

# PREDICTORS OF INFLUENZA VACCINATION AMONGST AUSTRALIAN NURSES

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Accepted for publication April 2002

**Key words:** nurses, influenza, immunisation, preventative health

## ABSTRACT

The Centers for Disease Control and Prevention recommend that health care workers receive influenza immunisation annually. There is no available data on factors predicting influenza immunisation or nurses' acceptance of the need for immunisation in Australia. To determine the predictors of influenza immunisation amongst nurses in Australia, a cross sectional survey of nurses in a 200-bed hospital was conducted. 232 of the 290 questionnaires were returned. In a logistic regression model, nurses having had previous influenza vaccination, severity of influenza if contracted, and, knowledge that the vaccine does not lead to clinical signs of influenza, were the factors most predictive of intention of influenza vaccination in the immediate future. Influenza immunisation rates among nurses may be increased by strategies addressing misconceptions about influenza immunisation and reinforcing predictors of influenza immunisation through education programs targeted to nurses.

## BACKGROUND

The Centers for Disease Control and Prevention (CDCP) recommend that health care workers (HCWs) be immunised against influenza (CDCP, 2001). The reason for this is that influenza immunisation of HCWs reduces the exposure of the influenza virus to patients (Thomson et al 1999). HCWs are potential reservoirs for transmission of influenza to patients and have been implicated in several nosocomial outbreaks (Coles, Balzano and Morse 1992; Ikeda, Drabkin and Birkhead 1992).

In Australia, during 2000, 2,937 deaths occurred which were attributed to pneumonia and influenza (ABS 2001). In the period of 1999-2000 a total of 2,591 admissions to Australian hospitals were recorded for influenza (Roche et al 2001). HCWs may be at an increased risk of contracting influenza, especially during nosocomial outbreaks. They may serve as vectors for transmitting influenza to others, including high risk patients. Although an important target group for immunisation (CDC 2001), nurses fail to receive the influenza vaccine each year in adequate numbers and this may be related to their beliefs and knowledge of influenza and its vaccine (Harbarth et al 1998).

In a New Zealand study, 45% of nurses did not believe in immunisation and 33% believed that they did not fall into a group in which influenza immunisation would be recommended (Walls 2000). Nurses are more reluctant to receive immunisation than other HCWs. Furthermore, nurses more often ignore the likelihood of contracting influenza and are less convinced of vaccine efficacy (Harbarth et al 1998). However, nurses who have been immunised previously are more likely to receive the influenza vaccine (Watanakunakorn, Ellis and Gemmel 1993).

In the hospital where this study was conducted, influenza immunisation has been offered free of charge to HCWs during the last two years. In the year before this study, less than 10% of all HCWs received the free vaccination (Mikhail 2001 personal communication). There is a lack of information in the scientific literature about the predictors of influenza immunisation uptake in

nurses in Australia. The purpose of this study was to determine possible predictors of intention of receiving the influenza vaccine in the immediate future in a sample of Australian nurses, by way of a cross-sectional survey.

## METHOD

The questionnaire used to obtain information about factors that may possibly be predictive of influenza immunisation in the immediate future was based on predictors reported by Chapman and Coupe (1998). Questions asked related to the beliefs and knowledge of influenza and its vaccine. The questionnaire was included with the payslip of every nurse employed in a 200-bed hospital in New South Wales, Australia. The completed questionnaires were deposited anonymously in a ballot box located in each work area. An incentive (participation in a raffle for cash vouchers) was provided for those who completed the questionnaire.

Statistical analysis consisted of contingency tables and the chi-square test for categorical variables. A logistic regression model was used to identify factors independently associated with intention of receiving influenza immunisation in the near future. The results are presented as odds ratios (ORs) with associated 95% confidence intervals (CIs). The analyses were conducted using the SAS V8 statistical software. A p-value of less than 0.05 was considered as denoting statistical significance.

## RESULTS AND DISCUSSION

232 of the 290 (80%) questionnaires were returned. 47% of respondents were aged between 21-39 years; 49.6% were 40-55 years old; and, 3.4% were aged 56-65 years. Just over 90% were women. About 23% of respondents had been immunised against influenza in the past.

Intention of receiving the influenza immunisation in the near future was significantly associated with eight factors (table 1). Other than age, the three greatest proportions were associated with:

- perception that if influenza is contracted it will affect the individual nurse severely;
- perception of a high likelihood of contracting influenza if not vaccinated; and,
- previous influenza vaccination.

