The impact of Canada's fragmented healthcare model on pertussis vaccination in pregnancy: a qualitative study of perinatal healthcare providers

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Abstract:	BACKGROUND: Vaccination against pertussis during pregnancy has the potential to substantially reduce disease in infants. In 2018, the Canadian National Advisory Committee on Immunization recommended a single dose of tetanus toxoid, reduced diphtheria toxoid and reduced acellular pertussis (Tdap) vaccine for every pregnancy. Because healthcare provider (HCP) recommendation is a well-established determinant of vaccine acceptance and uptake, we examined the influences on Canadian perinatal HCPs' abilities to recommend and provide antenatal Tdap vaccine, with a goal of informing an equitable, comprehensive pregnancy vaccination program. METHODS: We conducted semi-structured, individual phone interviews with 44 perinatal HCPs (12 midwives, 9 nurses, 13 family physicians, 10 obstetricians) from 5 provinces, representing diverse educational experiences, practice settings, and models of care. We interpreted these data using qualitative thematic analysis, informed by interpretive description.

	RESULTS: The ability of HCPs to recommend and provide antenatal Tdap vaccine was strongly influenced by structural constraints in the fractured Canadian perinatal healthcare system. Clinical training of HCPs varied resulting in different knowledge and practices. HCPs felt hindered by a lack of lay information resources. Consistent and convenient vaccine access was perceived to be key to promoting confidence and encouraging uptake, yet Tdap vaccine was not easily accessible for all women. INTERPRETATION: Our findings suggest that Canada's fragmented healthcare model has a detrimental effect on HCPs' ability to recommend and ensure access to antenatal Tdap vaccine. Lessons from this study of pertussis vaccine are pertinent to the implementation of successful pertussis vaccine programs and future pregnancy vaccination initiatives.

The impact of Canada's fragmented healthcare model on pertussis vaccination in pregnancy: a qualitative study of perinatal healthcare providers

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Declaration of author(s) competing interests:

Authors declare no competing interests.

INTRODUCTION

Endemic pertussis contributes considerably to childhood morbidity and mortality in Canada, particularly among infants under 4 months of age (1,2). A single dose of tetanus toxoid, reduced diphtheria toxoid and reduced acellular pertussis (Tdap) vaccine during pregnancy boosts maternal pertussis antibodies and provides passive protection for newborn infants until they are old enough to receive pertussis vaccine (3). In early 2018 the National Advisory Committee on Immunization (NACI) and the Canadian Society of Obstetricians and Gynecologists (SOGC) recommended Tdap in every pregnancy between 21 and 32 weeks gestation (2,4). As of November 2019, the vaccine is publicly funded for every pregnancy in all Canadian provinces and territories except for British Columbia and Ontario (5). Tdap is the second pregnancy vaccine to be routinely recommended in Canada since the recommendation of influenza vaccine in 2007. New pregnancy vaccines are under development and may become routinely recommended in the future (6).

Healthcare provider (HCP) recommendation is a well-established determinant of pregnancy vaccine acceptance and uptake (7–11). Canadian family physicians, midwives, nurses, and obstetricians all provide and frequently share care of pregnant women. Given the diversity of educational experiences, practice settings, and models of care among the perinatal HCP workforce, the ability to recommend and provide pregnancy vaccines may vary (12–14). Barriers to recommending and providing antenatal Tdap in clinical settings must be identified and addressed (7,8). Studies from other high-income countries with universal antenatal Tdap programs have focused primarily on the determinants of vaccine uptake from the perspectives of pregnant women (15–19). We conducted a qualitative study among a diverse sample of Canadian perinatal providers to understand the influences on HCPs' abilities to recommend and

provide antenatal Tdap vaccine. This information can help create an equitable, comprehensive pregnancy vaccination program and close the gap between a national-level vaccine recommendation and clinical practice.

METHODS

Purposive sampling was used to select family physicians, midwives, nurses, and obstetricians currently providing perinatal care in British Columbia (BC), Manitoba (MB), Nova Scotia (NS), Ontario (ON), or Quebec (QC). Sampling ensured a diversity of practice settings, including HCPs working with patients (commonly referred to in midwifery care as clients) who may have difficulties accessing perinatal care due to living in rural and remote communities, low socioeconomic status, substance use, and language barriers. HCPs were identified and recruited by telephone, email, mail, or direct contact and through professional networks. Recruitment ended when one or more HCP from each discipline in each province were interviewed and no new major themes were identified through the interviews.

The study team developed the interview guide (Appendix 1) and pilot-tested it with HCPs who were not study participants. Each interview explored the HCP's training and clinical practice setting, how they learned about and implemented vaccine-related guidelines, experience recommending and providing vaccines in pregnancy, and approaches taken with patients who had hesitations about vaccines. In keeping with the qualitative principle of emergent design (20), our approach was iterative in nature, with coding beginning before all data were collected. This permitted adjustment of questions and verification of findings emerging from early data collection in subsequent interviews.

