

Voluntary Influenza Vaccination Uptake Rates and Reasons for Refusal

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Abstract

Influenza, also known as the flu, is one of the most common seasonal illnesses with outbreaks commonly occurring each year. Although most cases of influenza are mild, up to 25% require outpatient medical care, as many as 4% require inpatient care, and 1% require intensive care. Thus, the prevention of influenza is highly important both for maintaining health and for reducing mortality. Many hospitals have implemented voluntary influenza vaccination programs, which provide free annual seasonal influenza vaccines for all staff. However, even though the influenza vaccination reduces the infection rate by 70% to 90%, the uptake of hospital-provided vaccination is relatively low. Existing data from the 2010-2011 flu vaccination program gained from the employee database of the hospital was used to examine vaccination rates and reasons for refusal at a teaching hospital in the Southeastern United States. Data show that 87.2% of employees were vaccinated or had a medical/religious reason to refuse.

Keywords: healthcare, influenza, primary prevention, vaccination, flu vaccine declination.

1.0 Introduction

Influenza is a common respiratory disease found in mammals and birds caused by RNA viruses of the family Orthomyxoviridae (Van Tam & Sellwood, 2009). Influenza is relatively infectious, with a review of studies finding infection rates between 0% and 37% in vaccinated populations and 33% to 55% in unvaccinated. Influenza tends to come in outbreaks centered in specific areas, such as a hospital wards or daycare centers (Brankston, Gitterman, Hirji, Lemieux, & Gardam, 2007).

One of the main defenses against influenza is vaccination. Vaccine creators need to correctly predict the dominant forms of influenza for a given season. The vaccine creators also need to produce the vaccine in sufficient quantities to provide for everyone that requires a vaccine (Miller, Viboud, Balinska, & Simonsen, 2009). The vaccine does provide significant protection against influenza infection, with a 70% to 90% reduction in influenza infection among vaccinated individuals (McLennan, Gillett, & Celi, 2008). One of the major routes of transmission for influenza is hospital settings. One study that sampled air in a hospital emergency department found that airborne influenza virus was present in 53% of respirable samples (Blachere, Lindsley, Pearce, Anderson, Fisher, Khakoo, 2009). Although there are a number of other factors that could change the outcome of transmission in the hospital environment, the presence of airborne influenza poses a significant risk for in-hospital transmission (Blachere et al., 2009). The degree to which hospital workers are infected with influenza is often not tracked or is underreported. Thus, estimating the impact of influenza on healthcare workers and their role in spreading influenza is difficult (Drumwright & Holmes, 2011).

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Despite the offer for free vaccinations and despite presumed knowledge regarding the benefits of the vaccine and the dangers of influenza, uptake of influenza vaccination is exceptionally poor, with some voluntary programs only achieving 4% to 40% vaccination rates (McLennan, Gillett, & Celi, 2008). Furthermore, there have been no signs that voluntary vaccination programs have been improving in terms of their individual uptake (McLennan & Wicker, 2010). Programs including mandatory vaccination and opt-out declination forms (which force those who decline to explain their reasons for doing so) have been suggested, but have not been fully effective (McLennan & Wicker, 2010).

A variety of factors affect vaccine uptake (Doratotaj, Macknin, & Worley, 2008; Mehta, Pastor, & Shah, 2008). Data show that fewer than 30% of respondents in some hospital systems been vaccinated against influenza (Loulergue, Moulin, Vidal-Treca, Absi, Demontpion, Menager et al., 2009). Influenza vaccination rates are so low that they are significantly out of line with other required occupational vaccinations.

Healthcare worker acceptance or rejection of vaccines may also be driven by beliefs towards vaccination. A review of studies conducted recently indicates that the most common reasons for refusal include a lack of knowledge or misconceptions about the vaccine, lack of access to the vaccination program, fear of side effects, lack of concern about the individual risk, inconvenience of program, and not perceiving individual risk had the most impact on refusal of vaccines within this study. To date, there has been no consistent findings regarding demographic characteristics (gender, race, age, and professional characteristics) of those who chose to participate in vaccination programs (Ballestaas, McEvoy, & Doyle, 2009; Llupia et al., 2010; Gavazzi et al., 2011; Looijmans-vandenAkker et al., 2009; deSante, Caplan, Shofer, & Behrman, 2010; Doratotaj, Macknin, & Worley, 2008; Looijmans-vandenAkker et al., 2009; Wicker & Rabenau, 2011; Mehta, Pastor, & Shah, 2008; Bryant, Stover, Cain, Levine, Siegel, & Jarvis, 2004; Norton, Scheffele, Bettinger, & West, 2008).

