

Influenza and pertussis vaccine uptake during pregnancy among Australian women in south-east Queensland, Australia

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Vaccines in pregnancy have become cornerstones of protecting the mother and newborn infant against influenza and pertussis. Immunisation against influenza is recommended at any stage of pregnancy, and pertussis vaccination is recommended between 20 and 32 weeks gestation.¹ The recommended, publicly funded influenza and pertussis vaccines used in Australia are inactivated vaccines and are safe for pregnant women.¹⁻³

Despite the recommendations, uptake of both vaccines during pregnancy remains sub-optimal in many settings. In the Northern Territory in 2015, antenatal pertussis (Boostrix) vaccination coverage was just 22.3%, with a negligible difference between First Nations and non-First Nations women (23.5% vs. 21.6%, respectively).⁴ An analysis of Victoria's perinatal data collection (n=153,980 pregnancies)⁵ reported pertussis vaccination coverage rising continuously from 37.5% to 82.2% from 2015 to 2017 and seasonal variation in influenza vaccine coverage (overall estimate over the 2 years was 39%). Marked differences in coverage between hospitals were observed;⁵ the median influenza vaccination coverage was 45.0% (IQR, 34.7–52.6%; range, 0–75.3%) and 80.4% (IQR, 65.1–86.3%; range, 0–100%) for pertussis vaccination.⁵ A 2017 cross-sectional Victorian study that analysed data from 1305 pregnant women, self-reported vaccine uptake was 48.3% for influenza and 82.9% for pertussis⁶

Abstract

Objectives: Population-specific studies of vaccine uptake in pregnancy are necessary to monitor progress and ensure enablers to vaccination are locally relevant. We aimed to determine the uptake of influenza and pertussis vaccine during pregnancy in women in south-east Queensland and the reasons why women were choosing not to vaccinate.

Methods: A secondary analysis of data collected in a prospective cohort study. Data were collected at enrolment during pregnancy and within six weeks of giving birth. The primary outcome was the proportion of women vaccinated during pregnancy.

Results: Among 310 pregnant women, 45.8% and 69.7% were vaccinated against influenza and pertussis, respectively; 123 (39.7%) had received both vaccines. The common predictor of vaccine uptake for influenza, pertussis or both was having had any vaccine in the 12 months prior to pregnancy. Not considering the vaccines necessary and perceptions of the risk of infection were common reasons for not intending to vaccinate.

Conclusions: Antenatal vaccine uptake remains suboptimal in women in south-east Queensland. Barriers to vaccination during pregnancy are complex and vary depending on context and population.

Implications for public health: More efforts are needed to promote antenatal uptake, particularly for influenza vaccine and having both the influenza and pertussis vaccines during pregnancy.

Key words: pregnancy; influenza; pertussis; vaccination; determinants

and of 1364 South Australian women studied between 2015 and 2017, coverage was 79% and 48% for pertussis and influenza, respectively.⁷

Previous studies into understanding antenatal vaccine hesitancy, particularly with respect to influenza and pertussis, have highlighted factors such as concerns about vaccine safety^{8,9} and advice from antenatal care providers^{10,11} to be influential factors when women are considering antenatal

vaccinations. The large Victorian study⁵ reported older maternal age, primigravidity, early antenatal care, and GP-led care were associated with increased vaccine uptake and the odds were significantly lower for women born overseas, those who smoked during pregnancy and for Aboriginal and Torres Strait Islander women.

Given the geographic and socioeconomic diversity of Australia, it is important to examine potential differences in uptake and

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determinants of vaccination in pregnancy in differing population groups to inform strategies to improve uptake. Further, given the availability of free vaccine and increasing promotion of antenatal vaccination in recent years, ongoing review of uptake over time in different settings is warranted. Thus, we aimed to determine vaccine coverage and its determinants among pregnant women in south-east Queensland (SEQ), Australia. Our objectives were: 1) to determine the proportion of pregnant women who received influenza and pertussis vaccine during pregnancy; and 2) to examine determinants of vaccine uptake among these women.

