



Mandatory influenza vaccination for all healthcare personnel: a review on justification, implementation and effectiveness

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Purpose of review

As healthcare-associated influenza is a serious public health concern, this review examines legal and ethical arguments supporting mandatory influenza vaccination policies for healthcare personnel, implementation issues and evidence of effectiveness.

Recent findings

Spread of influenza from healthcare personnel to patients can result in severe harm or death. Although most healthcare personnel believe that they should be vaccinated against seasonal influenza, the Centers for Disease Control and Prevention (CDC) report that only 79% of personnel were vaccinated during the 2015–2016 season. Vaccination rates were as low as 44.9% in institutions that did not promote or offer the vaccine, compared with rates of more than 90% in institutions with mandatory vaccination policies. Policies that mandate influenza vaccination for healthcare personnel have legal and ethical justifications. Implementing such policies require multipronged approaches that include education efforts, easy access to vaccines, vaccine promotion, leadership support and consistent communication emphasizing patient safety.

Summary

Mandatory influenza vaccination for healthcare personnel is a necessary step in protecting patients. Patients who interact with healthcare personnel are often at an elevated risk of complications from influenza. Vaccination is the best available strategy for protecting against influenza and evidence shows that institutional policies and state laws can effectively increase healthcare personnel vaccination rates, decreasing the risk of transmission in healthcare settings. There are legal and ethical precedents for institutional mandatory influenza policies and state laws, although successful implementation requires addressing both administrative and attitudinal barriers.

Keywords

healthcare personnel, healthcare-associated influenza, influenza vaccine, mandatory influenza vaccination, public health

INTRODUCTION

Transmission of influenza in healthcare settings is a common and serious public health concern, as spread of influenza from healthcare personnel (HCP) to patients may result in serious harm or death [1]. Although vaccination is the best available preventive measure against influenza, the effectiveness of currently available influenza vaccines is reduced in persons at least 65 years of age and in populations with certain chronic disorders, making protection via herd immunity a crucial component to protection [1]. As HCP interact with patients who are often at an elevated risk of complications from influenza, due to young or old age or the presence of an underlying medical condition, any measure that

increases vaccination rates would contribute to patient protection [2].

Surveys indicate that most HCP believe that HCP should be vaccinated against seasonal influenza [3,4[■],5], but the Centers for Disease Control and

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KEY POINTS

- Healthcare-associated influenza is a common and serious public health concern.
- Vaccination is the best available preventive measure against influenza.
- Mandatory influenza vaccination policies and state laws can improve healthcare personnel vaccination rates to more than 90%.
- Constitutional precedent has established that vaccination requirements and other public health initiatives may be enforced if such measures are a public health necessity; have a 'real or substantial relationship' to protection of public health; are not onerous or unfair; and do not pose a health risk to their individuals.
- Institutions should address both administrative and attitudinal barriers to vaccination through strategies such as absorbing vaccination costs, providing vaccines on-site, promoting the vaccines, offering education, establishing and utilizing vaccine champions, involving labour-management circles and gaining leadership buy-in to inspire employees.

Prevention (CDC) found that only 79% of HCP reported receiving an influenza vaccination during the 2015–2016 season, with rates as low as 44.9% in some institutions [6[■]]. Acute care hospital settings had the highest vaccination coverage (90.4%) among HCP, while long-term care settings had the lowest (63.9%) [6[■]]. It is crucial to enhance vaccination rates in all healthcare settings, which the CDC defines as including (but not limited to) 'acute-care hospitals; long-term care facilities, such as nursing homes and skilled nursing facilities; physicians' offices, urgent-care centers; outpatient clinics; home healthcare (i.e. care provided at home by professional healthcare providers), and emergency medical services. Also included are specific sites within nonhealthcare settings where healthcare is routinely delivered (e.g. a medical clinic embedded within a workplace or school)' [7].

