Workplace-Based Influenza Vaccination Promotion Practices Among Large Employers in the United States

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Objective: Influenza vaccination levels in the working-age population are low. Workplace promotion practices can increase employee vaccination levels, but the extent of employers' use of these practices is unknown. We aimed to estimate the prevalence of employers' use of evidence-based practices for promoting influenza vaccination in the workplace. **Methods:** We conducted a telephone survey of large employers across the United States regarding their use of evidence-based practices to promote vaccination. **Results:** Eighty-four percent of 583 employers surveyed offered on-site vaccination. Use of four promotion practices was high (75% or more), but the remaining four practices were used by only a minority of employers. There is particular room for improvement in the use of practices that increase physical access to vaccination. **Conclusions:** Employers are highly engaged in basic influenza vaccination promotion practices, but there is potential to increase levels of use.

The morbidity, mortality, and cost consequences of influenza in the United States are substantial. The annual incidence of influenza among adults 18 to 64 years of age is estimated to vary from 2% to 10%.[1] Influenza-related mortality is estimated to range between 3000 and 49,000 deaths annually.[2] Annual direct medical costs associated with influenza are estimated at $10.4 billion.[3]

For employers, influenza vaccination among employees can help limit productivity losses, absenteeism, and health care costs associated with influenza. Vaccination is the most effective means of preventing influenza infection[4] and the Centers for Disease Control and Prevention recommends influenza vaccination for all adults.[5] When the influenza vaccine is well-matched with the dominant influenza strains in a particular year, vaccination of employees is associated with decreases in influenza-like illness (34%), missed workdays (32%), and physician visits (42%).[6] Influenza vaccination is generally cost-effective for employers[7–9] and implementing on-site vaccination is generally inexpensive (less than $35 per employee).[10]

Despite the consequences of influenza and the benefits of vaccination, influenza vaccination levels among working-age adults are low. Only 31% of adults 18 to 49 years of age were vaccinated in 2012 to 2013, less than half of the vaccination level for adults 65 years of age or older (65%).[11] Vaccination levels among those 50 to 64 years of age are intermediate, with about 45% vaccinated in 2011 to 2012.[11]

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Employers can help address low influenza vaccination levels among their employees by engaging in evidence-based promotion practices. On the basis of a 2008 Community Guide review[12] and our review of the literature, we classified promotional practices into five domains—physical access, financial access, communication, mandates, and norms. There is particularly strong evidence to support the use of two access-based practices. First, employers can increase physical access to vaccination by offering it to employees at the workplace. Second, they can increase financial access by making vaccination free for employees. While knowledge levels are associated with vaccination levels, free and convenient access to vaccination have been reported as the strongest motivators for vaccination.[13] Supporting the use of these access-based practices, the Community Guide concluded that there was sufficient evidence to recommend interventions that combine reduced cost, on-site access to vaccination with active promotional activities to announce vaccination availability.[12] The reviewers found these practices effective alone or in combination with additional strategies to enhance access, increase knowledge levels, and change norms and attitudes.[12] Such strategies might include arranging a mobile cart to administer vaccinations at employees' workstations, providing employees with information to address common myths, and encouraging the development of employee vaccination champions.

Additional evidence-based practices also address physical and financial access to vaccination. In addition to offering vaccinations at the workplace, effective interventions have improved physical access by offering vaccinations across an increased number of days.[14] To address financial access, in addition to making vaccinations free for employees, some successful interventions have also incorporated vaccination "on the clock" and provided vaccination incentives such as deposits into health savings accounts or refreshments during the vaccination event.[15–17]

Communication is also an effective promotion practice.[14–19] Examples of communication methods are e-mails sent to employees and posters placed around the workplace. When used to announce availability of free, on-site vaccination, these communication practices form an essential element of evidence-based interventions, as determined by the Community Guide. The same communication methods can also be used to convey additional information designed to improve employees' attitudes about vaccination. For instance, communication materials might describe the reasons that employees should get vaccinated and address common misconceptions about influenza vaccination.[14,16,19] Improving employees' attitudes about vaccination is an important strategy for increasing vaccination levels because attitudes are associated with decisions about whether to receive influenza vaccination.[20]