Ethics Approval

This study received approval from the Research Ethics Boards of all co-authors. All participants provided informed consent.

Data Collection

Semi-structured telephone or in-person interviews were conducted from June 2018 to July 2019 in English or French (depending on participant's preference). Each interview lasted approximately 30 minutes and was conducted by a female graduate or post-graduate qualitative health researcher. Interviews were audio recorded and transcribed in their original languages. Participants were invited to review final, de-identified transcripts for accuracy.

Data Analysis

Data analysis was a two-stage deductive, then inductive, process. First, a standardized deductive codebook, developed by the research team for use in multiple vaccine confidence studies, was applied. Transcripts were deductively coded in their original languages using NVivo Software (QSR International). Factors affecting HCPs ability to recommend and provide Tdap vaccine were organized into patient, provider, and health-system level categories, similar to the categories applied in previous studies examining barriers and facilitators to pregnancy vaccine uptake (9,11). This content was then subjected to an iterative process of inductive coding and theme development by the entire research team, informed by interpretive description—a qualitative analytic approach that uses inductive analysis to provide novel, clinically applicable insights (21).

RESULTS

We sent 212 study invites and received replies from 58 HCPs (52 consented, 6 declined). Among the 52 HCPs who consented, 2 were not eligible because they did not provide prenatal care and 6 were not available for an interview. We interviewed 44 eligible HCPs practicing in a variety of settings (Table 1).

Participants described a trusting relationship between an individual provider and their pregnant patient to be the foundation for vaccine discussions. However, HCPs' abilities to consistently recommend and provide Tdap were shaped by healthcare system factors that were often beyond their control, including clinical training opportunities, availability of appropriate information for patients, and patient access to vaccination (Figure 1).

Patient-Provider Relationship

HCPs observed their patients were usually not aware of the new Tdap recommendation. Acceptance of Tdap vaccine was strongly influenced by HCP's recommendation and by their patients' trust in this opinion:

> "*They're not just trusting the science, they're trusting the person delivering the science.*"
>
> (Family physician, urban center, BC)

Physicians and nurses reported leveraging their rapport to make an unequivocal recommendation in support of Tdap; however, midwives' approaches to vaccine counseling varied. Some midwives described recommending Tdap and following up on their client's vaccination status through subsequent visits. Other said expressing a personal opinion or making a recommendation in favor of vaccine would compromise the principle of informed choice upon which the client-midwife relationship is based. They saw their role as informing women about the Tdap vaccine and then directing them to public health or physicians for further advice. Finally, some midwives believed vaccine counseling was not part of their professional role.

Clinical Training

While all study participants were aware of the Tdap recommendation, their practice setting appeared to influence both vaccine knowledge acquisition and ability to consistently incorporate vaccine recommendation into clinical work. HCPs' descriptions of how they learned about and implemented the Tdap vaccine recommendation in their practice illustrated that the NACI/SOGC recommendation was not disseminated via coordinated HCP training. Providers who drew upon their existing experience providing childhood or other pregnancy vaccines (e.g., nurses or family physicians) often felt well prepared to recommend and provide Tdap. Several rural family physicians and midwives, working in jurisdictions where all vaccines were delivered through public health programs, described feeling inadequately prepared to discuss Tdap. With multiple, competing priorities for continuing medical education, vaccine-related training was perceived as less directly relevant to their clinical practice.

When asked for suggestions about vaccine continuing education, providers agreed such training should be succinct, equipping them with patient-directed information and practical suggestions on how to best communicate the information in their practice settings. This included rationale for the new vaccine recommendation, risk of infant pertussis, vaccine effectiveness, approaches to talking to vaccine hesitant patients, and in some cases, clarification about vaccine funding and access. Some HCPs valued interactive training sessions that facilitated discussion, as described by a midwife who attended a talk on Tdap and consistently recommended the vaccine in her practice:

> *" [I] think part of the value of it was that all of us [midwives] were together. . . [I]t is useful to hear what your peers and colleagues think and have the opportunity to ask questions."* (Midwife, NS)

Many HCPs also emphasized the importance of being linked with academic institutions, and of sharing vaccine updates or questions with colleagues through practice group meetings, academic rounds or online forums.