In the 2015–2016 season, the overall burden of influenza in the United States was estimated to include 25 million influenza illnesses, 11 million influenza-associated medical visits, 310 000 hospitalizations and 12 000 pneumonia and influenza deaths [8]. There is increasing evidence that vaccinating HCP reduces the burden of influenza on patients [9,10[■],11,12]. Many professional organizations, including the American Academy of Pediatrics (AAP), CDC, American Academy of Family Physicians (AAFP), American Hospital Association (AHA), Society for Healthcare Epidemiology of America

(SHEA), Infectious Diseases Society of America (IDSA), Pediatric Infectious Diseases Society (PIDS), Association for Professionals in Infectious Control and Epidemiology, Inc. (APIC) and American Public Health Association (APHA) support mandatory influenza vaccination policies for all HCP [13–17]. Although similar measures are in place for measles, mumps and rubella (MMR) vaccine, tuberculosis screening and hepatitis B vaccine [18] and are generally accepted, mandatory influenza vaccination remains controversial among many HCP. Influenza vaccine acceptance among HCP faces many unique barriers [10[■]].

Commonly identified barriers to accepting the influenza vaccine among HCP include perceived ineffectiveness of the vaccine, low likelihood of contracting influenza, low threat compared with other infectious diseases, fear of getting influenza-like illness from the vaccine, fear of adverse effects and concern about exposure to thimerosal [10[■],19]. Although education may positively influence HCP attitudes towards the vaccine, it does not have a direct influence on willingness to receive the vaccine [10[■]]. A Swiss study in which 18 unvaccinated nurses in high-risk patient units were interviewed found that most nurses did not perceive their own patients as being at a high risk for influenza complications and did not see their rejection of vaccination as a threat to their patients [4[■]]. The results of this study highlight the need to address attitudinal barriers as well as knowledge barriers.

In this review, we discuss the rationale for mandatory influenza vaccination policies for all HCP and will also present strategies to successfully implement such policies.

WHY HEALTHCARE PERSONNEL INFLUENZA VACCINATION MATTERS

Every year, up to 25% of HCP are infected with influenza [12,20[■]]. Although the CDC recommends that HCP with fever and respiratory symptoms be excluded from work, afebrile employees with respiratory symptoms are allowed to work, provided that they wear a face mask during patient care activities and adhere to proper respiratory etiquette and precautions [21]. However, HCP compliance with face masks and other protective equipment is self-reported to be around 60% and often observed to be lower [22]. In addition, there are conflicting data in the literature on the efficacy of using face masks to prevent transmission of influenza. MacIntyre *et al.* [23] found that masks are highly effective in preventing the spread of influenza when used correctly, and other studies found that masks are most effective when used correctly and in combination with

proper hand-washing techniques [24,25]. Aiello *et al.* [26] reported that facemasks are only effective in reducing influenza-like illness when used with proper hand washing. Meanwhile, Crum [27] suggests that medical masks are not only ineffective, but may even increase the transmission rate of the influenza virus, as HCP's hands frequently encounter respiratory droplets while masks are readjusted, potentially spreading the virus via touch.

Another concern is that 32–56% of HCP infected with influenza A are afebrile, suggesting that as many as a majority of HCP may be infectious and utilizing an ineffective method of reducing transmission [22,28–30]. In one study of 449 HCP at the University of Chicago Medical Center, 243 employees (54%) had a positive test for any respiratory pathogen with 34 employees (7.6%) testing positive for influenza from 3 January 2014 through 28 February 2014. Nearly half of those with influenza were afebrile, and the hospital's Infection Control Program identified an afebrile HCP with respiratory symptoms as the source of infection for a healthcare-associated influenza case [20[¶]]. While Lau *et al.* [29] found that the decline of fever is correlated closely with the decline in viral shedding, they also found that a majority of viral shedding occurred within 2–3 days of acute respiratory illness onset. Acute respiratory illness was defined as the presence of at least two of the seven following symptoms: fever at least 37.8°C, headache, myalgia, sore throat, runny nose, cough and phlegm [29]. Evidence suggests that afebrile HCP with respiratory symptoms are at risk of transmitting influenza to their patients, and current preventive measures (i.e. wearing face masks and protective equipment) may not be completely effective, even if utilized appropriately.

