

# Influenza Vaccination in Health Care Workers



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Influenza represents a significant cause of global mortality, being responsible for up to 650,000 annual deaths. In the United States, the infection generates an economic burden of approximately \$87 million per year in health care settings. This is primarily due to a significant decline in productivity, including workplace absenteeism.<sup>1</sup> Healthy adults who receive the influenza vaccine experience 25% fewer upper respiratory tract infections and request 43% fewer sick days than those who do not.<sup>2</sup> Influenza vaccination of health care workers (HCWs) has, therefore, been recommended for the past 30 years, having been designated as a priority group by the CDC since 2009.<sup>3</sup> In recent years, reports from acute care hospitals across the United States,<sup>4,7</sup> in addition to a review of the available literature,<sup>8,9</sup> suggest that mandatory vaccine policies may be the most effective way to achieve maximal rates of HCW immunization. But what has the US experience been so far, and what are the current barriers to universal immunization?

## The Case for HCW Vaccination

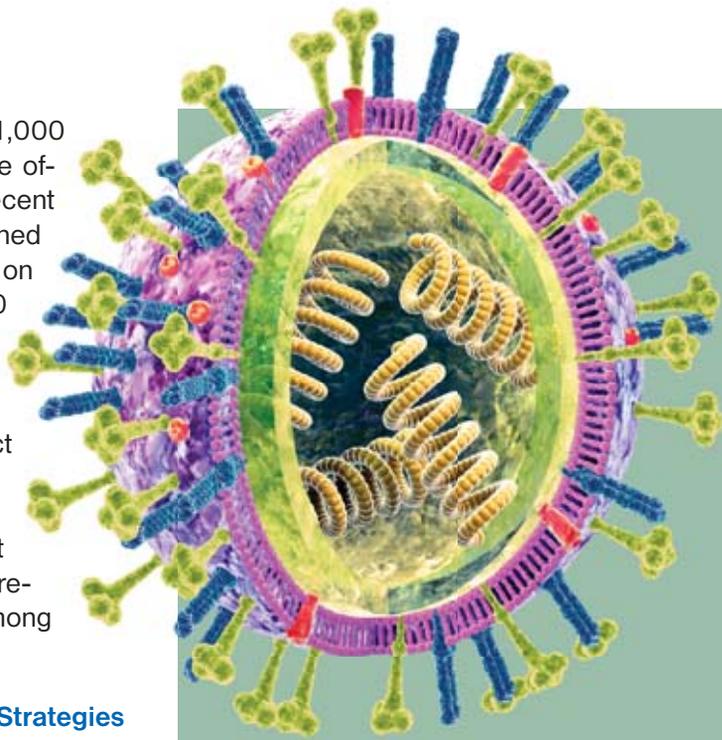
Worldwide, up to 20% of all HCWs will develop serological evidence of acute influenza infection yearly. In stark contrast, only 5% to 8% of vaccinated HCWs develop evidence of acute influenza infection.<sup>10</sup> Thus, mandatory influenza vaccine policies should be considered an important patient safety initiative in the prevention of health care-associated influenza outbreaks, especially in high-risk settings.<sup>11-13</sup> Published studies describe the benefits of such policies for reducing rates of health care-associated influenza and its associated morbidities.<sup>14-16</sup> A meta-analysis that included 4 randomized controlled trials and 4 cohort studies that took place in long-term care facilities or hospitals showed a significant reduction in all-cause mortality (-44/1,000 pa-

tients) and influenza-like illness (~68/1,000 patients) in facilities where HCWs were offered influenza vaccination.<sup>8</sup> A more recent Cochrane review in 2016, which examined the impact of immunization of HCWs on patient outcomes in patients aged 60 years residing in long-term care facilities, was inconclusive.<sup>17</sup> Although there is a need for more robust data to more clearly understand the impact of vaccination on patients' safety in different populations and across different settings, research to date suggests that immunizing HCWs has the potential to reduce both morbidity and mortality among vulnerable patients.