Lay Information Resources

HCPs said information resources for patients and their families were an important part of the vaccine discussion and were hindered by a lack of appropriate, widely-available resources for pregnant women. Participants reported that standardized paper and online resources, similar to those for childhood vaccines, would enable patients to verify information outside of the clinic visit and help validate HCPs' recommendations:

> *[H]aving something that . . . provides [patients] with the information they care about, like "Why now, Canada? And what are the risks, what do we know safety-wise, and what*

> *are the expected benefits?" would just help. . . . [I]t's not that I'm going to not say those things, but it's good for me to say them and then have them take a small part home. (Obstetrician, urban center, ON)*

Vaccine Access

Participants believed convenient access to publicly funded vaccines was essential to enable vaccine uptake. In an ideal scenario, a HCP's vaccine recommendation would be followed by offering the vaccine immediately at the point-of-care, especially for patients who had difficulties navigating multiple medical appointments:

> *[I]f I told them [patients] to go somewhere else, they would never go. They don't even show up to most of their appointments with me. So if we don't do something at the moment that we have that window, it doesn't get done with people who don't have a car and don't have a license and if they're using substances, they may not be able to keep good track of time.* (Family physician, urban center, MB)

HCPs with a vaccine fridge were able to vaccinate at the point-of-care. HCPs who did not vaccinate were oftentimes frustrated when vaccine was not readily available through public health clinics or pharmacies. Some felt the national recommendation for Tdap was made before ensuring "adequate infrastructure was in place to provide it" (Obstetrician, urban center, QC). HCPs, including but not limited to midwives, pointed out vaccinating was not within midwives' scope of practice in ON and QC. Some wondered whether this may have a negative impact on vaccine uptake among midwifery clients.

Finally, HCPs in BC and ON were concerned that a lack of public funding for the vaccine contributed to inequitable vaccine access for marginalized women. One HCP reported not discussing Tdap at all because they thought recommending the vaccine put undue pressure on women without financial means to afford it. Additionally, lack of public funding resulted in providers having to counter patients' perceptions that antenatal Tdap was less important or less safe than publicly funded vaccines.

INTERPRETATION

Major influences on HCPs' abilities to provide and recommend antenatal Tdap vaccine identified through our study included appropriate clinical training, lay information resources, and vaccine access for patients. Numerous barriers to implementing the NACI/SOGC Tdap recommendation highlighted by participating HCPs suggest that Canada's fragmented healthcare model is having a detrimental effect on perinatal HCP's ability to recommend and provide Tdap vaccine and ensure universal access in pregnancy. A structured approach to delivery of vaccination programs is important to achieve high and inclusive vaccine uptake and close the gap between national vaccine recommendations and clinical practice (8,22,23). In a Canadian context, this means implementing a coordinated, overarching nationwide pertussis vaccination program, ensuring that vaccine is publicly funded and easily accessible for all pregnant women, regardless of in which province/territory they receive prenatal care, and that all perinatal providers are appropriately supported, trained and feel confident recommending it.

Study participants confirmed that pregnant women value a confident vaccine recommendation by a trusted provider. A Canadian survey conducted before the NACI/SOGC recommendation of antenatal

Tdap concluded a national recommendation to receive pertussis vaccine supported by physician's recommendation would be well received by pregnant women (24). Given that it is common for patients to seek to triangulate non-emergency health information (25), widely available lay information resources for pregnant women may serve to reinforce the trust in and acceptance of HCPs' recommendations. Routine vaccine recommendation and provision by midwives may improve pregnancy vaccine access and uptake (26,27). Our study highlights that midwives' perceived role in vaccinating varies, and may depend on individual midwife's interpretation of informed choice and vaccine-related training they have received (27,28). The fact that provision of pregnancy vaccines is currently not within the midwives' scope of practice in all provinces may also contribute to this.

HCPs need current, consistent and reliable vaccine knowledge and access to concise training updates, as well as confidence in their communication skills and the time and ability to incorporate vaccine discussions into regular practice to be adequately prepared to recommend and provide vaccines (29). Coordinated clinical training around antenatal Tdap for Canadian perinatal providers would ensure all HCPs have access to the same information and resources, improve vaccine communication skills, and provide a chance for interdisciplinary collaboration. As suggested by study participants, such training should be succinct, practice-focused, and interactive. Linking vaccine updates with other educational activities could increase appeal to HCPs with multiple competing priorities. This coordinated training could also be implemented with any other future new vaccine recommendations.

Tdap vaccine is currently not accessible to all pregnant women in Canada. Vaccinating at point-of-care facilitates vaccine access, but may not be realistic in all practice settings, as observed previously in Quebec (13). This finding underscores the need for on-going communication and coordination between

perinatal HCPs and public health units or pharmacies to optimize convenient access. Importantly, current lack of universal public funding for the vaccine is further compromising vaccine access for women who cannot afford it.

Future Research Directions

Additional research is needed to triangulate these findings with the perspectives of pregnant women, representatives from public health, and policy-makers. This should include a nuanced discussion about ways to foster vaccine uptake while respecting women's autonomy in diverse communities and practice settings. SOGC recently released a Vaccination in Pregnancy online course for providers (30) along with a video and an e-book for patients (31). Evaluation of these resources will be helpful in determining whether the need for lay resources and clinical training identified in our study are being met. Finally, given the variety of HCPs providing perinatal care, studies assessing initiatives to increase vaccine acceptance and access through interprofessional collaboration and integrated provision of care would be timely.

