whooping cough."

3.1.1. Interprofessional relations

Participants who detailed good interprofessional relations around vaccination (e.g. successfully referring patient to another provider type for vaccination) typically had good logistical setups and conditions favouring collaboration. This was the case for one nurse in Manitoba, who described, "we have a really great system here with Manitoba Health. If we have a question about the vaccine… they are really great. And we also have a good relationship with the community health clinic down the road." Others, although routinely discussing benefits of vaccines with patients, said they did not administer vaccines because they believed this may infringe on the scope of primary care providers. "It's a delicate balance of treading in the turf of someone else's practice and trying to do the one stop shopping while they're pregnant and have some of their primary care stuff cared for here in conjunction with their prenatal care."

4. Discussion

These findings exploring perinatal care providers' knowledge, attitudes, and practices around vaccines provides an opportunity to examine how such factors may be adjusted to improve uptake. Knowledge about vaccination varied by type of provider and practice setting. Attitudes about giving vaccine advice were shaped by overall care philosophy and past clinical experiences. Participant accounts of their practice settings, counselling practices and logistical concerns also varied, with some facing more barriers than others. Overall results were generally consistent across French- and English-speaking providers, with other factors, such as training and practice setting contributing to differences.

Although strategies for vaccine counselling vary, a recommendation from a trusted provider is the single biggest factor in vaccine acceptance. [24–25] Participant responses indicate that perinatal providers vary their approach by patient, tailoring their vaccine counselling strategy according to the pregnant person's level of trust and vaccine attitudes. While most providers in the current study stressed the importance of relaying vaccine knowledge, several indicated they would not do so at the expense of building rapport. With many described a hands-off approach with patients perceived to be vaccine hesitant, it is possible some providers are less willing to offer in-depth vaccine counselling to some patients, potentially missing opportunities to address concerns with undecided or hesitant patients. Results suggest some provider types (e.g., public health nurses) receive more in-depth training than others. Many providers updated their knowledge via research and clinical updates. Lack of vaccination knowledge or confidence in vaccine counselling skills can serve as an additional barrier. [26] Similarly to previous research on vaccination during pregnancy, participants suggested a key barrier to vaccination in pregnancy is practice logistics. High costs also prevented some providers from vaccinating in clinic. Results suggest it may be beneficial to address logistical barriers to vaccine administration in perinatal care settings to reduce the likelihood of losing patients to follow-up and increase vaccine uptake.

Previous research on childhood vaccination demonstrates that answering questions without condescension, and demonstrating enthusiasm and good knowledge about vaccination can have a positive impact on parents' decision-making process. [12,27–28] Gagneur et al. have demonstrated perinatal vaccine counselling outcomes improve when providers establish a common goal with parents (e.g., safeguarding baby's health), avoid coercion and the urge to correct misinformation, ask open-ended questions to explore client values and reasons behind hesitancy, and ask permission first before clarifying inaccuracies, offering more information, or giving a different perspective. [29] Having a good working knowledge of herd immunity (e.g. the change in risk if many people opt out of vaccination), as well as the relative individual risks of vaccinating versus those associated with contracting vaccine preventable diseases can help address client concerns. For merely hesitant, rather than refusing patients, personal stories, anecdotes and illustrative examples are particularly powerful tools in addressing uncertainty about vaccines. [30] Parents are particularly motivated when vaccination is framed as protecting the fetus. [29,31].

3.1.1. Strengths and limitations

This study applied rigorous qualitative methods to a diverse sample of Canadian perinatal health professionals. Study credibility was enhanced by participant transcript review, discussion and debriefing among the study team, and use of quotes to exemplify the raw data (participants' own words). [32] Validity of the analysis was tested through triangulation of multiple data sources (interviews with different informant types) multiple investigators within the study team, and methods (directed content analysis). [33]

Given the researchers' affiliations with vaccine research, social desirability bias may have caused some participants to portray themselves or their professions as different—for example, more evidence-based—than what is actually enacted in day-to-day practice. For data collected in French it is possible that subtle differences were lost in translation. Results may have limited applicability to different health jurisdictions, or to populations facing specific barriers, such as remote Indigenous communities. Finally, as data collection ended in 2019, this data does not capture changes to vaccine knowledge, attitudes, and practices that came about as a result of COVID-19 or related events.

5. Conclusion

Canadian perinatal care providers detailed a range of knowledge, attitudes and practices pertaining to vaccination. These qualitative interview findings suggest while providers generally demonstrated a good working knowledge of vaccination, differences in attitude and approach to vaccine counselling, largely contingent on type of practice setting (e.g., working in a clinic set up to vaccinate in-house) impacted the extent to which providers discussed vaccination with patients.

To support perinatal providers' knowledge and practices, clinical guidelines should detail the importance of vaccination relative to other care priorities. Providers may need additional support and time to implement evidence-based strategies for engaging hesitant patients in vaccine counselling. Results are applicable to maternal RSV vaccination. As the number of vaccines recommended in pregnancy has increased, providers may face additional challenges in affording sufficient time to address patient concerns. To best reach providers, knowledge translation is needed to implement guidelines into practice. Policies should include supports in place for providers facing logistical challenges to administering vaccines in house.

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CRediT authorship contribution statement

Wendy Pringle: Data curation, Formal analysis, Project administration, Visualization, Writing – original draft. **Devon Greyson:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Supervision, Writing – review & editing. **Janice E. Graham:** Conceptualization, Data curation, Funding acquisition, Methodology, Writing – review & editing. **Ève Dubé:** Conceptualization, Data curation, Funding acquisition, Methodology, Writing – review & editing. **Hana Mitchell:** Data curation, Formal analysis, Writing – review & editing. **Margaret L. Russell:** Data curation, Funding acquisition, Writing – review & editing. **Shannon E. MacDonald:** Conceptualization, Data curation, Funding acquisition, Writing – review & editing. **Julie A. Bettinger:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Methodology, Project administration, Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

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