### Efficacy of Current HCW Vaccination Strategies

There are significant differences among global recommendations and coverage for vaccination of HCWs. Reported global coverage rates vary from less than 5% to more than 90% worldwide.<sup>18</sup> In Europe, 29 of 30 countries have national recommendations for influenza vaccination of HCWs; however, coverage is disappointing and rarely exceeds 40%.<sup>19</sup> For this reason, some experts have called for policies supporting mandatory vaccination of HCWs.<sup>19</sup> In the United States, where mandatory vaccination is becoming more common, coverage is better but remains suboptimal, with most recent data showing 78% coverage among health care personnel across all settings.<sup>20</sup> Currently, federal advisory boards recommend that all US HCWs receive the annual influenza vaccine. HCWs include physicians, nurses, nursing assistants, therapists, technicians, emergency medical service personnel, dental personnel, pharmacists, laboratory personnel, autopsy personnel, students and trainees, contractual staff not employed by the health care facility, and persons (eg, clerical, dietary, housekeeping, laundry, security, maintenance, administrative, billing, and volunteers) not directly involved in patient care but potentially exposed to infectious agents that can be transmitted to and from HCWs and patients.

The 2017-2018 influenza season revealed that vaccination rates remain suboptimal, with 78% vaccination coverage among HCWs across all settings, similar to coverage during the 2016-2017 season (78.6%). Vaccination coverage was highest among



### Flu Vaccine Coverage by Profession

Physicians	Pharmacists	Nurses
<b>96.1%</b>	<b>92.2%</b>	<b>90.5%</b>
Nurse practitioners and physician assistants	Assistants and aides	
<b>87.8%</b>	<b>71.1%</b>	
Clinical health care personnel	Nonclinical health care personnel	
<b>80.9%</b>	<b>72.8%</b>	

physicians (96.1%), pharmacists (92.2%), nurses (90.5%), and nurse practitioners and physician assistants (87.8%). Influenza vaccination coverage was lowest among other clinical health care personnel (80.9%), assistants and aides (71.1%), and nonclinical health care personnel (72.8%). Of note, 92% of those employed in hospital settings were immunized.<sup>20</sup> Looking at individual work settings, influenza vaccination coverage was highest among HCWs working in hospitals (91.9%) and continues to be lower among HCWs working in long-term care settings (67.4%) compared with those working in hospitals and ambulatory settings (75.1%).

## Does Mandatory Immunization Improve Vaccine Coverage?

In 2005, Virginia Mason Medical Center, in Seattle, Washington, was the first US health care institution to implement a mandatory influenza vaccination program for its HCWs. The medical center reported 97.6% coverage among its employees in the first year, and vaccination rates of greater than 98% were sustained for the subsequent 5 years. Of note, coverage rates in the year prior to implementation of mandatory vaccination ranged from 29.5% to 54.0%.<sup>5</sup> Many institutions have since followed suit, with 830 programs nationally now having mandatory policies in place.<sup>21</sup> Reports from such programs have repeatedly shown that mandatory vaccination is a successful intervention.<sup>4,6,7</sup>

In the 2017-2018 season, vaccination coverage was highest (95%) among health care personnel working in settings where vaccination was required. Among HCWs whose employers did not have a requirement for vaccination, coverage was higher among those who worked in locations where vaccination was either freely available on-site or actively promoted by their institution (75.1%) compared with that among HCWs working in locations where employers did not have any vaccination-related policies in place (47.6%).<sup>20</sup>

### Barriers to Universal Immunization

Barriers to acceptance of influenza vaccination among HCWs include concerns about safety and side effects, perceived ineffectiveness of the vaccine, perceived low susceptibility to the disease, religious beliefs, and ethical objections about employer-directed programs. Absolute medical contraindications to influenza vaccination are rare, and institutions that have adopted mandatory immunization of HCWs with medical and limited religious exemptions achieve coverage rates of more than 98%.<sup>5</sup> In the section below, we discuss some of the barriers to acceptance and challenges faced by mandatory programs.

#### Side Effects

Among unvaccinated health care personnel surveyed early in the 2017-2018 flu season who did not intend to be vaccinated during the influenza season, the most common reason reported for not being vaccinated was fear of experiencing side effects or getting sick from the vaccine (22.1%).<sup>20</sup>

The most common myth regarding influenza vaccine is a perception that it can cause an influenza-like illness. Although this can occur with the live-attenuated vaccine (FluMist, AstraZeneca), the inactivated vaccines do not contain live virus and thus cannot cause such symptoms.