Other effective promotion practices address vaccination norms, such as by establishing the fact that management supports employee vaccination. Supervisor encouragement has been associated with employees' decisions about influenza vaccination.[20] Receiving information about vaccination in the workplace can have a positive impact on vaccination levels even if knowledge levels remain constant,[13] suggesting that workplace norms may play an important role in vaccination levels.

Finally, imposing vaccination mandates has been associated with increases in employee vaccination levels. Hospitals establishing

such mandates experienced average improvements in employee vaccination levels between 11% and 20%.[21,22] Although more research is needed to determine the relative contribution of particular promotion practices, there is solid evidence that various combinations of practices can be very effective in increasing vaccination levels.[12]

Despite the strong evidence base for practices to promote vaccination in the workplace, the extent of employers' use of these practices is unknown. Our objective in this study was to estimate the prevalence of employers' use of workplace-based vaccination promotion practices. This will help determine the need for dissemination of evidence-based practices to employers offering influenza vaccination and will identify practices and employer groups with low levels of practice use.

METHODS

We conducted a national survey of large employers in the United States. The University of Washington institutional review board reviewed the study procedures and deemed the study exempt from review. Employers from all industries and regions were eligible. We included both employers who did and did not offer on-site vaccinations. Employers were not eligible if they had fewer than 500 employees, did not have a headquarters in the United States, did not have a working phone number available, or had no employee qualified to respond to the survey. A survey marketing company (Dunn and Bradstreet, Short Hills, NJ) provided a random sample of employers meeting inclusion criteria. A sample size of 376 was required for analysis, to obtain an estimate of the proportion of employers offering on-site influenza vaccination that were providing it for free. An initial sample of 1268 was selected to ensure an adequate sample of employers who offered vaccination, after accounting for anticipated nonresponse. We assumed a 50% response rate and that 62% of employers offered workplace vaccinations (Martin and Garson, unpublished data).

Data collection occurred in the winter of 2012 and addressed employers' practices during fall of 2011. Trained call center representatives from a market research firm (Research America, Philadelphia, Pennsylvania) administered the survey by telephone. Survey duration was approximately 10 to 15 minutes. Respondents were representatives of each employer that were the most knowledgeable about benefits or vaccination programs, such as benefits managers and occupational health nurses. Respondents received a $25 gift card in appreciation of their participation.

We took three steps to maximize response rate. First, the sample was cleaned to ensure accurate, up-to-date contact information. This was accomplished by cross-referencing the name and telephone number of potential respondents with information listed on employers' Web sites or provided by employers' headquarters. Second, research staff conducted an in-person training session with call center management and interviewers. Finally, we established a protocol of attempting to contact employers 30 times before considering them a nonresponder.

The data collection tool was a questionnaire consisting of short-answer items that included measures of employers' characteristics and vaccination promotion practices. Employer characteristics were industry, the number of employees, whether the employer was self-insured, percentage of employees working full-time, average employee age, average employee salary, and wellness capacity. We assessed wellness capacity by determining whether employers had a paid wellness staff person. Measures of promotion practices addressed the five domains identified in our review of the literature: physical access, financial access, communication, norms, and mandates. All measures were binary, with the exception of communication practices, which were measured continuously. Measures of physical access were as follows: having a multiday vaccination event, making vaccination available within all employees' working hours, and offering vaccination at all worksites. Financial access measures were as follows: making vaccinations free for employees, offering vaccinations "on the clock," and offering incentives for vaccination. Finally, we measured norms by assessing whether employers encouraged managers to get vaccinated as an example and mandates by determining whether employers had a policy mandating employee vaccination.

