

CONCISE COMMUNICATION

Impact of New York State Influenza Mandate on Influenza-Like Illness, Acute Respiratory Illness, and Confirmed Influenza in Healthcare Personnel

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In 2013, New York State mandated that, during influenza season, unvaccinated healthcare personnel (HCP) wear a surgical mask in areas where patients are typically present. We found that this mandate was associated with increased HCP vaccination and decreased HCP visits to the hospital Workforce Health and Safety Department with respiratory illnesses and laboratory-confirmed influenza.

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Influenza vaccination of healthcare personnel (HCP) has been a long-standing public health priority. However, HCP vaccination rates, while rising, are suboptimal.¹ Different approaches have been taken to improve HCP influenza vaccination rates. For example, a healthcare system in Delaware implemented mandatory declination, masking policies, peer pressure, accountability, and financial rewards; their vaccination rate increased from 72% to 92% across 4 influenza seasons.² In Rhode Island, unvaccinated HCP were mandated to wear masks in patient care areas; vaccination rates increased from 70% in the 2011–2012 influenza season to 87% in the 2012–2013 influenza season.³

In 2013, the New York State Department of Health (NYSDOH) mandated that, during the influenza season, HCP with direct patient contact either receive influenza vaccination or wear a surgical mask in areas where patients are typically present.⁴ We assessed the impact of this public health law over 3 influenza seasons on overall vaccination rates, HCP visits to the Workforce Health and Safety Department (WH&S) for influenza-like illness and acute respiratory illnesses (ILI/ARI), and laboratory-confirmed influenza and non-influenza respiratory viral infections.

METHODS

Study Design, Site, and Subjects

We performed a retrospective study in our 6-hospital healthcare system, which employs approximately 29,000 HCP, to

determine the impact of the NYSDOH public health law (described above) on HCP influenza vaccination rates and HCP visits to WH&S with ILI/ARI during three influenza seasons: October–April 2012–2013 (premandate) and October–April 2013–2014 and 2014–2015 (postmandate). Included HCP were those with respiratory symptoms classified by WH&S clinicians as ILI/ARI or those requesting clearance to return to work following ILI/ARI. The institutional review boards of Weill Cornell Medical College and Columbia University Medical Center approved this study with a waiver of informed consent.

Workforce Health & Safety Policies and Diagnostic Testing

WH&S provided influenza vaccination to HCP free of charge. During the study period, trivalent vaccine was used, and >95% of vaccinated HCP received the intramuscular formulation. Since 2008, participation in our medical center's Flu Vaccination Program has been mandatory; those declining vaccination signed a vaccine declination form and viewed a 15-minute online educational course or read an educational pamphlet. Following the 2013 mandate, those declining vaccination also received education from WH&S clinicians about appropriate mask use in patient-care areas.

WH&S protocols for managing and testing HCP with ILI/ARI were unchanged during the study period. Briefly, HCP who came to work with or developed ILI/ARI were expected to present to WH&S for evaluation during business hours (Monday–Friday, 7:30 AM–4:00 PM). Diagnostic testing was performed at the discretion of WH&S clinicians. If HCP developed ILI/ARI during off-business hours (for the WH&S) or off-duty hours, they were expected to be cleared to return to work by the WH&S clinicians. If seen by an outside provider, HCP were expected to present the results of diagnostic testing (if performed, eg, influenza testing) at their clearance visit. Influenza-positive HCP with comorbid conditions that placed them at increased risk of severe influenza were prescribed oseltamivir.

Diagnostic testing for respiratory viruses was performed using the FilmArray assay (Biofire, Salt Lake City, UT), which detects influenza A (H3N2 and H1N1) and B, 4 coronaviruses, parainfluenza 1–4, respiratory syncytial virus (RSV), rhino/enterovirus, human metapneumovirus, and adenovirus.⁵

Data Collection and Analysis

Data were extracted from the WH&S electronic database. The annual proportions of HCP vaccinated between 2006 and 2016 were determined to show the relative impact of the NYS mandate compared with other interventions. To assess other potential impacts of the 2013 mandate, the proportions of vaccinated HCP with ILI/ARI and laboratory-confirmed influenza who presented to the WH&S were compared using

χ^2 tests. Healthcare personnel were considered vaccinated if the influenza vaccine had been administered ≥ 14 days before presenting to the WH&S with ILI/ARI.