Intention of receiving the influenza vaccine in the near future was further explored by the use of a multivariate logistic regression model. This model identified three significant independent predictors of receiving the influenza vaccine in the near future (table 2). The predictors identified were nurses' previous vaccination, perceived severity of influenza if contracted and knowledge that the influenza vaccine does not lead to clinical influenza.

This study is one of the first to address predictors of influenza immunisation among Australian nurses. Nichol and Hauge (1997) found previous vaccination in HCWs an important independent predictor of the receipt of the influenza vaccine (OR=5.4). This study found similar results with an OR of 3.5. The difference in the OR in the study by Nichol and Hauge (1997) and this study may relate to differences between the populations studied; 26.2% of HCWs in the Nichol and Hauge study were doctors.

Although the influenza vaccine consists of inactivated killed virus and is non-infectious (CDC 2001), in the present study, a large number of nurses reported that having the influenza vaccine was likely to lead to clinical symptoms of influenza. Further education of hospital nurses about influenza and immunisation may be required to correct this misconception. Knowledge that the vaccine does not lead to clinical symptoms of influenza was an independent predictor to receiving the influenza vaccine (OR=2.3). Heimberg et al (1995) found similar results in their study. However, that study sample included only about 13% of nurses (Heimberger et al 1995). The perception that contracting influenza would significantly affect nurses was another independent predictor of the intention to have the influenza immunisation in the near future (OR=4.6). This factor has not been reported previously in the literature as a predictor of influenza

**Table 1: Factors associated with intention of receiving influenza immunisation in the near future**

	High intention of receiving influenza immunisation	Low intention of receiving influenza immunisation	p-value
Proportion of nurses who perceived a high likelihood of contracting influenza if not vaccinated	53.2%	20.3%	0.0001
Proportion of nurses who perceived that if influenza was contracted it will affect them severely	60.6%	17.1%	0.0001
Proportion of nurses with previous influenza vaccination	38.5%	8.9%	0.001
Proportion of nurses who perceived the influenza vaccine to be very effective	42.2%	21.1%	0.002
Proportion of nurses older than 40 years of age	61.5%	45.5%	0.011
Proportion of nurses who perceived a high likelihood of contracting the influenza from another person	71.6%	53.7%	0.007
Proportion of nurses who believe that influenza immunisation may lead to clinical symptoms of influenza	21.1%	40.7%	0.002

**Table 2: Independent predictors of the intention of receiving the influenza vaccine in the near future from a multivariate logistic regression model**

	Adjusted odds ratio* (95% CI)	p-value
Nurses with previous influenza immunisation	3.5 (1.5, 7.9)	0.003
Perception that if influenza is contracted it will severely affect health	4.6 (2.2, 9.7)	0.001
Belief that influenza immunisation less likely to lead to clinical symptoms of influenza	2.3 (1.1, 4.7)	0.02
* An odds ratio greater than one indicates a greater intention of receiving influenza vaccine in the near future and an odds ratio of less than one indicates a lesser intention of receiving the influenza immunisation in the near future		

immunisation uptake in nurses. It is possible that nurses related this factor to previous influenza infection, although this question was not asked in the questionnaire.

Walls (2000) found a 15% influenza vaccination rate in a sample of New Zealand nurses. In this study sample, approximately 23% of nurses had previously received the influenza vaccination in any one year. A possible explanation for the low uptake of influenza may be that nurses do not consider influenza a serious illness. It could be suggested that hospital-based nurses are not aware of the incidence and severity of influenza as these patients are usually managed in a primary care setting.

In the present study, the reported uptake of the influenza vaccine is similar to the findings of Harbarth et al (1998). These investigators reported that 20% of nurses had been immunised against influenza following an education program. Prior to the education program, the rate of influenza vaccination amongst these nurses was 5%. Findings such as this reinforce the authors' suggestions that education programs will improve influenza immunisation uptake.

## CONCLUSION

In this study, about 53% of nurses had a low intention of receiving the influenza vaccine in the immediate future. This is alarming as nurses have the closest and most intimate contact with patients and still remain the most reluctant group to accept immunisation for influenza (Harbarth et al 1998). Therefore, there is an obvious need to increase influenza uptake rates in hospital-based nurses.

A number of health behavioural change theories, for example, the health belief model, and the theories of reasoned action and planned behaviour (Nutbeam and Harris 1998) are underpinned by, among other factors, beliefs and perceptions about the benefits and costs of changing health behaviours. Hence, information from this and other similar studies can be used to inform effective health education campaigns aimed at favourably changing nurses' behaviour towards influenza immunisation.

A limitation of this study is the small sample size, however the response rate of 80% was high. The study results and conclusion are valid and generalizable. This is suggested by the high response rate, together with the consistency of our results with other published studies.

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