2. Methods

2.1 Data Collection

This study used secondary data available within a selected hospital setting. Data were collected from declination forms distributed to employees and from records made available from human resources regarding demographic characteristics. Within the hospital, the influenza vaccination program is voluntary, and healthcare workers are allowed to refuse the vaccination on an annual basis. However, each time a worker refuses the vaccination, the worker must fill out a form that identifies them as having refused the vaccine and specifies one of four reasons for refusing the vaccine (see Appendix A). The hospital also keeps records for each employee paired with these vaccination refusals, including demographic and professional information. Data include gender and ethnicity, number of years within the hospital setting, and data regarding reasons for refusal. Data for the most recent year on file for each employee within the hospital (2010-2011) were used. Both university and medical center Institutional Review Boards approved the study.

2.2 Participants

Participants ($n = 22,845$) included healthcare workers employed at a large teaching hospital in the Southeast, including (but not limited to) doctors, nurses and nursing assistants, specialists (such as radiologists, medical technologists, and phlebotomists), transporters and direct care specialists. All participants were at least 18 years of age. Respondents were 74.6% female ($n = 16,046$) and 25.4% male ($n = 5,799$).

2.3 Data Analysis

Descriptive statistics were used to describe the participants and reasons for refusal in terms of frequencies. Chi-square analyses were used to look for differences among key dependent variables and vaccination acceptance or declination. Results of these analyses are presented below.

3. Results

The main outcome variable was the flu vaccination attempt. Table 1 shows a detailed overview of the outcomes including all reasons for potential vaccine declination. (The "Other" category includes religious objections and fear of needles.) Most participants either accepted the vaccine (51.6%) or were vaccinated elsewhere (29.1%).

Table 1: Flu Vaccination Outcomes (Frequency Table) (n=22,845)

	Frequency	Percent
Accepted Vaccine	11794	51.6
Vaccinated Elsewhere	6643	29.1
Medical Refusal	867	3.8
"I'm afraid I'll get the flu from the vaccine."	876	3.8
"I've never had the flu and don't need the vaccine."	2043	8.9
Other	622	2.7

These responses were collapsed into two categories to facilitate odds ratio analysis. These categories included Acceptance/Valid Declination and Attitude-based declination (including "I'm afraid I'll get the flu" and "I've never had the flu"). Table 2 shows the relative frequencies of these responses.

Table 2: Acceptance or Declination of Vaccine (Frequency Table)

(n=22,845)	Frequency	Percent
Acceptance or Medical/Religious Declination	19926	87.2
Attitude-based Declination	2919	12.8

3.1. Factors affecting vaccination uptake rates

3.1.1 Ethnicity

Hispanic respondents had the lowest rate of attitude-based refusal (7.1%), while African Americans had the highest rate of attitude based refusal (25.6%). Chi-square results ($\chi^2 = 908.3$, $df = 5$, $p = .000$) indicate that ethnicity had a significant impact on vaccination uptake rates.

3.1.2 Gender

Gender was not a significant factor. Data show rates were similar for males and females. Chi-square analysis ($\chi^2 = 1.862$, $df = 1$, $p = .172$) shows that there is no significant difference in acceptance or rejection between genders. This is also shown in the odds ratio, with .939 odds of acceptance based on gender.

3.1.3 Years of Service

Years of service at the hospital were calculated using date of hire. Data show some differences, with those with employed between 1-5 years having a lower rate of attitude-based declination (11.5%) than those with more experience. Chi-square analysis ($\chi^2 = 35.711$, $df = 4$, $p = .000$) supports a statistically significant difference in uptake rates based on years of experience. However, there is no clear pattern that would suggest those with more years of service have higher uptake rates.

3.1.4 Personnel Role Category

Table 3 shows there was a wide disparity between attitude-based declinations among different professional role groups. The chi-square analysis ($\chi^2 = 943.293$, $df = 8$, $p = .000$) confirms that there is a significant difference in distribution of attitude-based declinations between these categories.

Table 3: Field of Practice * Acceptance or Declination of Vaccine (Crosstabulation)

		Acceptance or Declination of Vaccine	
		Acceptance and Medical or Religious Declination	Attitude-based Declination
Physician	Count	2844	33
	%Field of Practice	98.9%	1.1%
Nurse (RN, LPN)	Count	6957	909
	%Field of Practice	88.4%	11.6%
Nurse Assistant (NA, CNA, Aide)	Count	999	285
	%Field of Practice	77.8%	22.2%
Environmental Services Worker	Count	1371	519
	%Field of Practice	72.5%	27.5%
Hospital Unit Coordinator	Count	690	147
	%Field of Practice	82.4%	17.6%
Advanced Practice Nurse (Nurse Manager, Nurse Practitioner, Specialist)	Count	1158	81
	%Field of Practice	93.5%	6.5%
Allied Health	Count	3441	619
	%Field of Practice	84.8%	15.2%
Administration and Management	Count	1740	279
	%Field of Practice	86.2%	13.8%
Therapy and Social Services	Count	726	47
	%Field of Practice	93.9%	6.1%
Total	Count	19926	2919