HCP may also work if they are asymptomatic or presymptomatic, and infected persons may shed the virus for 24 h before the onset of symptoms [1,31,32]. Lau *et al.* [29] found that although 14% of individuals with confirmed influenza were asymptomatic or presymptomatic, these 'silent spreaders' (i.e. infected presymptomatic or asymptomatic individuals) may not be as contagious as previously believed, as they all had low levels of viral shedding. A more serious concern is presenteeism, or working when they should be excluded from work. Many HCP report having worked while febrile or with influenza-like symptoms [33–35]. Ablah *et al.* [33] found in a survey of 1500 HCP that while 86% report their intent to leave work if they have influenza-like illness, 59% report having worked with symptoms. Similar percentages were found among resident physicians, with 57.9% reporting working while sick at least once [34]. Data suggest that many HCP will continue working even when

infected with influenza, and current preventive measures are not maximally protecting patients given the prevalence of healthcare-associated influenza. Although respiratory hygiene, cough etiquette, hand hygiene, adherence to infection control for all patient-care activities and aerosol-generating procedures are important measures to prevent influenza transmission in healthcare settings, vaccination is a crucial step in decreasing healthcare-associated influenza.

Transmission of influenza from healthcare personnel to patients in healthcare settings

Influenza transmission from HCP to patients is very common and has been described in a number of international studies [35–38]. In 2012, there was an influenza A (H3N2) outbreak in the geriatric department at the Hôpital Edouard Herriot in Lyon. Laboratory testing of patients with influenza-like illness revealed 22 cases of influenza between 19 February and 15 March with six nosocomial infections recorded. Neuraminidase and haemagglutinin gene sequencing confirmed three independent influenza clusters, of which at least two were attributed to an HCP source. Epidemiological links were also analysed using a questionnaire, confirming influenza transmission from HCP to patients [38]. A prospective surveillance study conducted from 2006 to 2012 using data from acute care hospitals in the Canadian Nosocomial Infection Surveillance Program found that 17.3% of influenza cases were healthcare-associated (570 out of 3299 cases) [39], whereas Jhung *et al.* [40] found that only 2.8% of cases within the U.S. were healthcare-associated (172 out of 6171 cases) during the 2010–2011 influenza season. However, Jhung *et al.* [40] also found that despite lower incidences of influenza within hospitals compared within the community, patients with hospital-acquired influenza had greater lengths of stay and were more likely to be admitted to the intensive care unit or die. In a review, Salgado *et al.* [41] found that the median mortality rate among all patients with hospital-acquired influenza was 16%, but patients in high-risk groups, such as transplant recipients or patients in the ICUs, had mortality rates ranging from 33 to 60%.

Protecting patients

Vaccination not only protects patients and HCP from influenza but may also modify the severity of an influenza infection and/or reduce influenza complications [9,11,12,18,42–46]. Ahmed *et al.* [9] conducted a systematic review of randomized trials, cohort studies and case-control studies that looked

at HCP vaccination within long-term care institutions and used meta-analysis to examine the results. The authors also assessed the quality of the evidence with the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach and found the overall quality of evidence to be moderate. The pooled risk ratios for all-cause mortality and influenza-like illness were statistically significant (0.71 and 0.58, respectively), suggesting a 29% reduction in deaths and 42% reduction in influenza-like illness. However, Ahmed *et al.* [9] did not find statistical significance for all-cause hospitalization or laboratory-confirmed influenza. Recent Cochrane reviews in 2013 and 2016 of cluster randomized control trials in long-term care institutions also found that HCP vaccination may have little or no effect on the number of residents who develop influenza, but did not analyse HCP vaccination's effect on mortality [46,47]. A 2010 Cochrane review, which completed a meta-analysis for mortality, found similar results as Ahmed *et al.* [9] and found that institutions with vaccinated HCP had significantly reduced all-cause mortality [48]. Despite some inconsistency in results concerning influenza-like illness and hospitalizations, two major systematic reviews reached a similar conclusion that HCP vaccination decreases mortality. It is estimated that one patient life is saved for every eight HCP who receive influenza vaccination [49]. For that reason, increased HCP vaccination is a crucial step in protecting patients, although more randomized control trial studies should be conducted.