Limitations

Providers who agreed to participate in this study may have had greater vaccine knowledge and confidence than the typical Canadian maternity HCP, including familiarity with the Tdap guidelines. Due to the lack of comprehensive pregnancy vaccination registries, we were unable to explore relationships among the various barriers and facilitators identified by individual providers and the vaccine uptake rates in their communities. Interviews took place over 14 months, with earlier interviews conducted shortly after the NACI/SOGC recommendation. We acknowledge that some of the early concerns raised

by HCPs may have subsequently been resolved in their health jurisdictions, but the findings from our research would be applicable with any new vaccine recommendation.

Conclusion

Canadian perinatal HCPs and the patients they serve would benefit from an overarching nation-wide Tdap vaccination strategy and universal vaccine funding to facilitate national implementation of the SOGC/NACI recommendation. Elements of this coordinated approach should include: efficient clinical training, high-quality patient information materials, and universal coverage and patient access. Lessons learned from the Canadian Tdap vaccination program may be pertinent not only to the Tdap vaccine but to the implementation of pregnancy vaccination programs more broadly.

REFERENCES

1. Abu-Raya B, Bettinger JA, Vanderkooi OG, Vaudry W, Halperin SA, Sadarangani M, et al. Burden of Children Hospitalized With Pertussis in Canada in the Acellular Pertussis Vaccine Era, 1999–2015. J Pediatr Infect Dis Soc. 2018;

2. Public Health Agency of Canada (PHAC). NACI Update on immunization in pregnancy with Tdap Vaccine - 2018 [Internet]. 2018 [cited 2019 Aug 12]. Available from: https://www.canada.ca/en/public-health/services/reports-publications/canada-communicable-disease-report-ccdr/monthly-issue/2018-44/issue-3-4-march-1-2018/article-5-update-immunization-pregnancy-vaccine-2018.html

3. Abu Raya B, Edwards KM, Scheifele DW, Halperin SA. Pertussis and influenza immunisation during pregnancy: a landscape review. Lancet Infect Dis. 2017 Jul 1;17(7):e209–22.

4. Castillo E, Poliquin V. No. 357-Immunization in Pregnancy. J Obstet Gynaecol Can. 2018 Apr;40(4):478–89.

5. Public Health Agency of Canada (PHAC). Provincial and Territorial Routine Vaccination Programs for Healthy, Previously Immunized Adults [Internet]. 2017 [cited 2019 Nov 4]. Available from: https://www.canada.ca/en/public-health/services/provincial-territorial-immunization-information/routine-vaccination-healthy-previously-immunized-adult.html

6. Jones CE, Calvert A, Le Doare K. Vaccination in Pregnancy—Recent Developments. Pediatr Infect Dis J. 2018 Feb;37(2):191.

7. MacDougall DM, Halperin SA. Improving rates of maternal immunization: Challenges and opportunities. Hum Vaccines Immunother. 2016 Apr 2;12(4):857–65.

8. Gkentzi D, Katsakiori P, Marangos M, Hsia Y, Amirthalingam G, Heath PT, et al. Maternal vaccination against pertussis: a systematic review of the recent literature. Arch Dis Child Fetal Neonatal Ed. 2017 Sep;102(5):F456–63.

9. Poliquin V, Greyson D, Castillo E. A Systematic Review of Barriers to Vaccination During Pregnancy in the Canadian Context. J Obstet Gynaecol Can. 2018 Oct 22;41(9):1344–55.

10. Dubé E, Gagnon D, Kaminsky K, Green CR, Ouakki M, Bettinger JA, et al. Vaccination Against Influenza in Pregnancy: A Survey of Canadian Maternity Care Providers. J Obstet Gynaecol Can. 2019 Apr 1;41(4):479–88.

11. Wilson R, Paterson P, Larson HJ. Strategies to improve maternal vaccination acceptance. BMC Public Health. 2019 Mar 25;19(1):342.

12. Tong A, Biringer A, Ofner-Agostini M, Upshur R, McGeer A. A Cross-Sectional Study of Maternity Care Providers' and Women's Knowledge, Attitudes, and Behaviours Towards Influenza Vaccination During Pregnancy. J Obstet Gynaecol Can. 2008 May;30(5):404–10.

13. Brousseau N, Gagnon D, Vivion M, Poliquin V, Boucoiran I, Tapiéro B, et al. Expected challenges of implementing universal pertussis vaccination during pregnancy in Quebec: a cross-sectional survey. CMAJ Open. 2018 Jul 1;6(3):E391–7.

14. Ontario Agency for Health Protection and Promotion (Public Health Ontario). Pertussis immunization in pregnancy in Ontario [Internet]. Queen's Printer for Ontario; 2018 [cited 2019 Jan 12]. Available from: https://www.publichealthontario.ca/en/eRepository/pertussis-immunization-pregnancy.pdf

15. Gauld NJ, Braganza CS, Babalola OO, Huynh TT, Hook SM. Reasons for use and non-use of the pertussis vaccine during pregnancy: an interview study. J Prim Health Care. 2016;8(4):344–50.