3.1.5 Patient Contact Risk Level

A final analysis examined patient contact risk level as a determining factor in attitude-based declination. In this analysis, Physicians, Nurses, Nurse Assistants, Advanced Practice Nurses, and Allied Health workers were classified as High-Risk, while all others were classified as Low-Risk. Table 5 displays the results of this analysis and shows a significant difference between low contact/risk workers and high contact/risk workers. The chi-square results ($\chi^2 = 176.345$, $df = 1$, $p = .000$) suggests there is a statistically significant difference in distribution between these two risk categories. The odds ratio of .571 also indicates that low-risk workers were significantly more likely to use attitude-based declinations.

Table 5: Patient Contact Risk Exposure * Acceptance or Declination of Vaccine (Cross tabulation)

		Acceptance or Declination of Vaccine		Total
		Acceptance and Medical or Religious Declination	Attitude-based Declination	
Low Contact/Risk	Count	4527	992	5519
	%Patient Contact Risk Exposure	82.0%	18.0%	100.0%
High Contact/Risk	Count	15399	1927	17326
	% Patient Contact Risk Exposure	88.9%	11.1%	100.0%
Total	Count	19926	2919	22845
	%Patient Contact Risk Exposure	87.2%	12.8%	100.0%

4. Summary and conclusions

Ethnicity, professional job role, years' experience, and level of patient contact, were identified as having significant effects of vaccination uptake rates. African Americans had the highest rate of attitude based refusal. Health promotion campaigns could be developed to specifically address African American health care workers' concerns. In addition, health promotion and education campaigns could address risk perception among low contact/risk workers.

Overall, the rate of vaccine uptake (80.7%) was substantially higher than in previous studies (Doratotaj, McKnin & Worley, 2008; Mehta, Pastor & Shah, 2008). Additionally, as in most other studies, the majority of rejections for vaccines were not religious or medical, but were driven by existing attitudes and beliefs about the vaccines, particularly about side effects and lack of need (Esposito et al., 2007; Gavazzi et al., 2011; Hollmeyer et al., 2009). In contrast to Doratotaj et al's (2008) findings, there were differences between groups; this is more consistent with the findings of Wicken and Rabenau (2011), who suggested that physicians, with their greater experience of the effects of failure to immunize, may be more likely to do so. Again, educational campaigns should be developed to address lower risk health care workers.

Although there is a higher than average rate of vaccination at the chosen hospital, addressing attitude based refusals and misinformed beliefs may be a needed step to further improving vaccination rates. Educational campaigns have been shown to increase immunization rates substantially (Bryant, Stover, Cain, Levine, Siegel, & Jarvis, 2004). The declination statement program itself also has been shown to improve vaccination rates (Talbot, 2009). Mandating vaccination, although controversial, also has proven effective (Offit, 2010).

This study found that attitude-based declinations accounted for 12.7% of influenza vaccine declination in the chosen hospital. African Americans had particularly high rates of attitude-based declinations. Findings from this study suggest that the main determinant for whether an employee refuses a flu vaccine could be perceived risk.

Recommendations for future research include conducting real time interviews with employees to see if their reasons for refusal were indeed, what they indicated on their declination forms. It would also be interesting to examine reasons for declination other than those listed on the declination form. Replicating this research in other area hospitals would also be beneficial. The findings suggest that specific groups with lower vaccination rates would likely benefit from additional education and contact related to flu vaccination programs. Findings suggest that programs might do best to target certain ethnicities and staff with low levels of patient contact.

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Figure 1: Immunization Exemption/Declination Form for Influenza Vaccine

Employer: Medical Center: [] Contract Agency: [] Agency _____

Name: (print) _____ ID _____

Work Area: _____ **Position:** _____

Although I understand the importance of flu vaccination in preventing influenza in (Duke) hospital patients, I decline for the following:

Exemptions

- I am allergic to eggs** ()
- I have a history of Guillan Barre/anaphylactic reaction to the vaccine** ()
- I have other medical conditions with a doctor's statement** ()
- I have religious objections** ()
- Your records are incorrect. I was vaccinated by EOHW** ()
- I have been vaccinated elsewhere** ()

I decline the seasonal flu vaccine for the reason checked below:

- I've never had the flu and don't need the vaccine** ()
- I'm afraid I'll get the flu from the vaccine** ()
- I'm afraid of needles** ()
- I didn't have time** ()

Signature _____ **Date** _____