To summarize the use of promotion practices across the five domains among employers offering on-site vaccination, we developed a promotion practices scale. Nine promotion practices were included and employers could score a maximum of 10 points on the scale. Vaccination mandates were excluded from the scale because they differed from the other practices in that they require rather than promote vaccination. Most practices were dichotomized for inclusion in the scale, with employers categorized as either using or not using a particular practice. Use of communication methods was incorporated in the scale as the proportion of all possible methods that were used by each employer. Communication message use was included in a similar manner. Because of the relative strength of the evidence base for the impact of free vaccination, the scale was weighted to distribute two points for this practice and one point each for the remaining eight practices.

We conducted descriptive analyses to examine the characteristics of the sample and the use of promotion practices. We described the characteristics of the full sample using summary statistics, but most of the remaining analyses were restricted to employers offering influenza vaccination in the workplace. We estimated proportions and 95% confidence intervals for use of each promotion practice. Practice use was dichotomized for the purposes of analysis. We conducted bivariate analyses to assess associations between employer characteristics and offering on-site vaccinations or making them free. The significance of differences was determined using chi-squared tests and tests of proportion. Mean promotion practices score was calculated and bivariate associations between employer characteristics and score were examined.

We used regression analyses to assess the relationship between employer characteristics and the use of promotion practices. We performed the analyses using Stata version 12 (StataCorp LP, College Station, Texas). A logistic regression analysis was conducted to examine the association between employer characteristics and whether influenza vaccinations were offered. This analysis included all respondents who offered on-site vaccination and those who did not but excludes those who were unsure. We also conducted a logistic regression analysis to evaluate the association between employer characteristics and whether vaccinations were free, among those employers offering vaccination. Odds ratios were converted to relative risks for interpretation because the outcome was not rare.[23] We conducted an ordinary least squares regression analysis to examine the association between employer characteristics and promotion practices score. This analysis was also restricted to those employers offering on-site vaccination. The initial models for all regression analyses included employer characteristics hypothesized to have an association with offering on-site vaccination or offering it for free: industry, region, workforce size, workforce distribution, mean employee age, percentage of full-time employees, mean salary, and whether employers were self-insured. Because of their hypothesized relationship with the outcome and predictive employer characteristics, employer characteristic variables that were not significantly associated with the outcome were retained in the final models.

RESULTS

Our final respondents consisted of 583 employers. Our response rate was 52%, excluding 140 employers deemed ineligible.[24] Ineligible employers had fewer than 500 employees (80), lacked an employee with knowledge about the company's health benefits (12), had a disconnected phone number (45), or blocked the call (3). The

median number of employees among employers in the sample was 1435.5 and the median number of worksites was 12.0 (Table 1). The sample included employers from all geographic regions of the United States. All major industries were represented, as categorized by North American Industry Classification System code. The most prevalent industries in our sample were health care and social assistance (23.8%) after manufacturing (16.8%). Of the 583 employers in the sample, 490 (84.0%) offered employees on-site influenza vaccination in 2011, 90 respondents (15.4%) did not and 3 respondents (0.5%) were unsure. Employers offering on-site influenza vaccination had been offering it for an average of 9.74 years (standard deviation = 6.9 years).

Employers' level of use of promotion practices depended on the practice, with 4 practices used by 75% or more of employers offering on-site influenza vaccination and 4 practices used by 50% or less (Table 2). The more prevalent practices fell under the domains of physical and financial access. Prevalent physical access practices were holding a multiday vaccination event and making vaccination available within all employees' working hours. Prevalent financial access practices were offering vaccinations for free and offering them "on the clock." The less prevalent practices fell under all four domains. Mandating vaccination was less common than any of the promotion practices, with 14% of employers requiring it; 58% of employers mandating vaccination were in the health care and social assistance industry. The other less prevalent practices were offering vaccination at all worksites, offering incentives for vaccination, and encouraging managers to get vaccinated as an example.