16. Strassberg ER, Power M, Schulkin J, Stark LM, Mackeen AD, Murtough KL, et al. Patient attitudes toward influenza and tetanus, diphtheria and acellular pertussis vaccination in pregnancy. Vaccine. 2018 Jul 16;36(30):4548–54.

17. Donaldson B, Jain P, Holder BS, Lindsey B, Regan L, Kampmann B. What determines uptake of pertussis vaccine in pregnancy? A cross sectional survey in an ethnically diverse population of pregnant women in London. Vaccine. 2015 Oct 26;33(43):5822–8.

18. Maisa A, Milligan S, Quinn A, Boulter D, Johnston J, Treanor C, et al. Vaccination against pertussis and influenza in pregnancy: a qualitative study of barriers and facilitators. Public Health. 2018 Sep 1;162:111–7.

19. Winslade CG, Heffernan CM, Atchison CJ. Experiences and perspectives of mothers of the pertussis vaccination programme in London. Public Health. 2017 May 1;146:10–4.

20. Government of Canada - Interagency Advisory Panel on Research Ethics. Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans – TCPS 2 (2018) – Chapter 10: Qualitative Research [Internet]. 2018 [cited 2019 Aug 20]. Available from: http://www.pre.ethics.gc.ca/eng/tcps2-eptc2_2018_chapter10-chapitre10.html

21. Thorne S. Interpretive Description: Qualitative Research for Applied Practice. Routledge; 2016.

22. Turner N. The challenge of improving immunization coverage: the New Zealand example. Expert Rev Vaccines. 2012 Jan;11(1):9–11.

23. Potts A, Sinka K, Love J, Gordon R, McLean S, Malcolm W, et al. High uptake of HPV immunisation in Scotland – perspectives on maximising uptake. Eurosurveillance. 2013 Sep 26;18(39):20593.

24. MacDougall DM, Halperin BA, Langley JM, McNeil SA, MacKinnon-Cameron D, Li L, et al. Knowledge, attitudes, beliefs, and behaviors of pregnant women approached to participate in a Tdap maternal immunization randomized, controlled trial. Hum Vaccines Immunother. 2016 Apr 2;12(4):879–85.

25. Greyson D. Information triangulation: A complex and agentic everyday information practice. J Assoc Inf Sci Technol. 2018;69(7):869–78.

26. Mohammed H, McMillan M, Roberts CT, Marshall HS. A systematic review of interventions to improve uptake of pertussis vaccination in pregnancy. PLoS ONE. 2019 Mar 28;14(3).

27. Kaufman J, Attwell K, Hauck Y, Omer SB, Danchin M. Vaccine discussions in pregnancy: interviews with midwives to inform design of an intervention to promote uptake of maternal and childhood vaccines. Hum Vaccines Immunother. 2019 May 24;0(0):1–10.

28. Dubé E, Vivion M, Sauvageau C, Gagneur A, Gagnon R, Guay M. How do Midwives and Physicians Discuss Childhood Vaccination with Parents? J Clin Med. 2013 Dec;2(4):242–59.

29. Paterson P, Meurice F, Stanberry LR, Glismann S, Rosenthal SL, Larson HJ. Vaccine hesitancy and healthcare providers. Vaccine. 2016 20;34(52):6700–6.

30. The Society of Obstetricians and Gynecologists of Canada (SOGC). Vaccination in Pregnancy [Internet]. www.sogc.org. 2019 [cited 2019 Nov 4]. Available from: https://www.sogc.org/en/rise/Events/event-display.aspx?EventKey=VACCINE

31. The Society of Obstetricians and Gynecologists of Canada (SOGC). Vaccination in Pregnancy [Internet]. www.pregnancyinfo.ca. 2019 [cited 2019 Nov 1]. Available from: https://www.pregnancyinfo.ca/your-pregnancy/routine-tests/vaccination/

	British Columbia	Manitoba	Nova Scotia	Ontario	Quebec	**TOTAL**
Family Physician	6	1	1	2	3	**13**
Registered Midwife	4	4	1	1	2	**12**
Nurse	2	1	1	2	3	**9**
Obstetrician	1	1	2	3	3	**10**
TOTAL	**13**	**7**	**5**	**8**	**11**	**44**
PRACTICE SETTING: Rural (< 1, 000 inhabitants): 3 Small town (1,000-< 30, 000 inhabitants): 11 Medium town (30,000-< 100, 000 inhabitants): 3 Urban center (≥ 100, 000 inhabitants): 27			TIME IN PRACTICE: Range: 1-43 years Average: 13 years Median: 12 years		PROVIDED PERTUSSIS VACCINE AT POINT-OF-CARE AT THE TIME OF THE INTERVIEW: 18/44	

