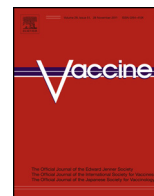




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## Influenza vaccination during pregnancy: Coverage rates and influencing factors in two urban districts in Sydney

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### ABSTRACT

**Background:** Pregnant women have an increased risk of complications from influenza. Influenza vaccination during pregnancy is considered effective and safe; however estimates of vaccine coverage are low. This study aimed to determine influenza vaccination coverage and factors associated with vaccine uptake in pregnant women in two Sydney-based health districts.

**Methods:** A random sample of women who delivered a baby in a public hospital in Sydney and South-Western Sydney Local Health Districts between June and September 2012 were surveyed using a computer assisted telephone interviewing service.

**Results:** Of the 462 participants (participation rate 92%), 116 (25%) reported receiving the influenza vaccine during their pregnancy. In univariate analysis, vaccination coverage varied significantly depending on antenatal care type, hospital of birth, and parity ( $p < 0.05$ ), but not for age category, highest level of education, country of birth, language spoken at home, or Aboriginal status. Women who received antenatal care through a general practitioner (GP) had 2.3 (95% CI 1.4–3.6) times the odds (unadjusted) of receiving the influenza vaccination than those who received their antenatal care through a public hospital. The main reason cited for vaccination was GP recommendation (37%), while non-recommendation (33%) and lack of knowledge (26%) were cited as main reasons for not receiving the vaccination. 30% of women recalled receiving a provider recommendation for the vaccination and these women had 33.0 times the odds (unadjusted) of receiving the vaccination than women who had not received a recommendation. In a multivariate model a provider recommendation was the only variable that was significantly associated with vaccination (OR 41.9; 95% CI 20.7–84.9).

**Conclusion:** Rates of influenza vaccination during pregnancy are low. There is a significant relationship between healthcare provider recommendation for the vaccination and vaccine uptake. Increasing provider recommendation rates has the potential to increase coverage rates of influenza vaccination in pregnant women.

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## 1. Introduction

Influenza infection during pregnancy is associated with increased risk of complications for both mother and baby, including respiratory and cardio-pulmonary illness requiring hospitalisation, pre-term delivery, foetal distress, and in severe cases, death [1-7]. Influenza vaccination during pregnancy is considered safe for both the mother and the foetus for use in any trimester of pregnancy [8-11]. Influenza vaccination during pregnancy protects pregnant women and their infants from severe influenza infection, significantly reducing respiratory illnesses in both the mothers and their infants in the first six months of life [12-14].

Routine seasonal influenza vaccination for all pregnant women is recommended in Australia by health authorities [15,16] and the Royal Australian and New Zealand College of Obstetrics and Gynaecology [17]. Despite the influenza vaccine being free of charge for all pregnant women in Australia, vaccine uptake during pregnancy is low, with coverage rates estimated to be between 10% and 40% [18-22]. Multiple factors influence vaccine uptake during pregnancy, with women more likely to receive the influenza vaccine during pregnancy if they perceive themselves to be at higher risk of influenza complications during pregnancy, perceive the vaccination to be safe, have received an influenza vaccine before, and receive a recommendation from a healthcare provider [21-26].

There is no surveillance of influenza vaccination during pregnancy in Australia hence most available data are derived from single-site surveys conducted in ante-natal care facilities or post-natal hospital wards [19-21]. Strategies to improve awareness about influenza vaccination during pregnancy in both antenatal care providers and pregnant women, including a letter, brochures, poster, and a reminder stamp in records, were implemented across central and south-western Sydney in early 2012 [27]. However, little information is available on vaccination uptake and associated factors in this population. This study was designed to ascertain the coverage of influenza vaccination in pregnant women central and south-western Sydney during the 2012 influenza season, and to identify factors that affect vaccine uptake for these women.

## 2. Methods

A cross-sectional survey of women who delivered a baby in public hospitals in South Western Sydney and Sydney Local Health Districts during the 2012 influenza season was conducted using computer assisted telephone interviewing. These Local Health Districts cover a population of 1.4 million people, and include higher proportions of people from culturally and linguistically diverse backgrounds and low socio-economic areas than the state average. In 2010 there were 21,252 births to residents of these districts, representing 22% of all births in the state of New South Wales, Australia, that year.

### 2.1. Study population

The study population was defined as women who gave birth in one of the seven public hospitals in South Western Sydney and Sydney Local Health Districts in the period June 1 to September 30, 2012. The following women were excluded: mothers of babies who were born before 35 weeks' gestational age, who were discharged to another hospital facility after delivery, who were still born or who died while in hospital, or women under 18 years and women who left hospital against medical advice after delivery.

### 2.2. Sample size

Based on an estimated population of 6321, an estimated vaccination coverage rate of 25%, and an accepted precision of  $\pm 4\%$ , it was

estimated that a sample size of 420 would be required. To allow for 40% non-participation, 700 women were randomly selected, using random number allocation and ordering.

### 2.3. Survey content

The survey tool consisted of questions designed to determine a woman's knowledge, attitudes, perceptions, and experiences of influenza vaccination during their recent pregnancy, reasons for being vaccinated or not, and demographic characteristics. Knowledge, attitudes and perceptions questions using a 5-point Likert-type scale were used in this survey, with some of which had been field tested in a previous survey [22]. Pre-survey interviews were conducted with 20 women to check face validity, following which minor refinements were made.

### 2.4. Survey delivery

A Computer Assisted Telephone Interviewing (CATI) service was employed to contact randomly selected women following the distribution of an introductory letter and information sheet. Translated information sheets in the three most common languages were provided as appropriate. Women were telephoned by an experienced interviewer who invited them to participate in the study, and the survey was conducted with consenting women. A minimum of six call attempts were made to contact each respondent, and once contacted a minimum of three further call attempts were made to complete the interview. When required a telephone interpreter assisted interview in the relevant language was arranged. The survey was conducted in November to December 2012.

### 2.5. Data analysis

The Index of Relative Socio-economic Disadvantage (IRSD) for areas was used to determine socio-economic status of women based on their postcode of residence, and reported in quintiles, where for example the most disadvantaged 20% of areas in NSW are in the lowest quintile. [28] Data analysis was conducted using SAS Enterprise Guide Version 5.1. A chi-squared goodness of fit test was conducted to compare the study group and study population from which they were selected to assess representativeness. The knowledge and attitudes 5-point response categories were collapsed into binary results, with a strongly agree or agree answer recorded as a positive response, and a neutral, disagree or strongly disagree answer recorded as a negative response. Chi squared tests for differences in proportions were conducted for each demographic and knowledge category to determine if any group category was more likely to have received the influenza vaccine. Within each category factors predicting whether the influenza vaccination was received or not were identified by conducting univariate regression, and calculating odds ratios and their respective 95% confidence intervals compared to a nominated referent category. A multi-variate logistic regression analysis was undertaken, which included all demographic and ante-natal care experience variables, with the exception of country of birth due to correlation with language spoken at home. The multi-variate analysis did not include knowledge and attitudes variables. A  $P$ -value of  $<0.05$  was considered statistically significant.

### 2.6. Ethics

This project was approved by the Sydney Local Health District Human Research Ethics Committee.

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