#### Egg Allergy

Previously reported reasons for vaccine refusal among HCWs include concerns about egg allergy. However, the Joint Task Force on Practice Parameters of the American Academy of Allergy, Asthma and Immunology; the American College of Allergy, Asthma, and Immunology; and the American Academy of Pediatrics (AAP) have recently reevaluated and updated these recommendations and now state that no special precautions are required for the administration of influenza vaccine to egg-allergic patients who have experienced hives only.<sup>22</sup> People with egg allergy are therefore deemed safe to receive any licensed, recommended age-appropriate influenza vaccine. People who have a history of severe egg allergy—those who have had any symptom other than hives after exposure to eggs—should be vaccinated in a medical setting, supervised by a health care provider who is able to recognize and manage severe allergic reactions. However, the quantity of egg protein in influenza vaccines is about 100-fold less than that necessary to induce an allergic reaction in those with severe egg allergy.

#### Medical Contraindications

There are few medical contraindications to the inactivated influenza vaccines. The only absolute contraindication to the inactivated vaccines is a history of severe allergic reaction (eg, anaphylaxis) to a previous dose of the vaccine, which is extremely rare. Precaution is recommended in patients who have experienced Guillain-Barré syndrome (GBS) within 6 weeks of receiving the vaccine. However, natural influenza virus is 17 times more likely to cause GBS than vaccination; so, in a sense, influenza vaccine prevents GBS.<sup>23</sup> The live-attenuated vaccine should not be given to pregnant or immunocompromised HCWs or HCWs who are close contacts or caregivers of immunocompromised patients who require a protective environment; however, HCWs in these categories can receive the inactivated vaccine.

## Pregnancy

Influenza vaccination of pregnant women is recommended by federal advisory and professional groups. Because millions of pregnant women have received the influenza vaccine, a great deal of data are available on vaccine safety. Studies have looked at pregnancy complications and adverse fetal outcomes including miscarriage, stillbirth, and preterm delivery. There is now a large body of evidence confirming that influenza vaccine is safe in pregnancy.<sup>24-26</sup> In 2018, a publication claimed a theoretical association between the influenza

**Flu vaccine coverage was highest (94.8%) when vaccination was required.**

Source: CDC.



vaccine and first trimester loss.<sup>27</sup> Since that time, there has been widespread criticism of this paper. Critical review has identified significant methodological flaws, including the potential inappropriate matching of cases and small sample size. These flaws would lead to failure to control for conventional risk factors for miscarriage and introduce bias.<sup>26,28,29</sup> A subsequent follow-up study by these same investigators looking at a larger sample of 2,762 women (3 times the number in the first paper) showed no significant association between influenza vaccine receipt and miscarriage regardless of prior-season influenza vaccine status.<sup>30</sup> These findings support the safety of influenza vaccine in early pregnancy, and the CDC and Advisory Committee on Immunization Practices continue to recommend that the influenza vaccine be given to pregnant women at any gestational age.

## Religious Exemptions

The US constitution supports a medical exemption but not a religious or philosophical exemption to mandated vaccines. Many institutions in the United States, which have adopted mandatory influenza

vaccination policies, have opted to include a religious exemption. This is complicated from both a legal and ethical perspective. The AAP policy statement on mandatory vaccination of HCWs recommends using a universal form with defined acceptable religious and medical exemptions.<sup>31</sup> A common theme in legal cases arising from this issue is a perception that institutions have evaluated a religious exemption in an arbitrary manner. Health care institutions are encouraged to have well-thought-out, transparent, and reasonably applied policies.<sup>32</sup>

## Ethical and Legal Considerations

There is an ethical debate surrounding the mandatory immunization of HCWs. Some may oppose mandated vaccination based on a concern for loss of autonomy or injustice. However, the core medical ethics principles of beneficence (do good) and not maleficence (do no harm) support mandatory vaccination as an ethical step, especially considering failure of voluntary approaches to achieve adequate coverage. HCWs have an ethical duty both to themselves and to their patients to be vaccinated.<sup>33,34</sup>

## Conclusion

Mandatory immunization of health care professionals against influenza is the most effective strategy to improve coverage. In doing so, we are protecting both our health care personnel and our patients.

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