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Major Article

Workplace interventions associated with influenza vaccination coverage among health care personnel in ambulatory care settings during the 2013-2014 and 2014-2015 influenza seasons

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Key Words:
Health care worker
Vaccine

Background: Vaccination of health care personnel (HCP) can reduce influenza-related morbidity and mortality among HCP and their patients. This study investigated workplace policies associated with influenza vaccination among HCP who work in ambulatory care settings without influenza vaccination requirements.
Methods: Data were obtained from online surveys conducted during April 2014 and April 2015 among nonprobability samples of HCP recruited from 2 preexisting national opt-in Internet panels. Respondents were asked about their vaccination status and workplace policies and interventions related to vaccination. Logistic regression models were used to assess the independent associations between each workplace intervention and influenza vaccination while controlling for occupation, age, and race or ethnicity.
Results: Among HCP working in ambulatory care settings without a vaccination requirement (n = 866), 65.7% reported receiving influenza vaccination for the previous influenza season. Increased vaccination coverage was independently associated with free onsite vaccination for 1 day (prevalence ratio [PR], 1.38; 95% confidence interval [CI], 1.07-1.78 or >1 day PR, 1.58; 95% CI, 1.29-1.94) and employers sending personal vaccination reminders (PR, 1.20; 95% CI, 0.99-1.46). Age ≥65 years (PR, 1.30; 95% CI, 1.07-1.56) and working as a clinical professional (PR, 1.26; 95% CI, 1.06-1.50) or clinical nonprofessional (PR, 1.28; 95% CI, 1.03-1.60) were also associated with higher coverage. Vaccination coverage increased with increasing numbers of workplace interventions.
Conclusions: Implementing workplace vaccination interventions in ambulatory care settings, including free onsite influenza vaccination that is actively promoted, could help increase influenza vaccination among HCP.

Influenza causes significant morbidity and mortality each year.[1-5] Health care personnel (HCP) can acquire influenza in the work setting and transmit influenza to patients at risk for influenza-related complications or death.[6] In previous studies, influenza vaccination of HCP has been shown to reduce the risk of influenza illness and absenteeism in vaccinated HCP[7,8] and to reduce the risk of respiratory illness and deaths in nursing home residents.[9,10] The Advisory Committee on Immunization Practices recommends that all HCP receive an annual influenza vaccination due to the potential to reduce influenza-related morbidity and mortality among HCP and high-risk patients.[6] According to data from the National Health Interview Survey (NHIS), influenza vaccination coverage among HCP has

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improved from <50% before the 2009-2010 influenza season to 68.6% during the 2014-2015 season.[11,12] However, coverage remains well below the national Healthy People 2020 target of 90%.[13] Similarly, estimates from Internet panel surveys conducted by the Centers for Disease Control and Prevention reported that influenza vaccination coverage among HCP increased from 63.5% in the 2010-2011 season to 75.2% in 2013-2014, but remained stable between the 2013-2014 and 2015-2016 seasons.[14]

Reported influenza vaccination coverage has reached as high as 98% among HCP who are subject to an employer requirement for vaccination,[15-17] although vaccination mandates have met resistance from HCP.[15,18-22] Previous studies show providing flexible access to free vaccination at the worksite, offering gift incentives for vaccination, educating HCP about the risk of influenza and the overall benefits of influenza vaccination, requiring employees to sign a declination form if not vaccinated, and imposing penalties such as requiring nonvaccinated HCP to wear a mask, have been associated with increased influenza vaccination uptake among HCP.[11,23-27] However, the results are inconsistent across studies and the majority have focused on HCP working in hospital settings,[24,27] leaving a gap in knowledge of effective interventions in ambulatory care settings where approximately 30% of US-based HCP work.[28] The purpose of this study was to investigate workplace interventions associated with increased influenza vaccination coverage among HCP working in ambulatory care settings without employer vaccination requirements.