DO MANDATORY VACCINATION POLICIES INCREASE VACCINATION RATES?

According to a 2015–2016 CDC report, vaccination was highest among HCP who were required by their

employer to be vaccinated (96.5%). Comparatively, vaccination rates among HCP who worked in healthcare settings with voluntary vaccination programs were observed to be as low as 44.9% [6[¶]]. If the institution offered the vaccine onsite for more than 1 day and promoted the vaccine among employees, rates were as high as 82.8% [6[¶]]. However, only an institutional mandate for influenza vaccination proved to achieve the *Healthy People 2020* objective of vaccinating 90% of HCP [50].

A number of studies have shown that implementing a mandate increases HCP vaccination [35,51,52,53[¶]]. In one 5-year study of Virginia Mason Medical Center, the first facility to make annual influenza vaccination a 'fitness-for-duty' requirement of every employee of the medical centre, Rakita *et al.* [35] found that 97.6% of approximately 5000 HCP were vaccinated in the first year of implementing a vaccination mandate. Rates remained more than 98% over the remaining 4 years of the study, compared with a 54% vaccination rate prior to the mandate [35]. This study suggests that a mandatory policy not only helps a healthcare setting achieve more than 90% vaccination for HCP but can also sustain that rate of vaccination longitudinally. Another study conducted at BJC HealthCare, a large Midwestern healthcare organization with nearly 26 000 employees in multiple facilities, found that 98.4% of HCP were vaccinated in the mandate's first year [51], suggesting that vaccination mandates can also succeed in health systems that are made up of multiple healthcare institutions. Figure 1 demonstrates that institutional mandates of HCP vaccination consistently increase vaccination rates.

In addition, laws requiring HCP influenza vaccination (similar to laws mandating certain vaccinations prior to school entry) have also proven to be

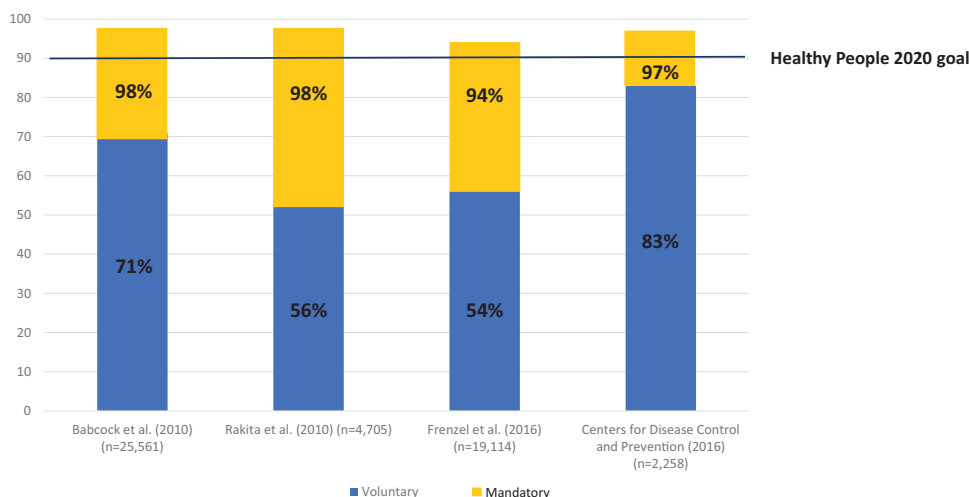


FIGURE 1. Vaccination rates prev. postimplementation of a mandatory vaccination policy.

