Article details: 2021-0011	
Title	Coverage for pertussis vaccination during pregnancy associated with 4 models of vaccine delivery: a quasi-experimental multicenter observational study
Authors	Yinan Li HBSc MScPH, Nicholas Brousseau MD MSc, Maryse Guay MD MSc, Ève Dubé PhD, Zineb Laghdir MSc, Isabelle Boucoiran MD MSc, Bruce Tapiéro MD, Caroline Quach MD MSc
Reviewer 1	Dr. Vanessa Poliquin
Institution	University of Manitoba
General comments (author response in bold)	This manuscript investigates a relevant clinical problem: vaccine uptake among pregnant women. It contributes to the medical literature by further affirming, through a novel statistical comparison the value of a prenatal provider recommending the administration of a vaccine during pregnancy. **We thank the reviewer for this comment and their consideration of our manuscript.** Some comments for consideration: 1) In the introduction, there is a comment about no maternal pertussis immunization program that is integrated into medical care, please clarify what is meant by this as many centres in Canada have successfully integrated Tdap into PN care. While not a national program, I think it would be more accurate to say that there is a great diversity of mechanisms, rather than a complete absence for integration of Tdap into PN care (across Canada). **In Quebec, the standard of practice for vaccine delivery is through healthcare professionals' referrals to CLSCs for vaccination. There has not been a maternal pertussis immunization program that is fully integrated into medical care or prenatal care provided by physicians or obstetricians. Thank you for making this clear that this applies to the Quebec context, meanwhile there is greater diversity of mechanisms of vaccine delivery across Canada. We have clarified this in the manuscript (2nd paragraph of introduction, page 4).** 2) In methods, the authors specify that in the "Obstetrics Model" the visit was on a different day. It would be important for interpretation of results to include information of whether in the FMG model the vaccines were delivered the same day or in a separate appointment as this would also potentially impact the differences seen between models. **For the FMG model, Tdap vaccines were delivered the same day after family physician recommendation. This was added to the Methods – section Vaccine Delivery Models, pages 6 and 7.** **It was mentioned in the interpretation section (page 12 of the manuscript with tracked changes) that, "the nurse offering Tdap vaccination only worked two days/week. Results could be different with another obstetric clinic organization". The model-specific vaccine coverage of the Obstetrics model may improve with different organization of services or with same-day vaccine delivery after obstetrician recommendation.** 3) Results: It would be helpful if, for the models where the global uptake was significantly higher than the model-specific uptake, the authors provided more information about where the participants went to receive their vaccine if it was not through the original model.

	We created a table to show the care pathways that women went through to receive their Tdap vaccines in the Supplementary Appendix.
	For FMG, Obstetrics, and OGCT models, the vast majority of vaccinations given outside of the model of delivery took place in CLSCs (baseline model).
	FMG model: The rest of vaccinated women of the FMG model received their vaccine at CLSCs (16.9%) and other settings offering vaccination (4.7%).
	Obstetrics model: Among vaccinated women, the majority of them were vaccinated at their CLSCs (54.6%), with the rest at FMG clinics (2.4%), and other settings offering vaccination (2.0%).
	OGCT model: Other places of vaccination among vaccinated women included CLSCs (21.3%), FMG clinics (1.1%), and other settings offering vaccination (6.2 %).
	4) Interpretation: The "OGCT" group was considerably different from the rest of the groups based on demographics, this could be an important source of confounding in the results of vaccine coverage for this group. This should be further explored in the interpretation section.
	Our results on vaccine coverage were unadjusted. However, we employed a multivariable logistic regression model to adjust for differences in baseline characteristics of the participants including maternal age, country of birth (Canada vs. other), education, language and the number of prior children. We noted in the limitations (page 13 of the manuscript with tracked changes) that our sample recruited for the OGCT model may not be representative of the population who access the pregnancy care services offered by the hospital as the hospital serves a large urban multiethnic catchment area and is the referral centre for high-risk pregnancies.
	5) Interpretation: Calculation of the model-specific vs. global vaccine coverage is a reasonably new way to look at vaccine uptake. This should be underscored in the discussion. More, the value of comparing these two types of coverage rates highlights the important of the provider discussion/plan for vaccination. It may be worthwhile to unpack this concept further in the discussion.
	We thank the reviewer for this comment. We noted in the interpretations section that, model-specific vaccine coverage emphasizes the utilization of vaccine delivery resources provided by each model. On the other hand, overall (global) vaccine coverage highlights the importance of Tdap vaccination recommendation from family physician, obstetrician, and nurses offering prenatal care. Significantly higher overall (global) vaccine coverage for the FMG and Obstetrics model may imply a stronger perceived importance of vaccination recommendation.
Reviewer 2	Dr. Sandra Steiner
Institution	Centers for Disease Control and Prevention
General comments (author response in bold)	General comments This manuscript describes a quasi-experimental multicenter study with four different models to evaluate vaccine coverage for Tdap during pregnancy at <21 weeks of gestation. Intended N were met for the most part (54 out 1000 participants were excluded for various reasons) and participation rates were high (75%). Analyses were appropriate and the results indicated that the family medicine group and obstetrics clinics had the overall highest vaccination coverage (86.5% and 85.5%, respectively) for the population evaluated in Quebec. The

