

Health-Care Worker Vaccination for Influenza: Strategies and Controversies

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Abstract Influenza infections cause significant morbidity and mortality throughout the world, and vaccination rates of health-care workers remain well below target goals. Strategies for increasing vaccination rates include mandatory vaccination of health-care workers, mandatory declination, employee incentives, intensive education, increased access to vaccines, and the use of social media to inform employees of the safety and efficacy of vaccination. While these strategies in combination have been shown to be effective in increasing vaccination rates, personal and religious objections, as well as the potential for infringing on individual autonomy, remain challenges in our efforts to bring health-care worker vaccination rates up to target goals.

Keywords Influenza vaccination · Mandatory vaccination · Health-care worker vaccination · Nosocomial influenza

Introduction

Influenza continues to remain an important source of morbidity and mortality. On the basis of CDC estimates, of the nearly 75,000 annual deaths attributed to pneumonia and influenza, 8.5 % of deaths were influenza associated [1]. Of the latter, people 65 years of age and older accounted for 89 % of the deaths. A novel strain of influenza A H1N1 was

the cause of a worldwide pandemic in 2009–2010. In the U.S. alone, the CDC reported almost 42,000 laboratory-confirmed hospitalizations and more than 2,000 laboratory-confirmed deaths associated with the 2009 pandemic influenza H1N1 virus [2].

Health-Care Workers and Influenza

In the last two influenza seasons, the Advisory Committee on Immunization Practices (ACIP) has recommended vaccination for all people over the age of 6 months, unless medically contraindicated [3]. The routine vaccination of groups at higher risk of being reservoirs of infection, such as health-care workers (HCWs), was stressed in their report as an important tool in the control of influenza [3]. HCWs have been known to be a cause of nosocomial outbreaks of influenza. In 2009, 8 children in a pediatric oncology ward developed pandemic influenza H1N1. The index case developed the disease while on isolation; an HCW was believed to have been the source of the infection [4]. Similarly, in sequential outbreaks of influenza A and B in a hospital in Japan, the spread of infection between strictly isolated patients was believed to have been caused by health care personnel [5]. Of note, influenza vaccination was not mandatory for HCWs at that time.

The importance of HCW vaccination in reducing nosocomial outbreaks of influenza was demonstrated by Salgado et al. [6]. Ten cases of influenza A H3N2 were reported in hospitalized patients, with one death, in the 1987–1988 influenza season. Provision of on-site vaccination of HCWs, along with intensive education, led to increased rates of HCW vaccination from 4 % in 1987–1988 to 67 % in 1999–2000. There was a simultaneous decrease in the number of nosocomial cases. In 1987–1988, nosocomial cases accounted for 32 % of hospitalized cases of influenza. This rate decreased to 3 % in the 1998–1999 season and then 0 %

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in the subsequent season. Similarly, in the U.K., vaccination of HCWs has been associated with significant decrease in influenza-like illnesses and mortality in elderly patients [7, 8]

The efficacy of the influenza vaccine in preventing infection has been debated. One study showed an 88 % efficacy against serologically defined influenza A infection in HCWs [9]. Data pooled from 18 cohorts of community-living elders showed that influenza vaccination was associated with a 27 % reduction in risk of hospitalization for pneumonia or influenza and a 48 % reduction in risk of death [10]. However, in an analysis of randomized controlled trials involving experimental influenza challenges in human subjects, Basta et al. estimated a 41 % protection against laboratory-confirmed influenza with the live attenuated vaccine [11].

Vaccination Rates

Seasonal influenza vaccination rates have remained low in the U.S. Analysis of over 6,000 HCWs in the National Health Interview survey from 2004 to 2008 showed a seasonal influenza vaccination rate of only 45 %, with physicians and nurses having higher rates of vaccination than health-care technicians [12]. Using the Behavioral Risk Factor Surveillance System (BRFSS) and the National 2009 H1N1 Flu Survey (NHFS), the CDC estimated that between October 2009 and May 2010, only 34.2 % of people initially targeted for pandemic H1N1 influenza vaccination received the same [13]. This group included pregnant women, those with medical conditions that put them at greater risk for complications, and HCWs and emergency service personnel. In other parts of the world too, rates of H1N1 vaccination have been low. In a nationwide survey in Greece, only 21.8 % of responding HCWs reported intending to get the vaccine [14]. In a Spanish university hospital, only 16.5 % of HCWs had received the H1N1 pandemic influenza vaccine, as compared with almost 50 % who had received the seasonal influenza vaccine [15]. Conversely, in British Columbia, 69 % of HCWs surveyed intended to receive the pandemic H1N1 vaccine [16].

