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Abstract

Background Annual influenza vaccination is recommended for all Australian health care workers (HCWs) including those working in primary health care. There is limited published data on coverage, workplace provision, attitudes and personal barriers to influenza vaccination amongst primary health care staff. The aim of this study was to contribute to the limited literature base in this important area by investigating these issues in the primary health care setting in New South Wales (NSW), Australia. Methods A postal survey was sent to general practitioners (GPs) and practice nurses (PNs) from inner city, semi-urban and rural areas of NSW, Australia. There were 139 responses in total (response rate 36%) from 79 GPs (response rate 30%) and 60 PNs (response rate 46%). Results Reported influenza vaccination coverage in both 2007 and 2008 was greater than 70%, with GPs reporting higher coverage than PNs in both years. The main barriers identified were lack of awareness of vaccination recommendations for general practice staff and concern about adverse effects from the vaccine. Conclusions Rates of influenza vaccination coverage reported in this study were higher than in previous studies of hospital and institutional HCWs, though it is possible that the study design may have contributed to these higher results. Nevertheless, these findings highlight that more needs to be done to understand barriers to vaccination in this group, to inform the development of appropriate strategies to increase vaccination coverage in primary health care staff, with a special focus on PNs. 2010 Blackwell Publishing Ltd.

Keywords

primary, attitudes, coverage, vaccination:, influenza, australia, annual, staff, care

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Annual influenza vaccination: coverage and attitudes of primary care staff in Australia

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Methods A postal survey was sent to general practitioners (GPs) and practice nurses (PNs) from inner city, semi-urban and rural areas of NSW, Australia. There were 139 responses in total (response rate 36%) from 79 GPs (response rate 30%) and 60 PNs (response rate 46%).

Results Reported influenza vaccination coverage in both 2007 and 2008 was greater than 70%, with GPs reporting higher

coverage than PNs in both years. The main barriers identified were lack of awareness of vaccination recommendations for general practice staff and concern about adverse effects from the vaccine.

Conclusions Rates of influenza vaccination coverage reported in this study were higher than in previous studies of hospital and institutional HCWs, though it is possible that the study design may have contributed to these higher results. Nevertheless, these findings highlight that more needs to be done to understand barriers to vaccination in this group, to inform the development of appropriate strategies to increase vaccination coverage in primary health care staff, with a special focus on PNs.

Keywords General practice, influenza, primary health care, vaccination.

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Introduction

Influenza is a serious respiratory virus which costs the Australian healthcare system \$115 million annually.¹ Primary health care workers (HCWs) like general practitioners (GPs) and practice nurses (PNs) have found to be at higher risk for influenza than the general population.² This may be because of: (i) exposure to influenza infection in both the general community and the workplace; and (ii) close proximity to visitors and patients.^{1,3} Vaccines remain the cornerstone of influenza prevention in many countries worldwide⁴ and are considered to be 50–80% effective in healthy persons aged 16–65 years.⁵

Annual influenza vaccination of Australian HCWs is recommended by the National Health & Medical Research Council (NHMRC),³ the Australian Committee on Safety and Quality in Healthcare⁶ and various jurisdictional health

departments, including New South Wales (NSW).⁷ The Royal Australian College of General Practitioners⁸ recommend that general practice staff members are offered immunisation appropriate to their duties.

Whilst there have been numerous Australian studies on influenza vaccine uptake amongst hospital and institutional HCWs^{6,9–13} and some studies on attitudes of primary care clinicians to influenza vaccination for their patients^{14,15}, there has been limited published studies to date on influenza vaccination coverage, barriers and enablers amongst primary health care staff in Australia. Influenza vaccination coverage amongst GPs in Australia was ~50% in 1998.¹⁶ In neighbouring New Zealand, coverage amongst GPs was 68% and 64% in PNs in 2001.¹⁷ Other countries have reported lower coverage estimates, with only 35% of Canadian family physicians from Québec¹⁸ and 36% of GPs from the Netherlands¹⁹ vaccinated in 1996 and 2008,

respectively. A study across all primary health care professions in Israel reported an average of 30% coverage across physicians, nurses, pharmacists and administration staff.²⁰