Six communication practices were used by approximately 50% or more of employers offering on-site influenza vaccination, while the remaining three practices were used by 15% percent or less. On average, employers used five out of nine of the communication practices described and 14% said that they used some other communication practice. The most popular communication practices were sending e-mails (95%) and hanging posters (79%). The least popular communication practices were sending mail to employees' homes (7%) and sending postcards to employees (6%).

Score on the promotion practices scale, which summarized the use of promotion practices among employers offering on-site influenza vaccination, ranged from 1.1 to 9.9 out of 10. Mean score was 6.5 (standard deviation = 1.8). Score distribution was slightly left-skewed.

Industry, wellness capacity, and mean employee age predicted whether or not employers offered on-site vaccination (Table 3). Membership in the professional, scientific, and technical services industry was associated with a 28% decrease in the probability of offering on-site vaccination, compared to membership in the reference group, manufacturing, after adjusting for other employer characteristics (RR = 0.72, 95% CI: 0.47 to 0.92). Employing a wellness staff person and having a higher mean employee age increased the probability that employers offered on-site vaccination, after adjusting for other employer characteristics.

We found that among employers offering workplace vaccination, two employer characteristics were associated with making

TABLE 1. Characteristics of Sample of Large Employers in the United States, 2011–2012 ($n = 583$)

Variable	Summary Statistic
Number of employees ($n = 490$), median	1435.5
Number of worksites ($n = 548$), median	12.0
Average employee age ($n = 494$), median	40.0
Average employee annual base salary ($n = 300$), median	$42,000
Percent full-time employees ($n = 519$), median	80.0%
Self-insured ($n = 583$), %	63.5
Paid wellness staff person ($n = 583$), %	45.8
Geographic region ($n = 583$), %	
Northeast	20.9
Midwest	25.7
South	33.6
West	19.7
Industry (583), %	
Health care and social assistance	23.8
Manufacturing	16.8
Education services	13.6
Professional, scientific and technical services	8.6
Public administration	6.5
Finance and insurance	5.7
Retail trade	4.8
Accommodation and food service	3.6
Other services	2.9
Transportation and warehousing	2.6
Wholesale trade	2.2
Utilities	1.7
Arts, entertainment and recreation	1.5
Construction	1.5
Information	1.4
Real estate and rental and leasing	0.7
Mining, quarrying, and oil and gas extraction	0.7
Agriculture, forestry, fishing and hunting	0.7
Administrative and support and waste management and remediation	0.7
Management of companies and enterprises	0.2

TABLE 2. Use of Promotion Practices Among Large Employers in the United States Offering On-site Influenza Vaccination ($n = 490$)

Promotion Practices	Summary Statistic
Physical access, % (95% CI)	
Multiday vaccination event	75.6 (72.1–79.1)
Vaccination available within all employees' working hours*	76.5 (72.8–80.3)
Offer at all worksites†	46.9 (42.3–51.5)
Financial access, % (95% CI)	
Vaccinations offered "on the clock"	96.7 (95.1–98.3)
Influenza vaccination free at workplace	83.1 (79.7–86.4)
Incentives offered for vaccination	24.7 (20.9–28.5)
Norms, % (95% CI)	
Encourage managers to get vaccinated as an example	39.8 (35.4–44.1)
Mandates, % (95% CI)	
Require vaccination	14.0 (11.0–17.1)
Communication, mean (SD)	
Number of communication methods used	4.7 (1.6)
Number of communication messages used	5.4 (2.1)

*Includes employees working only evenings or weekends, if applicable.
†Denominator includes employers with only a single site.
CI, confidence interval.