Reasons for Refusal

Multiple studies have shown that HCWs refuse vaccination for reasons of safety and because of doubts concerning the efficacy of the vaccines. In a literature review of 32 publications from 1985 to 2002, the main reasons for refusal of vaccination in HCWs were fear of adverse effects (8 %–54 %), fear that vaccination would cause influenza (10 %–

45 %), a feeling of not being at risk (6 %–58 %), lack of suitable time or location for vaccination (6 %–59 %), and concerns about inefficacy of the vaccine (3 %–32 %) [17]. A nationwide survey of HCWs in Greece in 2006 provided similar results. The rate of vaccination was extremely low at 5.8 %, with the main reasons for getting vaccinated being protecting themselves, then their family and their patients, against influenza. The reasons for refusal were again the belief that HCWs were not at risk for disease (43.2 %), fear of adverse effects (33.4 %), and concerns about the efficacy of the vaccine (19.2 %), and finally, 13 % of HCWs either were uninformed of the vaccination or were absent during the period that vaccination was available [18].

Recommendations

Given the potential for significant morbidity and mortality from influenza in vulnerable patients, as well as the relative safety of the influenza vaccine [19, 20], many medical professional societies advocate annual influenza vaccination of HCW [21]. The Healthcare Infection Control Practices Advisory Committee (HICPAC) and the ACIP recommend that influenza vaccines be given annually to all HCWs who do not have medical contraindications [22]. The Adult Immunization Advisory Board encourages mandatory vaccination for all HCWs without medical or religious contraindications and states that any HCW who has not received a vaccination should be relocated away from patients or wear a mask with any direct patient care during the influenza season [23]. Similar beliefs are promoted by the American Academy of Pediatrics [24] and American Academy of Family Physicians [25]. The Association for Professionals in Infection Control and Epidemiology [26••], the Infectious Diseases Society of America [27], and the Society for Healthcare Epidemiology of America take a sterner approach by supporting mandatory vaccination of all HCWs without any religious exemptions [28••]. In these instances, vaccination is touted as an ethical responsibility of the HCW and a quality measure for the health-care institution.

The target influenza vaccination rate for HCWs established by the U.S. Department of Health and Human Services Healthy People 2020 objective is 90 % [29]. During the 2010–2011 influenza season, the CDC estimates that 63.5 % of HCWs received the influenza vaccine [30].

Strategies

Various strategies have been implemented to improve vaccination compliance by HCWs. In a survey submitted to U.S. hospital-based infection preventionists during the

2010–2011 influenza season, researchers concluded that 55.6 % of the hospitals required HCWs to accept or decline the influenza vaccine, while 3.6 % of hospitals required mandatory influenza vaccines as a condition of employment [31].

Declination

Previous investigations regarding the impact of declination statements on vaccine compliance have had variable results. A survey provided to U.S. infectious diseases consultants revealed a significant increase in vaccination rate using declination statements, although not greater than 65 % compliance [32]. One study revealed no significant improvement in vaccination rates after implementing mandatory declination statements [33], while another study found a significant increase in rate of vaccination from 43 % to 66.5 % ($p < .001$) [34]. In the latter study, only 1.5 % had a medical contraindication to the influenza vaccine, and 20.6 % signed the declination form. Reasons cited for declination focused on vaccine safety and efficacy, aversion to needles, and perceived insignificance in patients who “never get the flu.” The exact role that concurrent educational initiatives and lack of negative consequences for declining the vaccine played in these results was unclear [32–34]. In another review of factors affecting influenza vaccine uptake by HCWs at U.S. academic hospitals and medical centers, use of declination statements did not significantly impact vaccination rates. Increased access to influenza vaccine and accountability to leadership were more likely to contribute to successful vaccine campaigns [35•].

Mandatory Vaccination

Some institutions have adopted mandatory influenza vaccination policies in an attempt to increase HCW compliance. The Virginia Mason Medical Center in Seattle, Washington, was the first hospital to require mandatory influenza vaccination of HCWs in 2004, although the actual policy did not take effect until the 2005–2006 vaccine season, due to vaccine shortages. Vaccine compliance increased from 54 % of HCWs in the 2003–2004 influenza season to 98.9 % for the 2009–2010 influenza season [36•]. Investigators at the University of California Irvine Healthcare demonstrated that HCW influenza vaccine compliance increased from 44 % during the 2006–2007 influenza season to 62.9 % in the 2007–2008 influenza season after improved vaccine access and mandatory declination policies were instituted and to 86.7 % after mandatory vaccination policies were implemented in the 2009–2010 influenza season [37]. A vaccination campaign at a large nationwide U.S. hospital system resulted in an increase from 58 % to 95 % after a mandatory vaccination policy allowing

declination for any reason, including personal or philosophical objections [38]. In hospitals requiring mandatory vaccinations of all HCWs, many facilities report greater than 90 % compliance [39–43].