Factors associated with influenza vaccination status have been examined in primary health care clinicians in other countries.^{17–21} Amongst this group of HCW's, significant predictors for vaccine acceptance include the following: agreement that HCW's have professional responsibility to be vaccinated, on-site access to free vaccine, workplace recommendation for staff influenza vaccination, desire for self-protection and belief that the benefits of vaccination outweigh the risk of vaccine side effects.^{17,21} Furthermore, previous influenza vaccination has been significantly associated with current vaccine acceptance in both hospital HCWs and primary care physicians.²⁰ Factors significantly associated with lack of vaccine acceptance include the following: no medical indication for vaccination, belief that regular medical exposure will protect against the disease, low risk of contracting influenza, fear of vaccine side effects and lack of time or priority.^{17,19,20} Some of these factors are similar to those cited by hospital HCWs whilst others differ. In a review of attitudes and predictors to influenza vaccination of hospital HCW's, lack of convenient access to vaccine and poor knowledge about influenza infection were prominent reasons for lack of vaccination with the desire for self-protection and belief in the vaccine's effectiveness the most prominent reasons for vaccine acceptance in this group.²²

To the best of our knowledge, there have been limited studies which specifically examine: influenza vaccination coverage, workplace provision of vaccination, knowledge, attitudes and personal barriers to influenza vaccination amongst GPs and PNs in Australia. The aim of this study therefore was to contribute to the limited literature base in this important area by investigating this in the primary health care setting in NSW, Australia.

Methods

A paper-based survey was developed based on pilot work undertaken by the authors and commonly identified barriers to vaccination from the literature.^{6,23,24} It elicited demographic data about the respondents, their influenza vaccination status from 2007 to 2009 and identified barriers to being immunised. It also posed questions intended to determine the respondent's attitude towards vaccination, based on seven statements about efficacy, safety, adverse events and recommended target groups for influenza vaccine and was part of a wider survey that incorporated questions on pandemic influenza. The survey was piloted with four GPs and PNs from outside the study area. Feedback from this process contributed to enhanced content, altered survey structure and modified wording.

Our sample was drawn from Divisions of General Practice (DGP) in NSW. DGPs are government-funded organisations that provide support to a defined geographical catchment of general practices in Australia. They are classified by population and locality into five categories based on Rural, Remote Metropolitan Areas (RRMA).^{25,26} NSW has the highest number of DGPs, with 32. Purposive sampling by the authors was used to select four DGPs in NSW to represent a diverse sample from metropolitan, semi-urban and rural areas. The final sample size for each participating Division was weighted according to how many GPs and PNs were practicing in the area.

The study was undertaken from the 1st February to 1st April 2009, prior to the Pandemic (H1N1) Influenza 2009 which was identified in late April 2009.²⁷ Authors were blinded to participant selection, as they were randomly selected from de-identified DGP databases of GPs and PNs. Surveys were posted by DGPs and were accompanied by personalised explanatory letter and a reply-paid envelope. Non-responders were sent a second letter and survey by the DGPs within 4 weeks.

Quantitative data was entered into Microsoft Access and was analysed using Microsoft Excel. Responses to the geographical location question were categorised into inner city, semi-urban and rural areas. Questions about influenza vaccine-related barriers, attitudes and beliefs were categorised into either agree, disagree or uncertain. The categories were compared with demographic characteristics and self-reported vaccination status of respondents using categorical data analysis. Ethical approval was granted by the University of New South Wales Ethics Committee.