Table 1: Study participants' characteristics

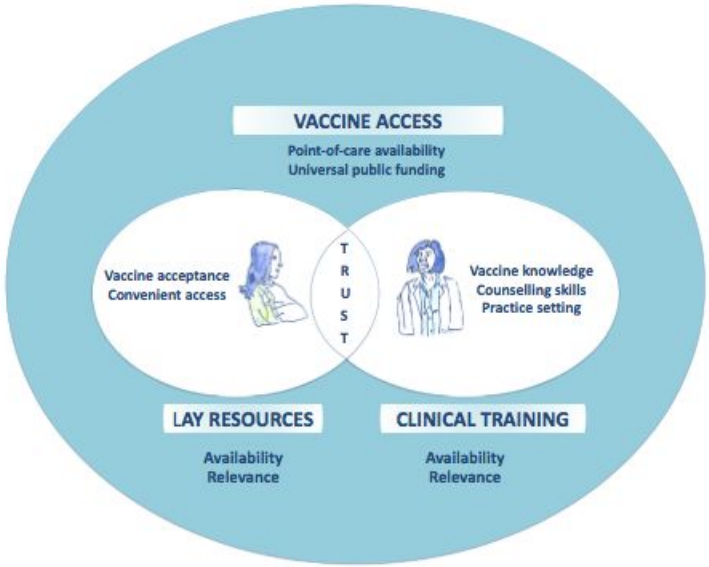

Figure 1: Influences on perinatal providers' ability to recommend and provide pertussis (Tdap) vaccine in pregnancy

Standards for Reporting Qualitative Research (SRQR)

O'Brien B.C., Harris, I.B., Beckman, T.J., Reed, D.A., & Cook, D.A. (2014). Standards for reporting qualitative research: a synthesis of recommendations. *Academic Medicine, 89(9)*, 1245-1251.

No. Topic	Item
Title and abstract	
S1 Title **TITLE PAGE**	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended
S2 Abstract **ABSTRACT**	Summary of key elements of the study using the abstract format of the intended publication; typically includes objective, methods, results, and conclusions
Introduction	
S3 Problem formulation **INTRODUCTION: PARAGRAPH 2**	Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement
S4 Purpose or research question **INTRODUCTION: PARAGRAPH 2**	Purpose of the study and specific objectives or questions
Methods	
S5 Qualitative approach and research paradigm **METHODS: DATA ANALYSIS SECTION**	Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., positivist, constructivist/interpretivist) is also recommended
S6 Researcher characteristics and reflexivity **AUTHORS CREDENTIALS and FUNDING STATEMENT** **METHODS: DATA COLLECTION**	Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, or transferability
S7 Context	Setting/site and salient contextual factors; rationale[a]
S8 Sampling strategy **METHODS: PARAGRAPH 1**	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale[a]
S9 Ethical issues pertaining to human subjects **METHODS: PARAGRAPH 2**	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues

S10 Data collection methods **METHODS: DATA COLLECTION**	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale[a]
S11 Data collection instruments and technologies **METHODS: PARAGRAPH 3 (DATA COLLECTION)**	Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study
S12 Units of study **RESULTS: PARAGRAPH 1 and TABLE 1**	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)
S13 Data processing **METHODS: PARAGRAPH 3 (DATA COLLECTION) AND PARAGRAPH 4 (DATA ANALYSIS)**	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/deidentification of excerpts
S14 Data analysis **METHODS: DATA ANALYSIS AUTHORS CONTRIBUTIONS AS LISTED IN THE TITLE PAGE**	Process by which inferences, themes, etc., were identified and developed, including researchers involved in data analysis; usually references a specific paradigm or approach; rationale[a]
S15 Techniques to enhance trustworthiness **METHODS: PARAGRAPH 2 AND PAARAGRAPH 3 (DATA COLLECTION)**	Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale[a]
Results/Findings	
S16 Synthesis and interpretation **RESULTS AND FIGURE 1 DIAGRAM**	Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory
S17 Links to empirical data **RESULTS - QUOTES**	Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings
Discussion	
S18 Integration with prior work, implications, transferability, and contribution(s) to the field **DISCUSSION**	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field
S19 Limitations **DISCUSSION**	Trustworthiness and limitations of findings
Other	
S20 Conflicts of interest **TITLE PAGE**	Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed
S21 Funding **TITLE PAGE**	Sources of funding and other support; role of funders in data collection, interpretation, and reporting

[a]The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

Interview Guide

Unpacking Vaccine Hesitancy among Perinatal Healthcare Providers: Influences on Beliefs and Practices

Thank you for agreeing to do an interview with us today.

The purpose of these interviews with health care providers across the country is to help us better understand the reasons you do or do not discuss, recommend, or administer vaccines in your practice.

As a reminder, we will be audio-recording this interview. We will keep your personal information strictly confidential, and you will have the opportunity to review the transcript for accuracy and privacy issues.

You can skip any question you do not wish to answer, for any reason.

Do you have any questions for me before we begin?

1. Please tell me a little about your clinical practice. Where and how do you practice, and what are your patients/clients like?