Materials and Methods

Design

This was a secondary analysis of data collected at enrolment during pregnancy and following the birth of the infant in a multi-centre randomised controlled trial of an intervention to improve immunisation timeliness in infants in south-east Queensland, Australia (Australian New Zealand Clinical Trial Registry Number ACTRN12616000204448). The study was conducted between 30 May 2016 and 24 May 2018 in antenatal clinics in First Nations' specific primary care clinics and district public hospital antenatal clinics in Caboolture and Toowoomba, Queensland, Australia.

Participants

Recruitment was undertaken by trained research assistants at the antenatal visit. Participants had the study explained in detail and a written plain language statement was provided. Women were eligible for inclusion if they: were in the second or third trimester of pregnancy; were not planning to move from the study area until the infant turned at least 8 months of age; had access to a working mobile phone; were intending to immunise their infant; and provided written consent. There were no exclusion criteria.

Data collection

Data were collected from the participants via structured questionnaires administered by trained research assistants at enrolment and within 42 days of the birth. Immunisation status was collected via self-report and participant consent was obtained to access the Australian Immunisation Register (AIR) to confirm unknown/uncertain vaccination status. Data collected included demographics,

pregnancy history, immunisation history, intention to vaccinate during pregnancy and reasons for not intending to vaccinate. Data were entered into a secure Filemaker Pro (V14.0) database.

Primary outcome

The primary outcome was the proportion of women who self-reported receiving the influenza and/or pertussis vaccine during pregnancy. As women were enrolled at various stages of their pregnancy and may not have had the opportunity to be vaccinated or were not yet eligible to be vaccinated (e.g. for pertussis vaccine) at enrolment, both enrolment and birth interview data were used to calculate uptake. If they answered 'no' at both timepoints, they were recorded as unvaccinated and a 'yes' on either questionnaire classified them as vaccinated. Women for whom vaccination status was 'no' at baseline and 'unknown' at birth interview were classified as unknown unless a record of receipt of vaccine was available on the AIR.

Data analysis

Descriptive analyses were undertaken to compare the characteristics of women who had and had not received the influenza and/or pertussis vaccine during pregnancy, including those for whom vaccination status was unknown. Backwards stepwise logistic regression models including only those variables with a p -value of <0.1 in univariate analyses (due to the number of variables examined) were employed to explore independent predictors of vaccination status with a p -value of <0.05 considered statistically significant. Odds ratios and the corresponding 95% confidence intervals (95%CI) are presented. Data were analysed in STATA v15.1 (StataCorp, Texas) and Microsoft Excel for statistical analysis.

Ethical approval

The study was approved by the human research ethics committees of the Queensland Children's Hospital and Health Service (HREC/16/QRCH/53) and the Queensland University of Technology (1600000443).

Results

Between 30 May 2016 and 24 May 2018, 883 women were screened and 322 (36%) were enrolled; 310 women were included in the analysis (Figure 1). Women who withdrew or were lost to follow-up between baseline

and birth interview were more likely to not be employed full-time ($p=0.025$) and less likely to be earning an income greater than AUD78,000 (Odds Ratio [OR] 0.42, 95% confidence interval [CI] 0.18–0.89) than those who remained in the study.

The characteristics of study participants are presented in Table 1. At enrolment, 78 (25.2%) women reported receipt of influenza vaccine and 84 (27.1%) had received the pertussis vaccine (Figure 1). Of those not yet vaccinated for influenza ($n=232$), 72 (31.0%) were enrolled outside of the influenza season, 98 (42.2%) reported they were not intending to get the vaccine during their pregnancy and 35 (15.1%) were unsure. Of those who had not received a pertussis vaccine at enrolment, 117/226 (51.8%) were not within the recommended gestation period. For those eligible but not vaccinated, 93/109 (85.3%) were planning to be vaccinated, eight were not and seven women were unsure. Of the women not yet eligible for vaccine, 78/117 (66.7%) were planning to be vaccinated, 24 (20.5%) were not and 15 (12.8%) were unsure.

Within the cohort of 98 women who were not planning to vaccinate against influenza (Table 2): 22 (22.4%) stated they didn't feel it was necessary; 20 (20.4%) believed the vaccine would make them sick; 19 (19.4%) stated they rarely got sick, hence, did not require the vaccine; and 15 (15.3%) recorded they didn't know the influenza vaccine was necessary (Table 2). Of those not planning to be vaccinated for pertussis ($n=32$): 22 (68.8%) stated they did not believe it was necessary; 9 (28.1%) had received the vaccination in a previous pregnancy and did not know that another was needed; 5 (15.6%) were afraid of needles; and 19 (59.4%) selected other reasons (Table 2).