Results

Of the 390 staff that was sent a survey, 139 completed and returned it, giving an overall response rate of 36%. Fifteen surveys were returned uncompleted as the staff member was no longer at the practice. Response rates were higher amongst PNs (46%) than GPs (30%). The demographic and occupational characteristics of the respondents are summarised in Table 1. There was some variation in geographical location of respondents, with 58.3% (81/139) located in semi-urban areas, 36% (50/139) in the inner city and the remaining 5.7% (8/139) in rural locations. Of the respondents, 45% (62/139) were working in practices with ≤ 4 GPs. Our sample parallels the findings of the 2007–2008 Bettering the Evaluation and Care of Health (BEACH) survey in terms of the spread in GP age, years worked in general practice and geographical location. The BEACH program is a continuous national study of general practice activity in Australia. It provides a reliable, ongoing, representative description of general practice activity nationwide.²⁸

Table 1. Demographic characteristics of participants

Characteristic	No. (%) (n = 139)
Occupational cohort	
GP	79 (56.8)
PN	61 (43.9)
Sex	
Female	92 (66.2)
Male	45 (32.4)
Not specified	2 (1.4)
Age group (years)	
18–30	4 (2.9)
31–40	28 (20.1)
41–50	40 (28.2)
51+	65 (46.8)
Not specified	2 (1.4)
Home/living arrangements	
Live alone	7 (5.0)
Live in shared accommodation	3 (2.2)
Live with partner/spouse	33 (23.7)
Live with partner/spouse and children	86 (61.9)
Other	9 (6.5)
Not specified	1 (0.7)
Number of years in general practice (range)	
GP	1–20+
PN	0.3–20+
Number of GPs working in practice (mean, range)	
GP	6.4, 1–27
PN	5.4, 1–21
Number of sessions usually worked* (mean, range)	
GP	7.8, 2–13
PN	6.7, 1–20
Vaccine uptake (2009) (%)	
Already received	
Yes	21.5
No	41.8
Unsure	36.7
Unspecified	0.0
Intending to receive	
Yes	62.0
No	15.2
Unsure	21.5
Unspecified	1.3

GP, general practitioner; PN, practice nurse.

*Four hours equals one session.

Just over 70% of respondents were vaccinated against influenza in 2007 (70.5%, 98/139, 95% CI: 62.9–78.1) and in 2008 (72.7%, 101/139, 95% CI: 65.3–80.1). Differences in vaccination coverage between GPs and PNs for both 2007 ($P = 0.74$) & 2008 ($P = 0.22$) (see Table 1) were non-significant. At the time of data collection, 25.2% (35/139, 95% CI: 18.0–32.4) of respondents had been vaccinated for the 2009 season, with a further 55.4% (77/139, 95% CI: 47.1–63.7) stating that they intended to receive the vaccine

that year. Of those GPs and PNs vaccinated in both 2007 and 2008, 34.9% (30/86, 95% CI: 24.8–45.0) had already received the vaccine in 2009 and of the remainder, 61.6% (53/86, 95% CI: 51.3–71.9) were intending to be vaccinated in 2009.

Participants indicated that free influenza vaccine was most commonly provided at the practice for GPs (79.1%, 110/139, 95% CI: 72.3–85.9), administration staff (74.8%, 104/139, 95% CI: 67.6–82.0) and PNs (72.7%, 101/139, 95% CI: 65.3–80.1). Of the GPs working at a practice which provided free influenza vaccine for GPs, 84.5% (49/58) were vaccinated in 2008 in contrast to 58.3% (7/12) coverage in GPs from practices that did not provide the vaccine free of charge for them. For PNs, 69.8% (37/53) vaccinated in 2008 worked at a practice where the vaccine was provided free and 66% (2/3) were vaccinated despite the vaccine not being provided free for PNs at their practice.