   Possible probes:
   a. How and why did you end up doing what you do?
   b. Have you always worked there, or did you begin in a different setting?
   c. Do you have an overarching philosophy or goal for your patient care?

2. How do you do to keep up-to-date with guidelines and recommendations on clinical topics or new therapies?

   Possible probes:
   a. Do you have the kind of time and support you need to find and integrate new evidence into your practice?
   b. Do you feel like you have the skills you need?
   c. Do you and colleagues share new evidence with each other? How?
   d. What kind of education, if any, do you have in critical appraisal of research, or in epidemiology?
   e. How well do you feel your training in use of medical evidence prepared you for actual clinical work?

3. What are your thoughts about Canada's infant vaccinations?

   Possible probes:
   a. How safe do you think they are?
   b. How effective do you think they are?
   c. What do you think about the recommended schedule?

4. What are your thoughts about vaccinations in pregnancy?

   Possible probes:
   a. What special considerations do you take into account with pregnant patients/clients in particular?
   b. Are there particular vaccines you have any concerns about in pregnancy?
   c. Are there any particular vaccines that you wish existed or could be given in pregnancy?

5. Do you think your beliefs about vaccines are shared by a majority of colleagues in your discipline? Why or why not?

6. Do you recall any clinical training that attempted provided with information on immunization? How about any continuing professional education?

   Possible probes:
   a. What did you think of them? How effective was it? What do you remember about it?
   b. Is there any type of training or support you would like, or that you think others in your profession would benefit from?

7. Do you routinely discuss vaccines with your patients/clients? This could be about vaccines in pregnancy, vaccines to get before or after pregnancy, or the infant vaccination schedule.

   Possible probes:
   a. What vaccines do you discuss?
   b. How does it come up? Do you bring it up or do they? Do you have any clinical reminder systems for vaccination?
   c. How frequently does this happen? Always? Usually? Occasionally?
   d. What do you touch on in these conversations?

8. Do you regularly make recommendations or express a strong opinion for or against vaccines with your patients/clients? This could be about vaccines in pregnancy, vaccines to get before or after pregnancy, or the infant vaccination schedule.

   Possible probes:
   a. If YES: About which ones? How does this go? What do you say to them? Can pretend I'm a patient and give an example of what you might say?
   b. If NO: Why do you refrain from making recommendations? (e.g., have no strong opinion, don't want to alienate patients, model of care)

9. Do you regularly provide any vaccines to clients in your practice or clinic?

   Possible probes:
   a. If YES: Which ones? How did you decide to provide that/those?
   b. If YES: Who administers them? How do you manage the logistics? Are there any challenges?
   c. If NO: Why not?
   d. In NO: Is there anything that could change that would encourage you to provide vaccines? (e.g., better evidence on effectiveness or safety, easier to purchase or bill for vaccines, more time in patient interactions, etc.)

10. What, if anything, do you think would make it more likely that a majority of your colleagues would recommend or offer vaccination in their clinical practice?

11. Are there other thoughts you would like to share about your clinical practice, your training, and your views on vaccination?

Thank you for your time and expertise! We will be in touch with your thank-you honorarium, and later on to invite you to review your interview transcript.

Guide d'entrevue

L'hésitation à la vaccination chez les professionnels de la santé qui font des suivis de grossesse : Influences sur les croyances et les pratiques

Merci d'avoir accepté de participer à une entrevue individuelle avec nous aujourd'hui.

Le but des entrevues que nous menons actuellement auprès de professionnels de la santé qui font des suivis de grossesse à travers le pays est de nous aider à mieux comprendre les raisons pour lesquelles vous discutez (ou non), vous recommandez (ou non) et vous administrez (ou non) des vaccins dans le cadre de votre pratique.

Je tiens à vous rappeler que cette entrevue sera enregistrée. Vos informations personnelles seront conservées de façon confidentielle et vous aurez la possibilité de relire la transcription de votre entrevue afin d'en vérifier l'exactitude et d'y apporter des corrections s'il y a lieu.

Durant l'entrevue, vous pouvez également choisir de ne pas répondre à une question si vous le souhaitez.

Avez-vous des questions avant de débuter l'entrevue?

1. Tout d'abord, j'aimerais que vous me parliez un peu de votre pratique clinique. À quel endroit pratiquez-vous? Quel est votre type de pratique? Décrivez-moi votre clientèle.

   Sous-questions:
   a. Comment et pourquoi avez-vous choisi de faire ce que vous faites?
   b. Avez-vous toujours travaillé à [cet endroit] ou bien votre parcours vous-a-t-il amené à travailler ailleurs?
   c. Avez-vous une philosophie particulière ou un objectif lorsque vous offrez des soins à vos patients/clients?

2. De quelle façon/Par quels moyens vous gardez-vous à jour en ce qui concerne les lignes directrices et les recommandations sur des sujets liés à votre pratique clinique ou sur de nouveaux traitements?