RESULTS

From 2006 to 2016, the influenza vaccination rate increased from 47% to 96% (Figure 1). From 2012 to 2015, 1,195 episodes of ILI/ARI were evaluated at WH&S and the number of ILI/ARI episodes decreased over time (Table 1). Conversely, the proportion of HCP with ILI/ARI who were vaccinated increased over time. Most HCP who had testing performed (907 of 989, 92%) were tested at WH&S, but the proportion of HCP tested varied from 74% to 91% during the 3 influenza seasons ($P < .05$). Overall, influenza was detected in 490 HCP (50%), and the proportion of HCP with laboratory-confirmed influenza who were vaccinated increased over time ($P < .05$). Among the 907 HCP tested at WH&S, 295 of 677 (44%) of vaccinated HCP versus 115 of 230 (50%) of unvaccinated HCP had laboratory-confirmed influenza ($P = .09$). Oseltamivir was prescribed for 51% of influenza-positive HCP.

Human coronaviruses were the next most common virus detected (97 HCP, 8%) followed by rhino/enterovirus (79 HCP, 7%), RSV (26 HCP, 2%), human metapneumovirus (13 HCP, 1%), parainfluenza (9 HCP, <1%) and adenovirus (6 HCP, <1%). The proportion of vaccinated versus unvaccinated HCP with noninfluenza viruses detected was similar ($P = .68$).

DISCUSSION

While many have advocated for universal influenza vaccination for HCP,^{6–8} we found that a public health law mandating mask use for unvaccinated HCP increased the vaccination rate to >95%. Others have noted similar increases in vaccination associated with masking policies.³ We also found that when the NYS mandatory vaccination policy in place during the 2009–2010 influenza season was rescinded, the vaccination rate decreased from 90% to 62%. In association with the NYSDOH mandate, the number of ILI/ARI visits to WH&S and number of laboratory-confirmed influenza cases decreased. Among those tested at the WH&S, we also observed a smaller percentage of vaccinated HCP with influenza (44%) compared with unvaccinated HCP with influenza (50%).

The optimal strategies for diagnostic testing of HCP with ILI/ARI working in acute-care settings are unknown. Fever is not predictive of influenza, and vaccinated individuals with influenza may not have fever or have milder symptoms.⁹ We found that half of HCP tested had influenza and half of those with influenza were prescribed oseltamivir, suggesting that the WH&S clinicians targeted those with comorbid conditions for testing. We also found that nearly 20% of HCP tested had other respiratory viruses detected; such viruses could be transmitted to patients as has been shown for RSV.¹⁰ Our findings suggest that testing HCP for both influenza and noninfluenza respiratory viruses could generate information that could mitigate risks to both HCP and patients.

This study had limitations. It was performed in a multihospital system in New York, so the findings may not be generalizable.