successful in increasing vaccination rates. From 2000 to 2005, only Maine and New Hampshire had laws concerning HCP influenza vaccination, and national HCP vaccination rates averaged at 22.5%. However, from 2006 to 2011, 19 states had laws about HCP influenza vaccination, and the average vaccination rate increased to 50.9% [52]. Lin *et al.* [52] found that the presence of a state law increased the odds of HCP vaccination in long-term care facilities by 84% and in acute care facilities by 73%. Although state laws may improve HCP influenza vaccination, one limitation is the variability in the specificity of the laws' language regarding exemptions, types of HCP included, reporting requirements and repercussions for refusal among others [52,54]. For example, of the 19 states and the District of Columbia with laws that addressed HCP influenza vaccination in 2011, only nine states and District of Columbia adopted CDC standards and recommendations [55].

In summary, data show that mandates increase influenza vaccination rates significantly. To achieve optimal rates, institutional mandates should be consistent throughout the United States and include all HCP. Mandates may be facilitated by state laws, which should also be standardized. Laws should require every healthcare setting to participate in mandatory vaccination, identify strategies to assist employer's purchase and distribution of vaccine to HCP, and draft exemption policies that only allow medical exemptions [56]. Perhaps, it is also necessary to include HCP influenza vaccination, such as hepatitis B vaccination, in the federal Occupational Safety and Health Administration (OSHA) standards [54].

IS A MANDATORY INFLUENZA VACCINATION POLICY FOR HEALTHCARE PERSONNEL ETHICAL AND LEGAL?

The four most commonly accepted principles of medical ethics are autonomy, justice, beneficence and nonmaleficence [57]. HCP have a professional obligation of nonmaleficence. However, mandatory influenza vaccination policies present a conflict between nonmaleficence and autonomy [51]. The legal justification for mandatory vaccinations of HCP has been supported by United States courts. In 1905, the United States Supreme Court ruled in *Jacobson v. Massachusetts* that states have constitutional power to enforce vaccination requirements or other public health initiatives if they are a public health necessity; have a 'real or substantial relationship' to protection of public health; are not onerous or unfair; and do not pose a health risk to their individual(s) [58]. This ruling was upheld in the 1950s and 1960s when laws mandating measles

and polio vaccination were enforced for school entry. These mandates have been successful in maintaining high vaccination rates and decreasing vaccine-preventable illnesses, and are repeatedly upheld in state and federal courts [54].

However, nurse unions have been vocal in opposing vaccine mandates. Unions frame mandates as new conditions of employment, which they have the right to negotiate as part of their collective bargaining agreement [59]. Many employers frame mandates as exercising managerial rights to establish patient care policies that are not subject to bargaining [18]. In the case of *Virginia Mason Hospital v. Washington State Nurses Association* in 2007, the court upheld the union's right to veto the vaccine requirement but also allowed the hospital to require unvaccinated HCP to wear masks when interacting with patients [60]. Despite opposing, 85.9% of the unionized nurses elected to be vaccinated in the 2005–2006 season, and that percentage rose to 95.8% in 2009–2010 [35]. As healthcare-associated influenza is a serious public health concern, and vaccination is well tolerated and the current best preventive measure, a mandate for all HCP is constitutional provided the institution facilitates the vaccination (i.e. absorbs vaccination costs and offers the vaccine onsite). In one cross-sectional anonymous survey of 2443 randomly selected clinical and nonclinical HCP at a large paediatric tertiary care hospital, Feemster *et al.* [61] found that while 72% of HCP believed the mandatory policy to be 'coercive', more than 90% agreed that the policy was important for protecting patients and that it was an ethical responsibility.

Influenza vaccination is not the only vaccination that has been considered for a mandate. Many institutions require MMR vaccination, and there is a federal requirement for hepatitis B vaccination [18]. Similarly, annual screening for tuberculosis is also required. However, the influenza vaccination mandate faces unique barriers, in part because of the many misconceptions concerning vaccine effectiveness, adverse effects from influenza vaccine and severity of influenza [10^a,19]. HCP who oppose influenza vaccination often cite the belief that although protecting patients is important, HCP vaccination is not proven to protect patients from harm and is not a guaranteed-safe intervention for the vaccinated [23].