TABLE 3. Characteristics Associated With Offering On-site Influenza Vaccination at Any Cost Among All Employers and Free of Cost Among Employers Offering On-site Influenza Vaccination in 2011 to 2012

		Adjusted Relative Risk* (95% CI)	
Employer Characteristic	**Category**	**Offering On-site Influenza Vaccination ($n = 580$†)**	**Offering Free On-site Influenza Vaccination ($n = 490$‡)**
Number of employees	Above median (1435.5)	1.01 (0.90–1.08)	1.12 (1.00–1.19)
Number of worksites	Above median (12.0)	0.95 (0.85–1.02)	1.00 (0.88–1.09)
Average employee age	Above median (40.0)	1.12 (1.03–1.18)	1.04 (0.93–1.12)
Average employee annual base salary	Above median ($42000)	1.09 (0.95–1.19)	1.06 (0.90–1.16)
Percent full-time employees	Above median (80.0%)	0.98 (0.85–1.07)	1.08 (0.98–1.15)
Insurance	Self-insured	1.07 (0.98–1.14)	1.09 (0.97–1.17)
Wellness capacity	Paid wellness staff person	1.19 (1.11–1.23)	1.08 (0.98–1.16)
Geographic region	Northeast	1.01 (0.86–1.11)	1.02 (0.86–1.10)
	Midwest	1.03 (0.89–1.11)	0.92 (0.73–1.04)
	South	1.06 (0.94–1.13)	0.91 (0.73–1.03)
	West	Reference	Reference
Industry	Health care and social assistance	1.02 (0.86–1.08)	1.18 (1.10–1.22)
	Prof., scientific, and technical services	0.72 (0.47–0.92)	1.04 (0.78–1.17)
	Public administration	0.99 (0.75–1.08)	1.04 (0.79–1.16)
	Manufacturing	Reference	Reference
	Education services	0.99 (0.81–1.07)	0.89 (0.64–1.06)
	All other industries	0.89 (0.71–1.01)	1.03 (0.87–1.13)

*Adjusted for all employer characteristics.
†Total number of respondents included in analysis. Includes respondents who offered and did not offer on-site influenza vaccination. Excludes three respondents who were unsure about whether they offered on-site vaccination.
‡Total number of respondents included in analysis. Includes respondents who offered on-site influenza vaccination for free or at some cost. Excludes respondents who did not offer on-site influenza vaccination or were unsure.
CI, confidence interval.

influenza vaccination free for employees. Specifically, offering vaccination for free was associated with industry and the number of employees (Table 3). Membership in the health and social services industry was associated with an 18% increase in the probability of making vaccination free, compared to membership in the manufacturing industry, the reference group, after adjustment (RR = 1.18, 95% CI: 1.10 to 1.22). Employers with a higher number of employees were also more likely to make vaccination free, after adjusting for other employer characteristics.

Industry, the number of employees, the number of sites, and wellness capacity were associated with the promotion-practices score, after accounting for other employer characteristics (Table 4). The strongest predictor of promotion practices score was industry. Membership in the health care and social services industry was associated with a score increase of 1.89 points. Having a paid wellness staff person was associated with a promotion practices scale score that was 0.72 points higher than not having a paid wellness person. Having a larger number of employees was associated with a score increase of 0.57 points, whereas having more worksites was associated with a decrease of 0.47 points.

DISCUSSION

Overall, we found that many evidence-based promotion practices were well used. Offering on-site influenza vaccination was a common practice that transcended most employer characteristics, including the size or worksite distribution of workforces and most industry groups. A large majority of employers offering on-site vaccination made it free for employees, helping address physical and financial access barriers. Financial access promotion practices were especially popular among employers. In particular, offering employees the opportunity to get vaccinated while they were "on the clock" was universal.

Nevertheless, room for improvement remains in the use of promotion practices. On average, based on the promotion practices score, employers offering on-site vaccination were only using 65% of potential evidence-based promotion practices. In particular, employers' use of the four evidence-based promotion practices in place at less than half of employers could benefit from increased dissemination efforts. First, fewer than half of the employers who offered vaccination made it available across all of their worksites. Availability at one worksite did not guarantee availability across all worksites. Given that employers offering vaccination at one or more worksites already recognize the importance of offering vaccination, identifying and addressing the barriers to offering vaccinations at the remainder of their sites could produce a large payoff in vaccination levels with a relatively modest investment of resources.

