

# Influenza Vaccination of Healthcare Workers: a Literature Review of Attitudes and Beliefs

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## Abstract

**Background:** Influenza vaccination coverage among healthcare workers (HCW) is insufficient despite health authority recommendations in many countries. Numerous vaccination campaigns encouraging HCW to be vaccinated have met with resistance. We reviewed published influenza vaccination programs in healthcare settings to understand the reasons for their success and failure, as well as the attitudes and beliefs of HCW.

**Methods:** Relevant articles published up to June 2004 were identified in the MEDLINE/Pubmed database.

**Results:** Thirty-two studies performed between 1985 and 2002 reported vaccination rates of 2.1–82%. Vaccination campaigns including easy access to free vaccine and an educational program tended to obtain the highest uptake, particularly in the USA. Yet, even this type of campaign was not always successful. Two main barriers to satisfactory vaccine uptake were consistently reported: (1) misperception of influenza, its risks, the role of HCW in its transmission to patients, and the importance and risks of vaccination (2) lack of (or perceived lack of) conveniently available vaccine.

**Conclusion:** To overcome these barriers and increase uptake, vaccination campaigns must be carefully designed and implemented taking account of the specific needs at each healthcare institution.

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## Introduction

Many institutions recommend that healthcare workers (HCW) be routinely vaccinated against influenza to reduce the occupational risk of infection [1], and to prevent the transmission of influenza virus to patients at risk of secondary complications and death. The latter reason is the one stated in most national recommendations. Influenza vaccination of HCW has been recommended by the United States Centers for Disease Control and Prevention (CDC) since the early 1980's, and since at least 2000 in 12 European countries [2, 3]. Numerous international vaccination programs have subsequently tried to encourage HCW to be vaccinated, but have met with surprising resistance.

Individual programs have been the subject of a number of articles and letters to journals. Here we review the published reasons for success and failure of vaccination programs, and the attitudes and beliefs of HCW. With this understanding we attempt to provide some helpful insights for future programs.

Healthcare workers are particularly exposed to influenza infection as they are exposed in both the general community (household contacts, public transport etc.) and the workplace. Close proximity to patients, and a constant flow of visitors and co-workers may increase the infection risk. Up to 25% of non-immunized HCW develop influenza during the winter [4]. Attack rates may be even higher as infected HCW may also be asymptomatic. In a study of 518 HCW during the winter of 1993–1994, 23% had serologically proved of infection, of whom 59% did not remember having influenza and 28% did not remember having any respiratory infection [5]. HCW show a high work-commitment and often continue looking after patients despite being infected with influenza [6]. The average incubation period is 2 days. Adults are infectious from the day before symptoms start and up to 5 days afterwards. The infection is regarded as nosocomial if symptoms start at least 2–3 days after hospitalization. Case reports include extended care facilities for the elderly, renal transplant and oncology units, neonatal intensive care and pediatrics [7, 8]. Persons cared for in these settings are at high complication-risk and personnel are often undervaccinated [9, 10]. In acute-care facilities and geriatric hospitals, the median mortality rate during influenza outbreaks has been put at 16%, but may be as high as 60% in transplant or

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intensive care units [7]. Unfortunately, the risks of influenza are not well perceived by all HCW [11]. For example 44% of homeopathic but only 2% of allopathic physicians consider influenza vaccination unnecessary for adults, children or even for risk groups [12]. Thus HCW are more likely to get influenza and to pass it on, with more significant consequences than for any other worker-group.

One simple definition for the term "HCW" is all medical and non-medical personnel in contact with patients [13]. The CDC holds this view, including non-remunerated and/or temporary staff, as well as persons exposed to human samples. This definition includes diverse roles with varying exposure levels to the virus and contact with the patients: physicians, nurses, physiotherapists, dieticians, religious workers, cleaning, kitchen and laboratory personnel. The Canadian National Advisory Committee on Immunization (NACI) adopts a narrower, and possibly more pragmatic approach by targeting personnel involved in direct patient care [14]. For this group, the NACI considers annual influenza vaccination to be essential component of the standard of care for the protection of patients and states that, in absence of contraindications, refusal of these HCW to be immunized against influenza implies failure in their duty of care.

### Methods

Relevant articles published up to June 2004 were identified (MEDLINE/Pubmed database) using keywords related to influenza immunization and the perception and coverage among HCW. The reference lists of the retrieved articles were reviewed to identify additional articles.