The concerns about mandatory vaccination remain employee opposition to the same and potential infringement on individual autonomy. However, an online survey conducted among U.S. health care professionals demonstrated that 57.4 % backed mandatory vaccination of HCWs for seasonal influenza [44]. Having a mandatory employer vaccination policy, personal receipt of the influenza vaccine, perceived risk of contracting influenza in self and close contacts, fear of significant health consequences from influenza in self or close contacts, and the belief that influenza vaccination was protective were factors significantly associated with increased support of HCW influenza vaccination. Other surveys cite higher support for mandatory influenza vaccine. An Internet-based survey submitted to emergency medicine and internal medicine physicians at the University of Pennsylvania Health System indicated that 85 % of physicians were supportive of mandatory HCW influenza vaccinations [45]. However, only 40.5 % of physicians responded to the survey, which could reflect a sampling bias. In another online survey submitted to health care workers at a large children’s hospital, 70 % felt that mandatory influenza vaccinations were warranted [46]. In the latter study, almost 15 % of HCWs were against a mandatory influenza vaccine policy, citing concerns for vaccine side effects, a lower perceived risk for infection, and the importance of autonomy as reasons for opposition. The investigators suggested that focusing on educational tactics might increase HCW acceptance of mandatory influenza vaccination.

These mandating policies have been limited to individual hospitals or health-care systems. However, the application of similar policies at the state or federal level has been difficult. In August 2009, a recommendation making influenza vaccination mandatory throughout New York State was adopted by the New York State Hospital Review and Planning Council [47]. All HCWs in hospitals, outpatient clinics, and home care services were mandated to receive initially the seasonal influenza vaccine, followed by the pandemic H1N1 influenza vaccine. There was significant opposition to this mandate, with suits being filed against the state. A New York State Supreme Court judge eventually granted a temporary restraining order against the requirement [48]. In October of the same year, the Commissioner of Health suspended this requirement, citing vaccine shortages [49].

Use of Masks

Masks have been used to decrease the spread of influenza from infected patients to HCWs [50]. The Virginia Mason

Medical Center utilized the masking of unvaccinated HCWs with mandatory vaccination and was able to sustain a vaccination rate of over 98 % for the latter 4 years of the study [36•]. The Geisinger Health System used an alternative approach [51]. They made the masking of unvaccinated HCWs mandatory and, simultaneously, provided increased and easier access to voluntary vaccination throughout their health system. They were able to achieve vaccination rates of 90 % and 92 % in consecutive years, with prior rates being below 65 %. Increased rates might be due to the masking policy making employees reevaluate their stance against vaccination. A potential downside to this policy might be the potential stigmatization of HCWs with a medical contraindication to vaccination [28••]. However, the use of face masks may be of use in those HCWs unable to receive vaccination due to medical conditions or personal or religious beliefs.

Other Strategies

Employee incentives and the use of social media have been other strategies used to improve influenza vaccination rates. A Spanish hospital used awareness campaigns with information disseminated via e-mails and a special Web site devoted to furthering vaccination [52]. Additionally, short snippets on vaccine efficacy, safety, and nosocomial outbreaks were added to these Web sites. HCW incentives in the form of prizes were also a part of the strategy. This was combined with providing increased accessibility of the vaccine to HCWs by providing mobile vaccination units, with their destinations published beforehand. A telephone line was also set up to provide answers to HCW questions or concerns. This campaign saw a modest increase in vaccination rates from 23.7 % to 37 %, with physicians having the highest rates of vaccination. Higher rates were observed in a hospital in Texas that used improved employee education, as well as easier access via provision of free vaccines at all clinic locations to improve vaccination rates [53]. Their rates rose from 36 % to 73 % over 4 years. Here as well, social media was used as a platform to provide information on vaccine safety, as well as ACIP recommendations to HCWs. Employee incentives were once again used to increase interest in vaccination. Demonstrating the importance easier access to vaccines has in improving HCW vaccination rates, Talbot et al. found that influenza vaccination rates were significantly higher in hospitals that provided weekend vaccinations (59 % vs. 44 %), trained and used noninfection control personnel to administer vaccine in outpatient clinics (60 % vs. 47 %), reported vaccination rates to the board of trustees (64 % vs. 53 %), and sent letters to HCW homes emphasizing the importance of vaccination (59 % vs. 47 %) [35•]. Lam et al. analyzed 12 articles assessing increased

coverage of influenza vaccination in various clinical settings [54]. In long-term care facilities, using a combined approach of education, promotion, and improved access to vaccines provided higher HCW vaccination rates than did promotion or education alone. This effect was not seen in hospital settings; here, mandatory declination forms or wearing of masks when HCWs were unvaccinated achieved higher rates than did other interventions.

Conclusions

The vaccination of HCWs is an important step in the prevention of the nosocomial transmission of influenza. Vaccination rates continue to remain well below the target set for HCWs. Voluntary vaccination programs alone are ineffective in reaching vaccination goals; mandatory vaccination programs may be necessary in an effort to improve vaccination rates. Combining these programs with convenient, free access to vaccines, intensive education programs, the use of social media to propagate information on vaccine safety and efficacy, and employee incentives will likely have the highest impact in increasing vaccine awareness and acceptance. Strong leadership support is also essential to ensuring implementation of such programs. With those employees who are unable or unwilling to be vaccinated despite the above, masks may provide some protection against transmission of influenza. Personal and religious beliefs against mandatory vaccination and concerns regarding infringement on personal autonomy will likely continue to challenge efforts to improve HCW vaccination against influenza.

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