METHODS

Study sample

Data were analyzed from 2 online surveys of HCP conducted for the Centers for Disease Control and Prevention by Abt Associates, Inc (Cambridge, MA) during April 2014 and April 2015. For both surveys, a convenience sample of HCP was recruited from 2 preexisting national opt-in Internet panels, Medscape and Survey Sampling International (SSI) (Shelton, CT). Survey participants in clinical occupations (excluding assistants and aides) were recruited from a list of members of WebMD Professional Network's professional health Web site (Medscape.com). Medscape has approximately 2 million US health care professional members, including physicians, nurses, allied health practitioners, and clinical technical professionals. A general population Internet panel operated by SSI (https://www.surveysampling.com/) was used to recruit additional health care occupations, including assistants and aides, administrative support staff and managers, and nonclinical support staff. Medscape and SSI panel members aged 18 years and older and living in the United States were invited to participate in the surveys via e-mail invitations and Web site messages.

Respondents were eligible for the surveys if they reported any patient contact or reported working in at least 1 of 8 health care settings (hospital; physician's office or other ambulatory care setting; dentist office or dental clinic; pharmacy; nursing home, assisted living facility, or other long-term care facility; home health agency or home health care; emergency medical service, ambulance, or other patient transport; or other health care settings); respondents could report working in multiple settings. A total of 3,906 eligible respondents completed the surveys. The current analysis is restricted to respondents who indicated that they worked in an ambulatory care setting, defined in the survey as a "physician's office or other non-hospital setting, such as any medical clinic, urgent care, or any other outpatient or ambulatory care setting." Of the 1,395 respondents who reported working in an ambulatory care setting, 529 (37.9%) were excluded because they reported that their employer in any of the settings in which they worked required them to be vaccinated, leaving a final analytic sample of 866.

The surveys were designed to provide end-of-season estimates of influenza vaccination coverage and vaccine-related knowledge, attitudes, and behaviors among HCP. A copy of the survey instrument is shown in the Appendix. Survey items included occupation, age, sex, education, race or ethnicity, work setting, self-reported vaccination status for the respective influenza season (vaccinated since July 2013 for those surveyed during April 2014 and since July 2014 for those surveyed during April 2015), workplace vaccination policies and interventions (including vaccination requirements and vaccination availability at the workplace), and promotion of vaccination (including educational activities; recognition, rewards, or compensation for vaccination; penalties for nonvaccination; personal reminders to be vaccinated; and free or subsidized vaccination).

Respondents could report working in more than 1 work setting, and 145 of respondents included in this analysis reported working in at least 1 other setting in addition to an ambulatory care setting. The workplace vaccination interventions included in this analysis were those reported for any setting where the respondent worked. Occupation was classified as clinical professional (physicians, dentists, nurse practitioners, physician assistants, nurses, allied health professionals, pharmacists, and students in a medical-related field), clinical nonprofessional (technicians and technologists, paramedics, emergency medical technicians, and assistants and aides), and nonclinical support staff (administrative support staff/managers, housekeeping and foodservice staff, and other nonclinical support staff).

Data were weighted to the US population of HCP by work setting, occupation, race or ethnicity, gender, age, and geographic region. A poststratification weight for each responding person in the survey was developed through raking using the most recent Bureau of Labor Statistics Occupational Employment and Wage Estimates[29,30] and Current Population Survey data.[31,32]

Statistical analysis

All analyses include combined data from the 2014 and 2015 surveys (N = 866 survey respondents). Logistic regression models were used to assess the unadjusted and adjusted prevalence ratios (aPR) and corresponding 95% confidence intervals (CIs) for the association of influenza vaccination with each workplace intervention as well as demographic and workplace characteristics thought a priori to be associated with vaccination coverage. Adjusted prevalence ratios were obtained from a multivariable model containing variables for each workplace intervention, occupation, age, and race or ethnicity (model I). A second multivariable model was constructed that used a composite variable for the total number of workplace interventions (0, 1, 2, or ≥3 interventions) instead of the variables for each individual intervention, occupation, age, and race/ethnicity (model II). Education was not included in the multivariable models due to potential collinearity with the occupation variable. Workplace interventions reported by fewer than 30 respondents were excluded from the multivariable models. Analyses were conducted using SUDAAN version 11 (Research Triangle Institute, Research Triangle Park, NC). P values < .05 were considered to be statistically significant. Statistical measures were calculated using the assumption of random sampling.

RESULTS

Table 1 presents the distribution of the study population by occupation, demographic characteristics, and presence of workplace vaccination interventions. The majority of respondents were aged 18-49 years (65.0%), women (76.9%), had a college education or