Misconceptions

Number 1: Influenza is not as serious as other infectious diseases

Approximately 3–5 million individuals around the world suffer from severe influenza annually, which

results in 250 000–500 000 deaths [62]. Although most hospitalizations and deaths occur among high-risk populations (i.e. young children, the elderly, pregnant women and individuals with specific chronic diseases), influenza-associated complications also occur in a substantial proportion of previously healthy individuals [62]. Influenza was the eighth leading cause of death for adults within the United States in 2015 [63], and 44.3% of children who were hospitalized for influenza had no identifiable underlying medical condition in the 2016–2017 influenza season [64]. In a study of influenza seasons from 1976–1977 through 2006–2007, the estimated annual number of influenza-associated deaths ranged from 3349 to 48 614 with an average of 23 607 deaths [65]. In addition, there is an average of more than 200 000 influenza-related hospitalizations per year, and the cost of a severe epidemic has been estimated to be \$12 billion [65]. The burden of influenza is significantly higher during some years, such as the 2009 H1N1 influenza pandemic, during which the CDC estimated that 60 million Americans were infected, 270 000 were hospitalized and 12 500 died [65]. Influenza is a serious concern for all individuals but is especially severe for individuals in high-risk groups, many of which are in healthcare settings and interact frequently with HCP.

Number 2: The influenza vaccine is ineffective

Unlike many other vaccines (i.e. MMR), the components of the influenza vaccine change as new influenza strains circulate. Additionally, the vaccine must be given annually. Because influenza antigenic changes are unpredictable, matching vaccine strains with circulating strains is difficult and is the cause of varying vaccine effectiveness from year to year. The U.S. Influenza Vaccine Effectiveness Network reports that from 2005 through 2016, the overall vaccine effectiveness has ranged from 10 to 60% [66]. As a result, it is a common belief that influenza vaccination does not protect people from influenza. In one survey that sampled more than 1500 U.S. HCP, nearly one-third of HCP did not believe the vaccine would protect them or those around them from influenza [3]. Despite the variation in vaccine effectiveness, annual vaccination remains the best preventive measure against influenza [2]. The CDC estimates that utilization of influenza vaccine prevented 5.1 million influenza illnesses, 2.5 million influenza-associated medical visits and 71 000 influenza-associated hospitalizations during the 2015–2016 influenza season. If vaccination coverage had increased by just 5 percentage points among adults aged 18–64 years during the most recent season,

300 000 additional influenza illnesses and 2000 additional hospitalizations could have been prevented [8].

Number 3: The influenza vaccine is unsafe

One of the most common concerns about the influenza vaccine is that vaccinated individuals develop the disease from the vaccine. Anecdotal evidence of vaccinated individuals who develop influenza days after receiving the vaccine is often cited. However, as the CDC explains, injected influenza vaccines are currently manufactured in two ways: from inactivated viruses that are no longer infectious or with no viruses at all (recombinant influenza vaccines) [67]. Neither form of the vaccine can infect vaccinated individuals, but vaccines do not prevent clinical symptoms in individuals who already have an influenza infection when immunized or infections caused by other respiratory viruses. It takes approximately 2 weeks for an adequate antibody response to develop following immunization. As the incubation period of influenza is short, averaging 2 days prior to the onset of symptoms, individuals may be infected prior to receiving the vaccine or shortly thereafter and misattribute the symptoms to the vaccine [68]. Many other respiratory virus infections are commonly interpreted as episodes of influenza. Thus, there are a number of scenarios in which vaccinated individuals may conclude that they have influenza, but these illnesses do not result from the vaccine.