### Results

Thirty-two primary publications reporting influenza vaccination coverage among HCW between 1985 and 2002 were identified, including 25 addressing the attitudes of HCW towards influenza vaccination [6, 11, 15–44].

#### Vaccination Coverage

The 32 publications can be divided into four classes: (1) 16 reported coverage in health care units in which a vaccination campaign accompanied the season and influenza vaccine was provided free of charge, (2) one reported the result of a vaccination campaign, but did not specify whether vaccine was provided free of charge, (3) in seven cases, vaccine was provided free of charge but no specific campaign was reported, and (4) eight publications reported coverage, but provided no details of any campaign or free vaccine (Figure 1).

Vaccination rates varied from 2.1% to 82% (Figure 1) [6, 41]. In the US studies, coverage rates in hospitals with free vaccine (with or without an informational campaign) were higher than in hospitals without free vaccine or campaigns, and tended to be higher than in Europe. In the five Canadian reports with vaccination rates between 35% and 51% no clear benefit of either free vaccine or a vaccination campaign was observed, with the exception of one study [31].

#### Healthcare Workers' Attitudes

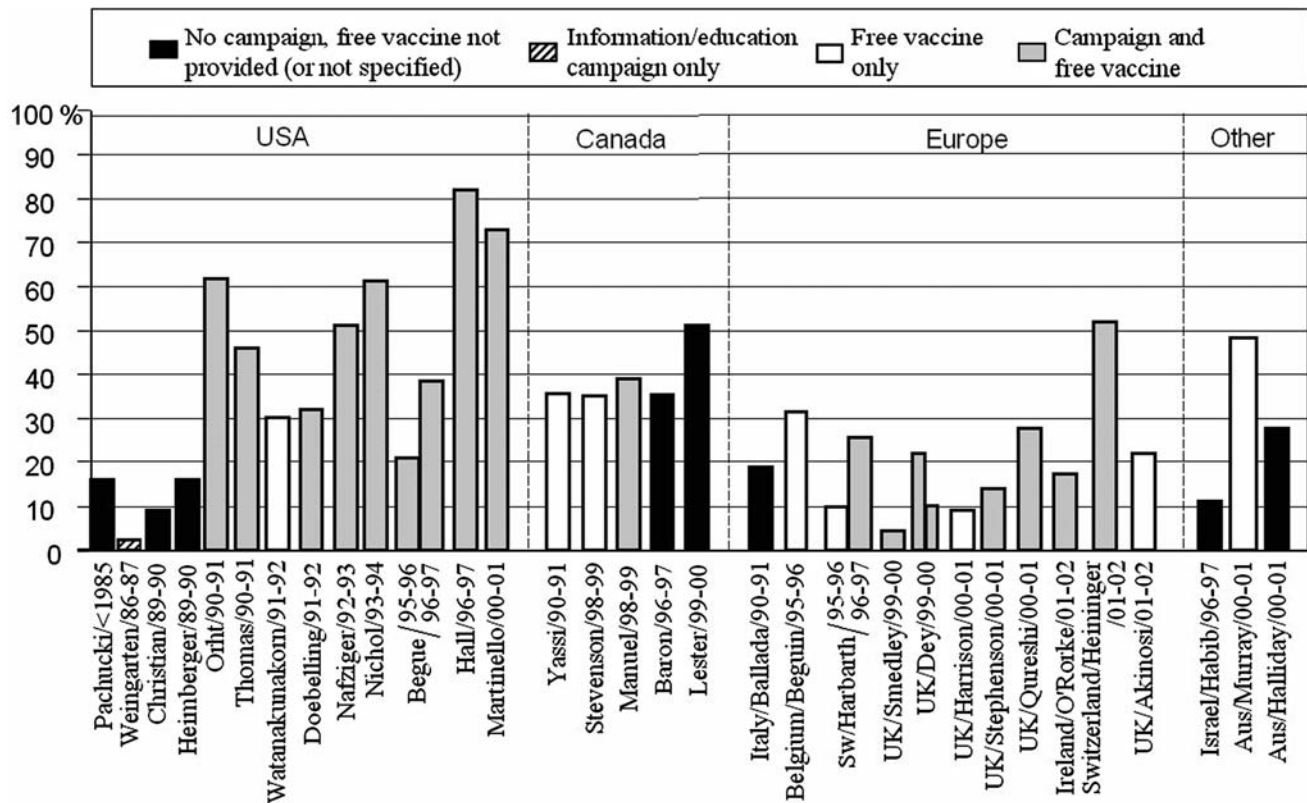
The 25 studies that addressed how HCW view influenza vaccination mostly used anonymous closed-question questionnaires to understand the motivations of HCW in getting vaccinated, and the reasons for refusal. The most recurrent ideas are presented in tables 1 and 2. The percentage range represents the minimum and maximum values reported in the publications that addressed each idea.