Birth interviews were completed for 194 (62.6%) women (Figure 1). Among women who were not vaccinated at baseline and did not complete the birth interview ($n=86$), a review of AIR records indicated 12 and 38 women had received the influenza and pertussis vaccine during their pregnancy, respectively. This brings the proportion of the whole cohort ($n=310$) who were vaccinated to 45.8% for influenza and 69.7% for pertussis (Figure 1), and 123 (39.7%) had received both. There were non-significant increases in uptake between the first and second year of the study (Table 1). There were no statistically significant differences between First Nations and other women with respect to uptake of influenza vaccine (44.8% vs. 46.7%) or having

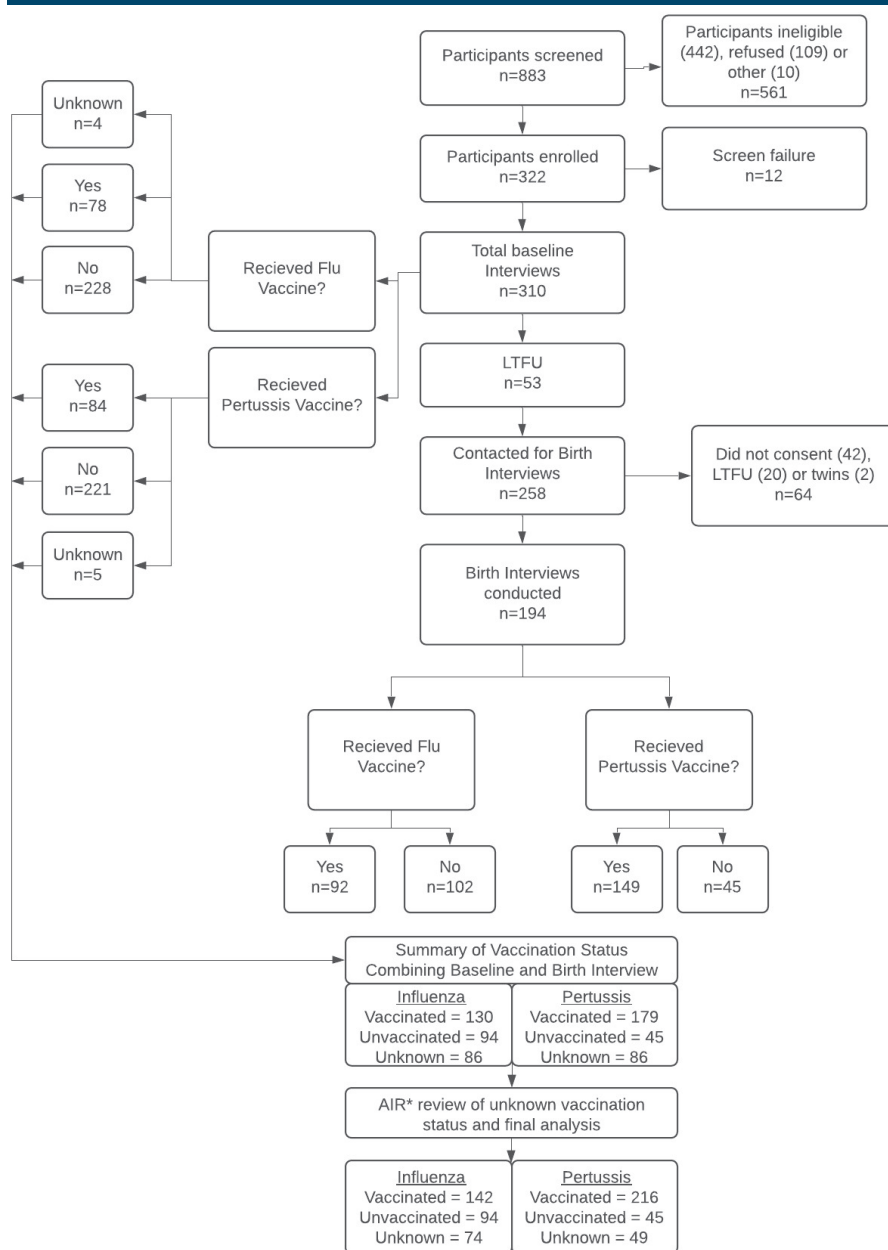
had both vaccines (67.2% vs. 58.2%), see Table 1. However, pertussis vaccine uptake was lower in First Nations women (53.5% versus 73.0%, respectively, $p=0.0004$).