Another concern that many people have about the influenza vaccine is that some formulations of the vaccine contain thimerosal. Thimerosal is a vaccine additive that prevents growth of bacteria and fungi that may be introduced to the vaccine as multiple syringe needles enter a multidose vial. Bacterial contamination can cause severe local reactions, serious illness or death [69]. Although thimerosal contains mercury, it is in the form of ethylmercury, which is distinct from methylmercury, the form found in certain fish that can result in toxic buildup in the human body. Ethylmercury is cleared from the human body more quickly than methylmercury and is less likely to cause harm [69]. Thimerosal use in medical products has a record of being safe. Although there is no evidence of harm caused by the low doses of thimerosal in vaccines, with the exception of minor reactions such as redness and injection site swelling, Public Health Service agencies, the AAP, and vaccine manufacturers agreed in July 1999 that thimerosal should be reduced or eliminated in vaccines as a precautionary measure [69]. In the 2016–2017 influenza season, only five of 16 influenza vaccine formulations contained thimerosal, all with concentrations below 25 µgHg/0.5 ml dose [2]. Although thimerosal-free

versions of the influenza vaccine are widely available, use of a thimerosal-containing vaccine should not deter HCP from vaccination.

Lastly, one of the greatest concerns about influenza vaccination is the risk of developing Guillain–Barré syndrome, due to a small increased risk following swine flu vaccination that was observed in 1976. The increased risk with that formulation was about one additional case per 100 000 people who received the vaccine [70]. The link between influenza vaccination and contraction of Guillain–Barré syndrome has been unclear in other years [71], but if there is a risk, it is thought to be in the range of approximately one in a million doses [70]. Studies suggest that a person is more likely to get Guillain–Barré syndrome after developing influenza than after receiving the vaccine [72,73].

The most common side effects from the influenza vaccine are far from serious. They include soreness, redness, tenderness or swelling at the injection site. Vaccinated individuals may also experience low-grade fever, headache and muscle aches, and in randomized, blinded studies in which participants received an injection of either the inactivated influenza vaccine or a isotonic saline placebo injection, the only differences in symptoms were increased soreness and redness among those who received the vaccine. Those studies did not find differences in body aches, fever, cough, runny nose or sore throat [32,74], demonstrating that influenza vaccination does not pose a significant health risk to HCP.

Number 4: Institutional provision of influenza vaccine is not cost-effective

While implementing a mandatory influenza vaccination policy requires significant human and financial resources from the healthcare institution, it is an advisable investment. Using Virginia Mason Medical Center as a model, Rakita *et al.* [35] estimated that vaccination of more than 5000 HCP required more than 500 h of nursing and medical assistant time. In addition, the institution had to provide clerical support to track employee vaccination status as well as storage space for the vaccines. The cost of 6000 doses of influenza vaccine in 2005 was approximately \$70 000 [35]. However, studies have shown that vaccination decreases absenteeism [41,75,76], thereby generating a fiscal benefit and decreasing the economic burden on a healthcare institution. A retrospective cohort study of HCP working in a health authority in British Columbia found that unvaccinated staff had twice the rate of absenteeism [75].

One randomized, double-blind, placebo-controlled trial of over 800 individuals found that healthy adults who receive influenza vaccination

have 25% fewer upper respiratory infections, 44% fewer physician visits and 43% fewer sick days. Nichol *et al.* [74] estimated that vaccination saves the healthcare setting an average of \$47 per person annually. One study from 1993 estimated that a hospital paid \$7500 in excess per episode of nosocomially acquired influenza [77].

It is crucial for HCP to recognize that healthcare-associated influenza is a serious public health concern and that vaccination is a necessity. Despite variation in vaccine effectiveness from year to year due to the disease's unpredictability, vaccination remains the best preventive measure and is supported by strong evidence suggesting that HCP vaccination protects patients.