#### Discussion

Many national/international recommendations include HCW as a priority group for annual influenza vaccination [1–3, 14, 45] without defining a minimum coverage rate for this population. Uptake rates of ~50% have been associated with a ~40% reduction of total winter mortality of elderly patients in long-term care [46, 47]. The Canadian NACI sets a minimum rate of 90% of all "eligible recipients" of influenza vaccine [14]. The WHO and ACIP state coverage rates of 50–90% for the elderly population and 60% for high-risk adults, but none for HCW [2, 48]. Current HCW influenza vaccination coverage is far below these figures: 38% in 2002 in the USA [2], 26–61% in Canada [14], and 12–25% in Europe [49]. Strategies to increase coverage are clearly necessary.

The six US programs with the highest uptake rates can be considered successful as they attained uptake rates in excess of the 2002 national average (38%), surpassing 60% in four cases [16, 22–24, 26, 41]. All included free vaccine, and five (including all four with uptake >60%) an educational component. Although the details of these successful campaigns differed, many features were similar including three key phases: notification, education, and vaccination. Notification was characterized by the communication of key messages through various media: individual invitations sent with pay slip, e-mail messages, memos, and posters in well-traveled areas. Education included staff in-service sessions, conferences, and educational films. Vaccination was characterized by readily accessible free vaccine using mobile vaccination carts and "walk-in" vaccination clinics. Interestingly, the highest coverage was obtained by a US program including festive vaccination sessions with educational games, free refreshments and participation in a lottery for vaccinees [41].

Yet even this type of extensive program does not guarantee success. One such program during the 1995–1996 season in the USA, achieved an uptake of only 21% [17]. However, when HCW were questioned on their reasons for refusing vaccination and when these concerns were addressed during the following campaign, coverage was increased to 38%. Similarly, Swiss HCW were questioned on their attitudes regarding influenza and vaccination and their answers were used to design interventions to improve coverage [30]. This worked, as coverage increased from 10% (1995–1996) to 26–37% (1996–1997). More recently, a significant increase of vaccination rates among the staff of 25 German hospitals over 5 years was achieved using



**Figure 1.** Healthcare worker influenza vaccination rates in 32 publications classed by region and by whether vaccine was provided free of charge and whether vaccination was actively promoted through an information campaign.

posters in the wards and common areas, combined with active support from hospital management [50].

Only one European study had an uptake of > 50% [31]. In this hospital, free vaccination was actively promoted and frequently available at immunization clinics. Campaign advertisements in the monthly hospital newsletter included local epidemiological data, and the rational and benefits of vaccination. Coverage in the European studies was generally lower than in the USA, paralleling the difference in national rates between the two regions [2, 49]. One British campaign reported success with a rate of just 4.5%, since this was double that of the previous year [34]. Cultural and political issues have been evoked to explain these differences [33], however other factors may be involved:

*Ease of access to vaccination:* In a UK study, vaccine was free, but personnel had to consult their general practitioner to obtain it [40].

*Influenza education:* Two programs advertised vaccination (notice board announcements, e-mails etc), but no educational component was included [32, 43]. In two other cases, the information/educational campaigns were insufficient [35] or poorly adapted to the target audience [34]. In the first case HCW remained largely unaware of the vaccine-availability. In the second, physicians deemed the information insufficiently scientific and inappropriately relayed by non-medical managers.

Coverage differed between physicians and nurses: US physicians had higher coverage than US nurses [24], while in the UK the opposite was true [43]. Educational differences between these professions may impact uptake by influencing beliefs and attitudes. But it is also possible that these groups simply respond differently to different campaign-types. This is suggested by researchers stressing the need of separate strategies for separate groups: easily accessible vaccination for physicians, and education for non-physicians [22].