Two other practices that were used relatively infrequently were offering incentives and encouraging managers to get vaccinated as an example, a norms practice. Both incentives and norms are aspects of workplace vaccination culture. Fostering a workplace culture that supports vaccination could help increase employee demand for vaccination.

Finally, few employers used mandates to require employee vaccination. It is not surprising that the health care and social services industry uses mandates the most frequently. Improving patient safety through reducing health care–associated influenza is aligned with the

TABLE 4. Variation in Influenza Vaccination Promotion Practices Score by Selected Employer Characteristics ($n = 458$*)

Employer Characteristic	Category	Difference in Promotion Practices Score† (95% CI)
Number of employees	Above median (1435.5)	0.57 (0.24, 0.91)
Number of worksites	Above median (12.0)	−0.47 (−0.78, −0.16)
Average employee age	Above median (40.0)	0.18 (−0.13, 0.50)
Average employee annual base salary	Above median ($42,000)	0.04 (−0.38, 0.45)
Percent full-time employees	Above median (80.0%)	0.28 (−0.07, 0.64)
Insurance	Self-insured	0.13 (−0.19, 0.44)
Wellness capacity	Paid wellness staff person	0.72 (0.43, 1.02)
Geographic region	Northeast	−0.11 (−0.56, 0.33)
	Midwest	0.16 (−0.28, 0.60)
	South	0.12 (−0.28, 0.53)
	West	Reference
Industry	Health care and social assistance	1.89 (1.36, 2.41)
	Professional, scientific, and technical services	−0.07 (−0.74, 0.60)
	Public administration	−0.19 (−0.90, 0.46)
	Manufacturing	Reference
	Education services	−0.49 (−1.05, 0.08)
	All other industries	−0.20 (−0.66, 0.26)

*Includes only employers offering on-site vaccination and excludes 32 employers with incomplete data on promotion practices.
†Adjusted for all employer characteristics. Possible score ranged from 0.0 to 10.0. Employers' scores ranged from 1.1 to 9.9 with a mean of 6.5.

nature of their work.[25] Furthermore, influenza vaccination may be mandated by hospitals or health systems and health care employers in some states are required to have influenza vaccination programs.[26] Nationally, about 56% of acute care hospitals currently mandate influenza vaccination.[27]

There were several limitations to this study. One concern is that our results were affected by nonresponse bias. Employers who offered vaccination might have been more likely to be willing to participate in the survey than those who did not. This effect may have inflated our estimates of the prevalence of on-site vaccination. Nevertheless, a similar effect is less likely to have impacted our findings about the levels of promotion practices among those employers who do offer on-site vaccination. Another limitation was our limited ability to assess the intensity of use of promotion practices. For instance, while we measured which methods employers used to communicate to employees about the availability of on-site vaccination, we were not able to obtain the level of detail of information needed to understand more about how intensely employers were using the practices. For instance, we captured whether or not employers used communication methods such as e-mails and posters, but not when or how often they used them or whether they were sent in all relevant languages. A final limitation is that we included only large employers. Our results generalize only to large employers and additional research is needed to assess vaccination-related practices among small and midsized employers.

CONCLUSION

We found that large employers' use of workplace-based vaccination promotion practices is generally high, although some promotion practices were more widely used than others. A large majority of employers were using the two practices with the greatest strength of evidence of effectiveness, offering vaccination at the workplace and making it free for employees. This study showed that employers are generally highly engaged in the fundamental practices involved in workplace vaccination promotion.

Further research is needed to help focus future dissemination efforts. An important component of this will be to evaluate the individual contribution of different promotion practices, many of which have only been evaluated in combination with other promotion practices. Research is also needed to determine barriers to implementation at different types of worksites. Finally, given the generally high use of evidence-based practices but low vaccination levels among the working age population, novel vaccination promotion methods may need to be developed and evaluated.

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