We assessed independent predictors for vaccination among the entire cohort ($n=310$) following the inclusion of the additional AIR records described above. Women lost to follow-up with unknown vaccination status were classified as unvaccinated if vaccination status could not be confirmed on AIR. Maternal age, gestational age and First Nations status were retained in all models. Having received a vaccine in the 12 months prior to the pregnancy was positively associated with receipt of influenza, pertussis and both vaccines (Table 3). Women who identified as Aboriginal and/or Torres Strait Islander and those not employed full-time were less likely to have received the pertussis vaccine, and those who had a regular GP were more likely to have been vaccinated.

Discussion

We assessed influenza and pertussis vaccine coverage of pregnant First Nations and non-First Nations women in south-east Queensland, Australia. Among 310 women, approximately 46% were vaccinated for influenza and 70% for pertussis, with only 40% having received both. There were small but non-significant increases over the two years of the study. Having received either or both vaccines during pregnancy was positively associated with having had a vaccine in the 12 months prior to pregnancy. Identifying as First Nations and not being employed full-time were associated with a lower likelihood of pertussis vaccination whereas women who had a regular GP were more likely to have been vaccinated. The most common reasons for not being vaccinated were not considering them necessary and not knowing they were recommended/needed. Our findings are within the ranges reported by other Australian studies.^{5,6,11} Further, recent data from the Queensland Perinatal Data Collection¹² indicated 42% of Queensland women were influenza vaccinated during their pregnancy and 68% had received a pertussis vaccine in 2018, up from 28% and 52% in 2016, respectively. There were differences in vaccine uptake between First Nations and non-First Nations women for both influenza and pertussis vaccines – 31% and 42% for influenza; 55% and 69% for pertussis, respectively.¹² In our study,

Figure 1: Flow diagram of study recruitment and outcome data for analysis.



Note:
* AIR - Australian Immunisation Register

we found minimal differences in influenza vaccine coverage by First Nations status but similar differences for pertussis vaccine. The reasons for these differences between statewide data and our study are not immediately apparent. We did not undertake any intervention in the study to encourage vaccine uptake with these women given the pragmatic nature of the overall study. However, the primary care centres in our study regularly conducted annual influenza vaccination initiatives with their clients and this may have contributed to improved knowledge and acceptance of the vaccine.

Approximately one in two women and one in five women were not intending to get the influenza vaccine or pertussis vaccine, respectively, with the most common reason for non-receipt of both vaccines being not considering it necessary. A 2018 cross-sectional study on vaccination hesitancy in the antenatal period reported the main reasons why women did not receive the influenza vaccine were due to concerns about side effects to the mother (37.1%) and side effects to the baby (32.5%), and because it was not recommended by a health provider (33.6%).¹¹ Similar to influenza vaccine, Corben et al.¹³ reported 27% of women who did not

Table 1: Baseline characteristics at enrolment by receipt of influenza and/or pertussis vaccine during pregnancy (n=310).