Respondents' knowledge, attitudes and perceptions of influenza vaccination are summarised in Table 2. Over 90% of the participants believe that the influenza vaccine is

Table 2. Knowledge, attitudes and perceptions of influenza vaccination amongst general practitioners (GPs) and practice nurses (PNs)

	GP n = 79 (%)	PN n = 60 (%)	Overall n = 139 (%)
The yearly flu vaccine is safe			
Agree	76 (96.2)	57 (96.0)	133 (95.6)
Disagree	0	3 (5.0)	3 (2.2)
Unsure	1 (1.3)	0	1 (0.7)
Not specified	2 (2.5)	0	2 (1.4)
The yearly flu vaccine is effective			
Agree	72 (2.4)	56 (93.3)	128 (91.1)
Disagree	1 (3.8)	1 (1.7)	2 (1.4)
Unsure	4 (1.3)	3 (5.0)	7 (5.0)
Not specified	2 (2.5)	0	2 (1.4)
Getting vaccinated against influenza is important to protect patients			
Agree	73 (92.4)	58 (96.7)	131 (94.3)
Disagree	3 (3.8)	2 (3.3)	5 (3.6)
Unsure	1 (1.3)	0	1 (0.7)
Not specified	2 (2.5)	0	2 (1.4)
The influenza vaccine contains live viruses that may cause some people to get influenza			
Agree	19 (24.1)	11 (18.3)	30 (21.6)
Disagree	54 (68.4)	46 (76.6)	100 (71.9)
Unsure	5 (6.3)	2 (2.5)	7 (5.1)
Not specified	1 (1.2)	1 (1.6)	2 (1.4)
I don't believe that flu immunisation will benefit me because I don't get the flu			
Agree	8 (10.1)	3 (5.0)	11 (7.9)
Disagree	62 (78.5)	32 (53.3)	94 (67.6)
Unsure	2 (2.5)	2 (3.3)	4 (2.9)
Not specified	7 (8.9)	23 (38.3)	30 (21.6)

safe (95.6%, 133/139, 95% CI: 92.2–99.0) and effective (92%, 128/139, 95% CI: 87.5–96.5). The majority of unvaccinated respondents (in both 2007 & 2008) felt that influenza vaccine was safe (92.1%, 24/26) and effective (80.7%, 21/26). Looking specifically at previously vaccinated GPs, the majority felt the vaccine was important to protecting patient health (94.3%, 131/139, 95% CI: 90.4–98.2). Only 8 GPs (10.1%, 8/79) and three PNs (5%, 3/60) felt that the vaccination would not benefit them as they reported a low personal threat for influenza. There were a small number of GPs (1.3%, 1/79) and PNs (3.3%, 2/60) who felt that annual influenza vaccination was only for older people.

Of the respondents, 72.7% (101/139, 95% CI: 65.3–80.1) correctly identified that annual influenza vaccines do not provide complete protection against all influenza strains. Similar proportions of GPs and PNs held the incorrect belief that the influenza vaccine contains live viruses that may cause some people to get influenza (24.1%, 19/79 versus 18.3%, 11/60).

Attitudes towards vaccination barriers amongst the respondents are presented in Table 3. While there was a

low level of agreement with all of the statements provided (<10%), the most commonly identified barriers were lack of awareness of any recommendation for general practice staff to receive influenza vaccination (10.1%, 14/139, 95% CI: 5.1–15.1) and unacceptable nature of vaccination side effects (7.2%, 10/139, 95% CI: 2.9–11.5).

Having to pay for the vaccine was identified as a barrier to getting vaccinated by 25.2% (35/139) of respondents. Five of the twelve GPs, who worked in a practice that did not provide free vaccine, felt that paying for a vaccine was a barrier.

Discussion

Our study of primary health care staff found much higher influenza vaccination coverage than hospital HCWs in Australia. Overall reported coverage of GPs and PNs was markedly higher than those for Australian institutional and hospital HCWs which have been found to range from 18% to 58%.^{6,9–12,23} Self-reported vaccination coverage for GPs in our study (for 2007) was higher than the percentage reported for Australian hospital-based doctors from the Northern Territory (72.7% versus 28%)¹² and Western Australia (72.7% versus 51.9%).⁹ PNs in our study had higher coverage when compared to nurses in residential aged care facilities (RACF) (68.3% versus 62%)¹¹, and hospital-based nurses (68.3% versus 49.6%) yet had lower coverage than PNs from the Australian Capital Territory (ACT) (68.3% versus 79%).²⁹