observed differences are relevant given that there were so many more women attending the local community clinics for their pregnancy follow-up and vaccinations. The following comments are made to improve the clarity of the manuscript.
We thank the reviewer for this comment and their consideration of our manuscript.

Specific comments
1.   The use of the term "global" vaccine coverage implies international vaccination. This reviewer recommends changing to "total" or "overall" vaccine coverage.
The term "global" vaccine coverage has been changed to "overall" vaccine coverage in the manuscript.

2.   The study could have been controlled for vaccination coverage to other vaccines like influenza. While the study can stand on its own, this comparison could have given information regarding vaccine bias or reluctance.
We agree that vaccination coverage to other vaccines such as influenza could have given information regarding vaccine bias or reluctance. In our study, we employed a multivariable logistic regression model to adjust for differences in baseline characteristics of the participants including maternal age, country of birth (Canada vs. other), education, language and the number of prior children. The variables that we controlled for in our model, such as education level, could also serve as a proxy indicator for vaccine bias or reluctance. Moreover, influenza vaccination during pregnancy is limited to a specific time of year, unlike pertussis and only recommended in the 2nd or 3rd trimester of pregnancy in Quebec during the influenza vaccination season, which differs from the rest of Canada and the USA.

3.   If women rejected the Tdap vaccine, were they asked why?
In the online questionnaire administered to participants at their 35th week of pregnancy, participants were asked for the main reasons why they chose not to be vaccinated as well as their opinions towards pertussis vaccination during pregnancy. There were also interviews conducted with the healthcare professionals involved in the pertussis vaccine delivery, which included questions on why participants rejected the Tdap vaccine. For example, some participants were not yet at their 26th week of pregnancy at the time of the OGCT and decided to wait until later for their vaccination. In some cases, they came back to the same hospital vaccination clinic or they went to another local community service centre for vaccination later when they reached their ideal time period for vaccination. This information was collected for another study under this project, which aimed to study women's acceptability towards Tdap vaccination during pregnancy. This study is currently being finalized.

4.   This reviewer recommends changing CLSC to LCSC.
CLSC is the French name for Local Community Service Centers in Quebec. We decided to keep the French name because this is how they are called in Quebec.

	5. In page 9, ln 47 how many CLCSs participated in the vaccination coverage study? And what is the average number of pregnancies that they follow each year? **There were 5 CLSCs in Montérégie that participated in the vaccination coverage study. Each CLSC follows around an average of 450 pregnancies each year.**
	6. In page 16, Ln 18 is should be plural: recruitment sites. **This has been edited in the manuscript (Limitations, page 13 of the manuscript with tracked changes).**
	7. In page 28, Ln 33 should read: "known to have diabetes according to…" **This has been edited in the manuscript (Supplementary Appendix).**