Characteristic	Influenza			Pertussis			Both		
	Yes N=142 (45.8)	No N=168 (54.2)	p-value	Yes N=216 (69.7)	No N=94 (30.3)	p-value	Yes N=123 (39.7)	No N=187 (60.3)	p-value
Year enrolled									
30 May 2016 – 29 May 2017	43 (44.3)	54 (55.7)	0.725	62 (63.9)	35 (36.1)	0.137	35 (36.1)	62 (63.9)	0.383
30 May 2017 – 29 May 2018	99 (46.5)	114 (53.5)		154 (72.3)	59 (27.7)		88 (41.3)	125 (58.7)	
Mother's age in years at enrolment									
Mean (SD)	28.6 (5.9)	27.8 (6.0)	0.215	28.6 (5.9)	27.1 (6.2)	0.049	28.8 (6.0)	27.7 (6.0)	0.130
Gestation in weeks at enrolment									
Mean (SD)	26.5 (8.6)	27.7 (8.4)	0.230	26.6 (8.5)	28.3 (8.4)	0.104	26.6 (8.6)	27.5 (8.4)	0.378
Number of prior pregnancies									
0 (Ref)	30 (47.6)	33 (52.4)	0.489	50 (79.4)	13 (20.6)	0.039	27 (42.9)	36 (57.1)	0.464
1	36 (49.3)	37 (50.7)		52 (71.2)	21 (28.8)		30 (41.1)	43 (58.9)	
≥2	76 (43.7)	98 (56.3)		114 (65.5)	60 (34.5)		66 (37.9)	108 (62.1)	
Complications of previous pregnancies (excludes 63 women with no prior pregnancies)									
Yes	57 (46.7)	65 (53.3)	0.668	80 (65.6)	42 (34.4)	0.589	45 (36.9)	77 (63.1)	0.528
Enrolled during the influenza season									
Yes	99 (46.5)	114 (53.5)	0.725	148 (69.5)	65 (30.5)	0.912	85 (39.9)	128 (60.1)	0.903
Mother's Indigenous status									
Indigenous	26 (44.8)	32 (55.2)	0.795	31 (53.5)	27 (46.6)	0.004	19 (32.8)	39 (67.2)	0.360
Mother's relationship status									
Single (Ref)	61 (51.3)	58 (48.7)	0.384	96 (80.7)	23 (19.3)	0.001	57 (47.9)	62 (52.1)	0.060
Married	58 (43.9)	74 (56.1)		90 (68.2)	42 (31.8)		47 (35.6)	85 (64.4)	
De facto	23 (41.8)	32 (58.2)		29 (52.7)	26 (47.3)		19 (34.6)	36 (65.5)	
Decl/ Miss/ Unk	0 (0.0)	4 (100)		1 (25.0)	3 (75.0)		0 (0.0)	4 (100)	
Receives government pension/unemployment benefits									
Yes	82 (49.4)	84 (50.6)	0.340	129 (77.7)	37 (22.3)	0.002	43 (32.1)	91 (67.9)	0.037
Mother's highest education status									
Tertiary (Ref)	22 (47.8)	24 (52.2)	0.356	36 (78.3)	10 (21.7)	0.013	20 (43.5)	26 (56.5)	0.061
Cert/Trade/Dip	60 (48.4)	64 (51.6)		89 (71.8)	35 (28.2)		53 (42.7)	71 (57.3)	
High school	33 (50.0)	33 (50.0)		51 (77.3)	15 (22.7)		31 (47.0)	35 (53.0)	
Didn't finish high school	24 (36.4)	42 (63.6)		36 (54.6)	30 (45.4)		17 (25.8)	49 (74.2)	
Decl/ Miss/ Unk	3 (37.5)	5 (62.5)		4 (50.0)	4 (50.0)		2 (25.0)	6 (75.0)	
Mother's Employment Status									
Full time (Ref)	29 (46.8)	33 (55.2)	0.205	57 (91.9)	5 (8.1)	<0.001	29 (46.8)	33 (53.2)	0.014
Part time/Casual	45 (54.2)	38 (45.8)		63 (75.9)	20 (24.1)		40 (48.2)	43 (51.8)	
Unemployed	62 (41.6)	87 (58.4)		87 (50.4)	62 (41.6)		50 (33.6)	99 (66.4)	
Decl/ Miss/ Unk	6 (37.5)	10 (62.5)		9 (56.3)	7 (43.7)		4 (25.0)	12 (75.0)	
Total annual household income									
≥\$78,000 (Ref)	54 (50.5)	53 (49.5)	<0.001	89 (83.2)	18 (16.8)	<0.001	50 (46.7)	57 (53.3)	0.028
\$26,000 - < \$78,000	45 (47.9)	49 (51.1)		63 (67.0)	31 (33.0)		38 (40.4)	56 (59.6)	
≤ \$26,000	18 (51.4)	17 (48.6)		16 (45.7)	19 (54.3)		12 (34.3)	23 (65.7)	
Decl/ Miss/ Unk	25 (33.8)	49 (66.2)		48 (64.9)	26 (35.1)		23 (31.1)	51 (68.9)	
Mother has regular GP									
Yes	95 (48.0)	103 (52.0)	0.340	148 (74.8)	50 (25.3)	0.013	82 (41.4)	116 (58.6)	0.440
Mother has had the same midwife for antenatal care									
Yes	47 (48.5)	50 (51.5)	0.547	72 (74.2)	25 (25.8)	0.480	41 (42.3)	56 (57.7)	0.353
Number of antenatal visits by time of enrolment									
Mean (SD)	5.0 (4.0)	5.4 (4.9)	0.433	5.3 (4.6)	5.0 (4.5)	0.636	5.1 (3.9)	5.2 (4.9)	0.746
Pre-existing medical conditions									
Yes	58 (47.5)	64 (52.5)	0.115	85 (69.7)	37 (30.3)	0.294	51 (41.8)	71 (58.2)	0.029
Received any vaccine in the 12 months prior to pregnancy									
Yes	46 (56.8)	35 (43.2)	0.047	67 (82.7)	14 (17.3)	0.008	42 (51.9)	39 (48.2)	0.013
Mother has someone to confide in									
Yes	135 (45.5)	162 (54.6)	0.580	211 (71.0)	86 (29.0)	0.041	119 (40.1)	178 (59.9)	0.908
Mother has someone she can trust/rely on for help									
Yes	133 (45.2)	161 (54.8)	0.449	210 (71.4)	84 (28.6)	0.015	118 (40.1)	176 (59.9)	0.667