STRATEGIES FOR SUCCESSFULLY IMPLEMENTING A MANDATORY INFLUENZA VACCINATION POLICY

Implementing a mandatory influenza vaccination policy requires a multipronged approach, including education efforts, easy access to vaccines, vaccine promotion, leadership support and consistent communication emphasizing patient safety [35,51,53[¶]]. It is crucial that the policy is introduced as a coordinated patient safety campaign. In an 8-year study conducted at the University of Texas MD Anderson Cancer Center with over 15 000 healthcare employees, Frenzel *et al.* [53[¶]] found that influenza vaccination rates of all employees significantly increased from 56% in 2006–2007 to 94% in 2013–2014 ($P < 0.0001$) after a mandatory policy for all HCP was implemented in 2012, as prompted by state law. The institution also increased hours in which influenza vaccination were offered from 30 to more than 100 h, the number of on-site clinics and scheduled clinic hours for HCP to receive the vaccine [53[¶]]. The authors concluded that comprehensive mandatory policies are the most effective strategy for increasing vaccination rates, and state laws requiring HCP vaccination also provide legal justification for employers to implement such policies. However, with any policy change, attitudinal barriers and HCP willingness to accept change must also be addressed.

A survey that was circulated to HCP in a pediatric care facility in Nova Scotia, Canada, during September and October 2010 prior to the implementation of a mandatory influenza vaccination policy was designed to elicit a range of knowledge, attitudes and beliefs about the influenza vaccine. With 202 responses, the researchers found that although knowledge of the seasonal influenza vaccine was a significant predictor of HCP's attitudes towards the vaccine, it did not have a direct influence on

willingness to accept the policy change. To promote positive attitudes towards the policy change, comprehensive and novel approaches were recommended, including utilization of opinion leaders, peer vaccine champions and participation of labour-management circles [78[■]]. In a different survey of 18 Swiss nurses, mandatory vaccinations as a condition of new, or even ongoing, employment were accepted, although compulsory mask-wearing for nurses who refused was criticized, as it was felt to be stigmatizing and discriminating [4[■]]. Institutional mandate policies may work when expressed as a term of employment for new HCP hires and at the time of contract renewal for all unionized HCP.

CONCLUSION

Healthcare-associated influenza is a serious public health concern and a significant healthcare burden in the United States. As HCP often interact with populations at a high risk of influenza complications, increasing HCP vaccination to provide herd immunity for persons in healthcare settings is crucial to decreasing patient morbidity and mortality. Voluntary vaccination programmes consistently fall below Healthy People 2020 goals of 90% HCP coverage, although mandatory policies have been a successful and cost-effective strategy for ensuring vaccination rates more than 90%. Although protecting patients is a recognized ethical obligation for HCP, misconceptions concerning influenza have resulted in controversy over the acceptability of a mandatory policy. However, as state and federal courts have consistently and repeatedly ruled, public health may outweigh personal autonomy. Some states have passed laws requiring influenza vaccination for HCP. This may also be a successful approach to achieve widespread mandatory requirements. Institutions should also incorporate strategies that address administrative and attitudinal barriers to influenza vaccine uptake. These strategies include absorbing vaccination costs, providing vaccines on-site and at convenient times, promoting the vaccines, offering education, establishing and utilizing vaccine champions, involving labour-management circles and gaining leadership buy-in to inspire employees. HCP influenza vaccination saves lives and a mandatory policy contributes to that protection.

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Conflicts of interest

There are no conflicts of interest.

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- of special interest
- of outstanding interest

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The authors of this study conducted semi-structured qualitative interviews with a sample of 18 nonvaccinated nurses, working in units with high-risk patients at two hospitals in Switzerland. The study highlights that the perception of choice is a crucial factor in accepting influenza vaccine and that nurses believe mandating influenza vaccination is feasible, effective and ethical if perceived as a condition of employment. Limitations include the study's small sample size and a potential lack of generalizability, although it provides an interesting framework when implementing an influenza vaccination mandate.

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This study surveys HCP and how knowledge and attitudes impact their likelihood to accept influenza vaccination policy changes. The authors found that knowledge of seasonal influenza is important, albeit an insufficient predictor of willingness to accept policy change, highlighting the necessity of addressing attitudinal barriers as well as knowledge barriers.