The Australian National Influenza & Pneumococcal Survey provides the earliest available influenza vaccination coverage estimates for GPs in Australia.¹⁶ Results of this survey found coverage for NSW GPs was the lowest of any jurisdiction, with 29% vaccinated in 1998, and just over 20% for the preceding 3 years. Comparing these rates to those observed in our study, influenza vaccination coverage amongst GPs in NSW appears to have risen substantially from 1998 to 2008.

More recently, a national survey from the Australian General Practice Network (AGPN)²³ assessed influenza vaccination coverage in GPs and PNs in the same years as our study (2007/2008) with similar response rates (34% versus 36%). Comparing vaccine uptake between the studies for both GPs and PNs in NSW only, the AGPN study reported slightly lower coverage (~5%) across both years in both groups.²³ As data was collected at a practice level in the AGPN study, individual vaccination status may have been incorrectly reported and may be underestimating the actual coverage rate. However, our results may overestimate actual coverage because of a number of reasons including the low response rate and use of self-reported vaccination status.

Table 3. Barriers to influenza vaccination amongst general practitioners (GPs) and practice nurses (PNs)

	GP n = 79 (%)	PN n = 60 (%)	Overall n = 139 (%)
I am not aware of any recommendation for general practice staff to receive flu immunisation			
Agree	7 (8.9)	7 (11.7)	14 (10.1)
Disagree	51 (64.6)	35 (58.3)	86 (61.9)
Unsure	8 (10.1)	2 (3.3)	10 (7.2)
Not specified	13 (16.5)	16 (26.7)	29 (20.8)
I don't have time for vaccination			
Agree	2 (2.5)	0	2 (1.4)
Disagree	64 (81.0)	42 (70.0)	106 (76.3)
Unsure	0	2 (3.3)	2 (1.4)
Not specified	13 (16.5)	16 (26.7)	29 (20.9)
Having to pay for the vaccine is a barrier for me			
Agree	24 (30.4)	11 (18.3)	35 (25.2)
Disagree	40 (50.6)	27 (45.0)	67 (48.2)
Unsure	2 (2.5)	6 (10.0)	8 (5.8)
Not specified	13 (16.4)	16 (26.7)	29 (20.8)
The side effects of influenza vaccine are not acceptable to me			
Agree	4 (4.0)	6 (0.1)	10 (7.2)
Disagree	60 (75.9)	32 (53.3)	92 (66.2)
Unsure	2 (2.5)	6 (10.0)	8 (5.8)
Not specified	13 (16.4)	16 (26.7)	29 (20.8)
I have a medical contraindication to flu vaccination			
Agree	1 (1.3)	0	1 (0.7)
Disagree	61 (77.2)	36 (60.0)	97 (69.8)
Unsure	4 (5.1)	8 (13.3)	12 (8.6)
Not specified	13 (16.4)	16 (26.7)	29 (20.9)

Studies into GP influenza vaccination coverage have been performed in other countries.^{17–21,30} Cowen *et al.*²¹ in the United States (US) had a similar response rate to our study (30% versus 38%), but reported a much higher vaccination coverage rate for US family physicians (84%). Semaille *et al.*³⁰ and Brunton *et al.*¹⁷ reported influenza vaccination coverage as 67% amongst French GPs and 68% amongst New Zealand GPs, respectively. In contrast, studies from the Netherlands¹⁹ and Israel²⁰ found lower coverage rates for GPs with 36% and 40%, respectively.

Even though the majority of our respondents worked in a practice that provided free vaccine for their staff, many felt that paying for the vaccine was a barrier to getting vaccinated. The wording of the question may have impacted on the result, as respondents could have taken it to mean for GPs in general and not for them personally. However, it is interesting to note, of the GPs who said their practice does not provide free vaccine, 40% stated that paying for the vaccine was a barrier to receiving it. Further qualitative research would assist in addressing these gaps in understanding.