Note:

SD= standard deviation

vaccinate against pertussis cited concerns about side effects to themselves or harm to their baby, along with previous immunisation history against pertussis and/or plans to vaccinate postpartum. A 2015 study¹⁴ found similar results, with the most common concerns being the potential side effects to themselves (22.6%) or their infant (12.2%), effectiveness of the vaccine (16.2%) or fear/dislike of injections/needles (5.7%). Concerns about vaccine safety and vaccine-provider recommendation were not predominant in our study; however, not considering the disease important or the vaccine necessary, and/or fear of needles, was not uncommon. Not considering the vaccines necessary and perceptions of disease importance are likely to be associated with exposure to vaccine-provider recommendations and health literacy with respect to individual assessment of the risks and benefits of vaccination. This emphasises the importance of detailed antenatal advice about both the diseases and the vaccines, particularly influenza, where perceptions of low disease severity persist.^{15,16}

The only common predictor of vaccine uptake for influenza, pertussis or both was having had a vaccine in the 12 months prior to pregnancy. Wong et al.¹⁴ reported 51% of pregnant women self-reported receipt of an influenza vaccine during their lifetime; of those, 46.4% had received it within the last 12 months. Women who were aware of the availability of the influenza vaccine during pregnancy prior to study participation were three times more likely to be vaccinated ($p=0.026$).¹⁴ This link between existing vaccination behaviours and behaviours during pregnancy suggests health education to promote vaccinations to the population before family planning is important.

The proportion of women who had received both vaccines was only 40% and uptake of influenza vaccine lags behind pertussis vaccine. While the availability of influenza vaccine may be a factor depending on the time of year and stage of a woman's pregnancy, influenza vaccine can be given in any trimester and there are no restrictions on giving both vaccines at the same time. In addition to considering the vaccine unnecessary, relatively high proportions of women not intending to vaccinate reported that was it due to them rarely getting sick or a belief that the vaccine made them sick (Table 2). More efforts are needed to increase the understanding of the benefits of the influenza vaccine to pregnant women and their babies.

Table 2: Reasons why women were not intending to vaccinate during pregnancy.