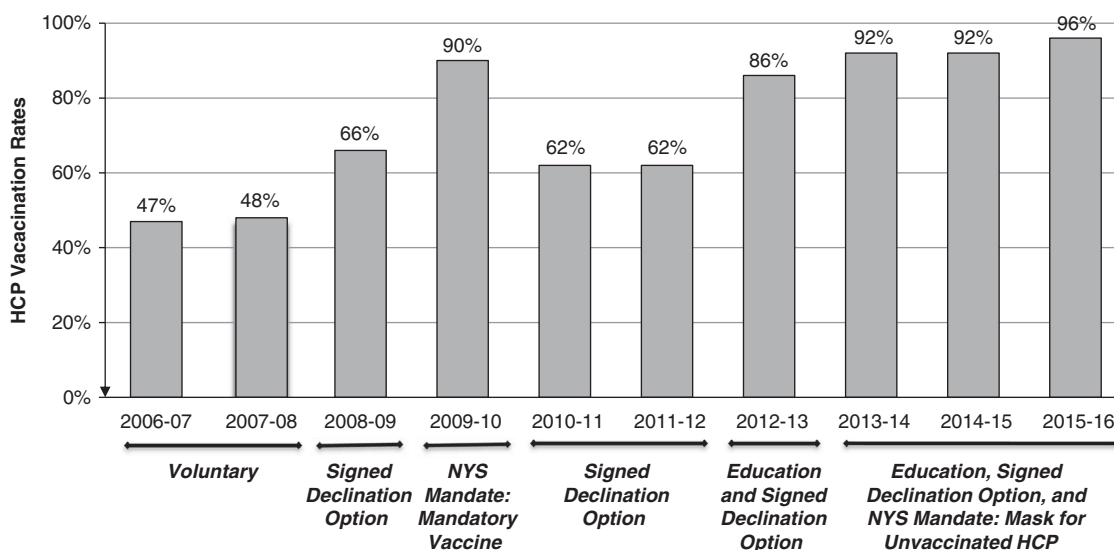


FIGURE 1. Influenza vaccination rates over time. The proportion of vaccinated healthcare personnel (HCP) from the 2006–2007 influenza season to the 2015–2016 influenza season is shown in association with the interventions used to improve vaccination rates during the respective seasons. For the 2008–2009, 2010–2011, and 2011–2012 influenza seasons, HCP who opted for the “signed declination option” signed a vaccine declination form. For the 2009–2010 influenza season, New York State had a mandatory vaccination policy for all HCP,⁶ but that regulation was not renewed. For the 2012–2013 influenza season, HCP who refused vaccination viewed a 15-minute online course or read an education pamphlet. After implementation of the 2013 New York State Department of Health mandate, those declining vaccination were also educated by the hospital’s Workforce Health & Safety staff about appropriate mask use in patient-care areas.

TABLE 1. Healthcare Workers With Influenza-Like Illness/Acute Respiratory Illness, Laboratory-Confirmed Influenza and Their Vaccination Status, 2012–2015

Illness and Vaccination Status	2012–2013	2013–2014	2014–2015	Total
	No. (%)	No. (%)	No. (%)	No. (%)
ILI/ARI episodes, No.	567	340	288	1,195
ILI/ARI in vaccinated HCP	388 (68)	295 (87)	264 (92)	947 (79)
ILI/ARI with viral testing performed ^{a,b}	469 (83)	308 (91)	212 (74)	989 (83)
HCP influenza-positive	229 (49)	172 (56)	89 (42)	490 (50)
HCP influenza-positive, vaccinated ^c	128 (56)	143 (83)	85 (96)	356 (73)
HCP influenza-positive, oseltamivir prescribed	106 (46)	93 (54)	52 (58)	251 (51)

NOTE. ILI, influenza-like illness; ARI, acute respiratory illness; HCP, healthcare personnel.

^aTested by Workforce Health & Safety or test results from outside provider.

^b χ^2 test for proportion: Testing of HCP with ILI/ARI varied over time ($P < .05$).

^c χ^2 test for proportion: influenza-positive HCP who were vaccinated increased over time ($P < .05$).

The rates of compliance with WH&S policies are unknown; it is highly likely that many HCP with ILI/ARI (particularly those with milder symptoms) do not report to the WH&S department. The proportion of HCP tested for respiratory viruses varied over time, which could have biased our findings. Negative tests performed by outside providers may not have been provided by HCP requesting clearance to return to work; furthermore, such testing generally lacks sensitivity and usually only tests for influenza. We did not assess the impact of relative vaccine effectiveness or the overall burden of influenza each influenza season. The WH&S database did not permit an accurate ascertainment of HCP job locations, patient contacts with influenza, or missed work days.

In summary, this study demonstrated that a statewide mandate for mask use by unvaccinated HCP during influenza season increased influenza vaccination in a multihospital healthcare system and was associated with a beneficial impact on employee health and use of WH&S resources. These findings should be evaluated across more influenza seasons and in other centers. The impact of the mandate on missed work days and healthcare-associated influenza in patients should be further assessed.

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