The GPs and PNs in our study largely disagreed with the common vaccination myths presented in the survey (see Table 3). In contrast, the most frequently reported reason amongst Dutch GPs for not being vaccinated was having no medical indication for influenza vaccination¹⁹ and in Israel; physicians were much less frequently influenced by the fear that vaccination would cause influenza when compared to other practice staff.²⁰ There was almost no consistency of agreement with both these misconceptions in our sample or that of Litt *et al.*,¹⁶ who found that the main reasons indicated by Australian GPs for being vaccinated against influenza were concern about getting influenza or its complications and to prevent having time off work because of influenza. Live viruses in the influenza vaccine was the most common myth supported by respondents (21.6%, 30/139) yet a decade ago, less than 4% of Australian GPs gave this as a reason for not getting influenza vaccine.¹⁶ The reasons behind this shift in belief is unknown; however, technology could play a part, with increased access to a variety of information sources. In the light of this, GP education should continue to focus on dispelling this myth through use of evidence-based information. Other barriers to influenza vaccination identified in our study were lack of awareness of any recommendations for general practice staff to receive the influenza vaccine (10%) and unacceptable side effects of vaccination (7%). These are similar to those commonly cited by HCWs in other countries.^{19–21} For hospital doctors, being too busy has been identified as a major barrier to getting vaccinated against influenza.^{6,12,24} In contrast, only a small number of participants, all of whom were GPs, identified lack of time as a barrier as did approximately 25% of GP respondents

the Australian Influenza and Pneumococcal Vaccination Survey (2003) in the elderly.¹⁶

A previous investigation of general practice staff across 53 DGPs in Australia found a significant association between workplace influenza vaccination policy and staff vaccination.²³ We found that interrelationship between staff beliefs and practice policies may be an important determinant of HCW immunization behaviours in these practices. Office policies demanding immunisation and operating within an effective hierarchy can lead staff members to re-evaluate their beliefs about influenza immunization in the light of their own experience.³¹ Continued efforts at the practice level to make formal commitments to staff health by developing policies for influenza vaccination of staff may assist in increasing coverage in this group. Provision of the influenza vaccine to patients along with consistent, direct, exposure to influenza like illness by this population³² may further impact on their decision to be vaccinated. Pandemic (H1N1) Influenza 2009 is also likely to increase awareness of influenza vaccination and instigate new policies and practices surrounding vaccination of primary health care staff as has been seen in other countries during heightened awareness of an impending influenza pandemic threat.³³

There are a number of limitations to this study including sample size, generalisability and use of self-report for vaccination status. Although the sample size was small, compared to other general practice-based surveys, it would be considered reasonable in the light of the challenges with surveying this population.^{34,35} There is potential for selection bias in this study towards those who are particularly concerned about influenza and/or vaccination or those who accept vaccination. Furthermore, using self-reported vaccination status in adults has been shown to overestimate coverage.^{36,37} There may also be limitations with generalisability because our study was conducted only in one state of Australia. This study did not collect any data on non-respondents or outcomes for those who intended to be vaccinated in 2009. In addition, the barriers in our survey may not have covered all possible options, thus may have influenced participants response. Qualitative research is needed to further explore these findings.

Despite these limitations, influenza vaccination coverage was found to be relatively high amongst the GPs and PNs in our study; however, there is still room for improvement. Understanding barriers to vaccination is the first step to developing effective strategies to overcome them. For institution-based HCWs, there is now an extensive literature base around knowledge, attitudes and practices towards influenza vaccination, whereas, there are only a few studies exploring these topics in the primary health care setting in Australia. To enhance development and targeting of strategies to increase coverage, a more complete and current

understanding of coverage in this group is needed to build on the estimates presented here. We believe this study to be a basis for future investigations and interventions to increase influenza vaccination rates in primary health care staff in Australia.

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