Reason	Influenza N=98	Pertussis N=32
Already had a flu vaccine in last 12 months	3 (3.1)	Not applicable
Had one in previous pregnancy but didn't know another one was needed	0	9 (28.1)
I didn't know it was recommended	15 (15.3)	5 (15.6)
I don't think [disease] is that serious	0	0
I don't feel that it's necessary	22 (22.5)	22 (68.8)
I don't like/am afraid of needles	10 (10.2)	5 (15.6)
I don't think vaccines in pregnancy are safe	3 (3.1)	1 (3.1)
I once had a reaction to a vaccine	8 (8.2)	2 (6.3)
I rarely get sick	19 (19.4)	3 (9.4)
I think [disease] vaccine makes you get sick	20 (20.4)	0
I won't be able to afford it	0	0
I'm allergic to the [disease] vaccine	6 (6.1)	1 (3.1)
No one has told me about it	5 (5.1)	2 (6.2)
Someone told me not to	5 (5.1)	0
Other	19 (19.4)	19 (59.4)

Note:
More than one response was permitted

Table 3: Independent predictors of influenza and/or pertussis vaccination in pregnancy.^a

Vaccine	N (%)	Crude OR ^b (95%CI) ^c	Adjusted OR ^b (95%CI) ^c	p-value
Influenza vaccine (n = 142)				
Has had a vaccine in the past 12 months	46 (32.4)	1.81 (1.09 – 3.04)	1.91 (1.3 – 3.25)	0.017
Pertussis vaccine (n = 216)				
Identifies as First Nations	31 (14.4)	0.43 (0.24 – 0.77)	0.38 (0.20 – 0.74)	0.004
Employment status				
Full-time	57 (26.4)	Ref	Ref	
Part-time	63 (29.2)	0.28 (0.10 – 0.78)	0.27 (0.09 – 0.78)	0.016
Casual	87 (40.3)	0.12 (0.05 – 0.32)	0.15 (0.05 – 0.40)	<0.001
Declined	9 (4.2)	0.11 (0.03 – 0.43)	0.12 (0.03 – 0.54)	0.005
Has a regular general practitioner	148 (68.5)	1.87 (1.14 – 3.08)	1.82 (1.05 – 3.17)	0.033
Has had a vaccine in the past 12 months	67 (31.0)	2.57 (1.36 – 4.86)	2.65 (1.33 – 5.28)	0.005
Both vaccines (n = 123)				
Has had a vaccine in the past 12 months	42 (34.2)	1.97 (1.18 – 3.29)	2.11 (1.24 – 3.59)	0.006

Notes:

a: Models included all variables in Table 1 with a p-value < 0.1 in univariable analyses.

b: OR – Odds ratio

c: 95%CI – 95% confidence interval

Loss to follow-up between the baseline and birth interviews is an important limitation of our study, resulting in vaccination status being unknown for 86 (27.7%) women if we had relied solely on self-report. The birth interviews were conducted within six weeks of the baby's birth to account for the impact of a new baby, and four contact attempts were made, thus the reasons for discontinuation in the study are unclear other than it was no longer considered important among competing priorities. We conservatively assumed that women lost to follow-up with no record on the AIR were unvaccinated in regression modelling. The recording of adult vaccines on the AIR has not been evaluated and it is therefore not

possible to assess any misclassification bias we may have introduced. However, our final estimates are similar to studies elsewhere and it is unlikely significant bias has been introduced.

Finally, an inclusion criterion for the primary study was the intent to vaccinate the infant; thus, our sample was comprised of women who were supportive of vaccines, at least for their newborn infants. Our study would by default have excluded women who were not supportive of vaccines and thus our estimates may overestimate overall vaccine uptake in pregnancy.

Conclusions

While improving, uptake of vaccines during pregnancy remains suboptimal, particularly for influenza vaccine. Discrepancies persist between First Nations and other Australian women. There is now substantial evidence for why women do not vaccinate during pregnancy, much of which can be overcome by sustained education campaigns of women, their support networks and their healthcare providers and removing logistical barriers to vaccination.^{9,17,18} Antenatal care providers are known to be trusted sources of information for vaccination during pregnancy and services that are proactive in vaccinating women during an antenatal visit hold promise for improving coverage.¹⁹ As new vaccines targeted for delivery during pregnancy are on the horizon (for example, respiratory syncytial virus and group B streptococcus), addressing vaccine hesitancy and gaps in service delivery will become increasingly important. Further, population-based monitoring and reporting of coverage through AIR will be important to the evaluation of public health campaigns and clinical initiatives and an evaluation of the register for accuracy and completeness of reporting is warranted.

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