Education programs should address the most frequent anti-vaccination ideas. A perceived lack of vaccine efficacy was a frequent dissuasion. Yet the efficacy of influenza vaccines among adults is 70–90% against confirmed influenza when the vaccine strains match the circulating strains [51]. Immunization has been shown to significantly reduce influenza like and, upper respiratory illnesses and sick leave for influenza in HCW and other healthy working adults [52–54].

Although “to protect oneself” was the main idea encouraging immunization, this is not the primary intention of most recommendations. By targeting HCW, recommendations seek to protect patients or frail elderly persons in care [2, 14, 45]. The fact that “to protect one’s patients” was a key motivation, suggests that some HCW understand this. However, the recurrent “not at risk”, “doubt

Table 1  
Ideas encouraging influenza vaccination.

- **To protect oneself** appeared to be the strongest motivation (33–93%) even among non-vaccinated individuals.
- **To protect patients** was a secondary motivation in most cases (2–98%). Only in two studies did HCW put patient protection before self-protection [23, 37].
- **Free and convenient vaccination** was fairly motivating in studies considering this aspect (11–58%).
- **Being previously vaccinated** is not perhaps a motivation, but these individuals were more likely to have been subsequently revaccinated. Thus, vaccination programs really only have to convince people the first time around [28].
- **Following the example set by peers.** Whether it is a physician who attended an influenza seminar given by an illustrious peer or peer-pressure in the workplace, medical workers seemed to be positively influenced by their colleagues [28, 42].

that influenza is a serious disease” and “inefficacy of the vaccine” answers indicate that not all HCW fully recognize their role in spreading influenza to their patients or the possible consequences.

A main barrier was the fear of adverse reactions. Therefore, campaigns should include factual information about possible reactions and their incidence. As with any vaccine, reactions do occur after vaccination: mainly local inflammatory reactions that are generally mild and short lived. Less frequently (< 15% of recipients) fever, myalgia, arthralgia or headache can occur [45, 51]. Influenza vaccines are generally considered to be safe [45].

Table 2  
Ideas preventing influenza vaccination.

- **Fear of adverse effects** to vaccination was most dissuasive pressure in 17 studies (8–54%).
- **Misconception that "vaccination can cause influenza".** 10–45% of HCW feared getting influenza from the vaccine.
- **Not at risk.** The feeling of being healthy and having good natural defenses towards influenza infection was expressed by 6–58% of HCW (16 studies). In Switzerland, [30] Canada, [21, 25] and Italy, [29] this response was notably frequent, in physicians and nurses alike [29].
- **The times/locations of vaccination were unsuitable** for 6–59% of HCW. This was the most common reason given by medical house staff and students.
- **Doubt that influenza is a serious disease.** With response rates of 2–32%, this is clearly a problem of education.
- **Inefficacy of the vaccine.** In 18 studies, 3–32% of HCW except physicians considered influenza vaccine to be inefficient in preventing the disease and therefore not worth having [23, 25], in another investigation 44% of homoeopathic physicians refused influenza vaccination and only 21% voted for its application [12].
- **Fear of injections.** For 4–26% of HCW, the fear of injections is too strong.

Other barriers to vaccination concerned the ease of access to vaccine and the fear of injections. While the former can be overcome by careful planning, communication and the use of mobile vaccination carts, the latter can only be overcome by demonstrating that the benefits of vaccination outweigh their fears or by ultimately mandating vaccination.

In conclusion, despite recommendations for annual influenza vaccination, HCW are insufficiently vaccinated, due to two hurdles: a misperception of influenza, its risks, the role HCW play in its transmission, and the importance and risks of vaccination and a lack (or perceived lack) of accessible free vaccine. Several vaccination programs have successfully overcome these hurdles. While others have failed, possibly due to their suboptimal content or conduct. Those responsible for influenza vaccination programs might consider adopting an iterative approach to improving coverage. By integrating a survey of HCW beliefs and attitudes as a routine and integral part of a campaign, the answers collected can be used to refine the next season's campaign.

Influenza vaccination campaigns will only be effective in the long run if HCW understand their role in influenza-transmission and prevention, and if vaccination is free and convenient. Concerted efforts are required to attain these goals and fulfill recommendations.

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