   Sous-questions:
   a. Avez-vous le temps et le soutien nécessaire pour être au courant et pour intégrer de nouvelles évidences/informations dans votre pratique?
   b. Sentez-vous que vous avez les habiletés nécessaires pour le faire?
   c. Vous arrive-t-il de partager entre collègues de nouvelles évidences/informations? Si oui, comment?
   d. Avez-vous reçu de la formation en lien avec la recherche ou l'épidémiologie?

e. Estimez-vous que votre formation académique vous a bien préparé(e) pour utiliser les évidences médicales dans votre pratique clinique?

3. Que pensez-vous de la vaccination infantile au Canada?

   Sous-questions:
   a. À quel point considérez-vous que les vaccins administrés/recommandés aux enfants sont sécuritaires?
   b. À quel point considérez-vous que les vaccins administrés/recommandés aux enfants sont efficaces?
   c. Que pensez-vous du calendrier vaccinal qui est recommandé?

4. Que pensez-vous de la vaccination durant la grossesse?

   Sous-questions:
   a. Prenez-vous des dispositions spéciales avec les patientes enceintes?
   b. Avez-vous des inquiétudes face à certains vaccins en particulier durant la grossesse?
   c. Y a-t-il certains vaccins que vous aimeriez qui existent ou qui puissent être administrés durant la grossesse?

5. Croyez-vous qu'une majorité de vos collègues exerçant dans votre discipline partage vos opinions au sujet des vaccins? Si oui, pourquoi? Si non, pourquoi?

6. Vous souvenez-vous d'avoir assisté à ou d'avoir suivi une formation clinique au cours de laquelle des informations sur la vaccination vous ont été données? Et qu'en est-il pour les formations médicales continues auxquelles vous auriez-pu assister?

   Sous-questions:
   a. Qu'en avez-vous pensé? Avez-vous trouvé cela utile? Que vous souvenez-vous de cette formation/ces formations?
   b. Est-ce qu'il existe une formation ou un type de soutien que vous aimeriez avoir ou qui, selon vous, serait utile pour des professionnels comme vous?

7. Discutez-vous de façon régulière de la vaccination avec vos patient(e)s/client(e)s? Cela peut être autant au sujet de la vaccination durant la grossesse, que de la vaccination avant ou après la grossesse ou bien du calendrier vaccinal de l'enfant.

   Sous-questions:
   a. De quel(s) vaccin(s) discutez-vous?
   b. De quelle(s) façon(s) le sujet est-il abordé? Abordez-vous le sujet en premier ou vos patient(e)s/client(e)s vous parlent-elles de la vaccination d'emblée?
   c. À quelle fréquence cela arrive-t-il? Toujours? Souvent? Occasionnellement?
   d. Qu'abordez-vous généralement lors de ces discussions?

8. Dans le cadre de votre pratique, recommandez-vous souvent ou vous exprimez-vous souvent en faveur ou en défaveur de la vaccination? Cela peut être autant au sujet de la vaccination durant la grossesse, que de la vaccination avant ou après la grossesse ou bien du calendrier vaccinal de l'enfant.

   Sous-questions:
   a. Si OUI : Au sujet de quel(s) vaccin(s)? Comment ces discussions se passent-elles? Que dites-vous à vos patient(e)s? Vous pouvez faire semblant que je suis un(e) de vos patient(e)s pour me donner un exemple de ce que vous pourriez dire.
   c. Si NON : Pour quelle(s) raison(s) ne faites-vous pas de recommandations? (par exemple : aucune opinion particulière sur la vaccination, ne veut pas frustrer/déranger ses patientes, modèle de soins existant)

9. Dans votre pratique ou votre clinique, est-ce que des vaccins sont régulièrement administrés aux patient(e)s/client(e)s?

   Sous-questions:
   a. Si OUI : Lesquels? Comment s'est prise la décision d'offrir ces vaccins?
   b. Si OUI : Qui administrent les vaccins? De quelle façon la vaccination est-elle offerte? (Parlez-moi un peu de la logistique entourant l'administration des vaccins?) Est-ce que vous rencontrez des défis particuliers?
   c. Si NON : Pourquoi?

d. Si NON : Qu'est-ce qui pourrait vous encourager à offrir la vaccination dans votre milieu de pratique/clinique? (par exemple, davantage de preuves entourant l'efficacité ou la sécurité des vaccins, plus grande facilité pour l'achat et la facturation, plus de temps avec les patient(e)s durant les rendez-vous, etc.)

10. Selon vous, qu'est-ce qui ferait en sorte que la majorité de vos collègues recommande ou offre la vaccination dans leur pratique clinique?

11. Est-ce que vous aimeriez ajouter autre chose sur votre pratique clinique, votre formation ou vos perceptions de la vaccination avant que l'on termine l'entrevue?

Merci beaucoup pour votre temps et votre expertise! Nous vous recontacterons sous peu au sujet de la compensation financière pour le temps que vous avez accordé à cette entrevue ainsi que pour la relecture de la transcription de votre entrevue.