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Influenza vaccination among health care personnel in California: 2010–2011 influenza season

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Abstract

Background—Influenza vaccination among health care personnel (HCP) is a key measure to prevent influenza infection and transmission in health care settings. This study described influenza vaccination coverage among employees in various health care settings in California and examined factors associated with HCP influenza vaccination.

Methods—This study analyzed data from 111 facilities recruited through statewide invitation. Data on facility characteristics, vaccination programs, and vaccination receipt within and outside facilities were collected using Web-based questionnaires. Employees were defined as all persons in the facility payroll system regardless of patient contact. Facility-level employee vaccination coverage was calculated for 91 facilities.

Results—The mean employee influenza vaccination coverage was 60.7% overall: 64.0% for acute care hospitals (n = 30), 54.7% for long-term care facilities (n = 22), 59.4% for ambulatory surgery centers (n = 8), 58.6% for dialysis centers (n = 25), and 77.2% for physician practices (n = 6). Vaccination promotion methods such as risk-benefit education, personal reminders, and vaccination data tracking and feedback were significantly associated with increased vaccination coverage.

Conclusion—The study findings suggest some variations in HCP vaccination coverage by type of health care setting as well as substantial challenges in reaching the Healthy People 2020 goal of 90%. Health care facilities need to use comprehensive promotion methods to improve HCP influenza vaccinations.

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Keywords

Influenza; Health care worker; Vaccination surveillance

Seasonal influenza affects 5% to 20% of the US population every year, with more than 200,000 hospitalizations and 3,000 to 49,000 influenza-associated deaths on average.[1,2] Vaccination is the most effective method to prevent influenza infection. Influenza vaccination of health care personnel (HCP) is a key measure to prevent influenza infection and transmission in health care settings. Studies have demonstrated that HCP influenza vaccination is associated with lower mortality and fewer influenza outbreaks among long-term care patients and decreased HCP absenteeism.[3–6]

HCP influenza vaccination has been recommended by the Centers for Disease Control and Prevention (CDC) for many years and is currently endorsed by many professional organizations.[7,8] However, HCP influenza vaccination coverage has remained suboptimal. Studies analyzing the National Health Interview Survey (NHIS) data from 2004 to 2008 estimated that HCP influenza vaccination coverage ranged between 37% and 49%.[9,10] A recent CDC study shows that HCP influenza vaccination coverage improved to 64% in the 2010–2011 influenza season.[11] With the Healthy People 2020 goal of 90% HCP influenza vaccination coverage,[12] health care facilities continue to face challenges to improve vaccination among HCP.

The State of California has led efforts to improve HCP influenza vaccination and monitors vaccination coverage among California hospital workers.[13] In 2006, California became the first state to mandate that general acute care hospitals offer free vaccine to all employees and require a signed declination for all refusals. In 2009, all general acute care hospitals in California were required to report HCP influenza vaccination data to the California Department of Public Health (CDPH). In the 2010–2011 season, 350 (91%) out of 383 hospitals submitted influenza vaccination data to the CDPH; the facility-level employee vaccination coverage was 64% on average, and 50% achieved the Healthy People 2010 goal of 60%.[13] State-level surveillance of HCP influenza vaccination coverage has been established for acute care hospitals in California but not for non-hospital settings such as long-term care and outpatient facilities.

The CDC has recognized the utility of a nationwide standardized surveillance system for HCP influenza vaccination in all health care settings and developed a standardized measure that would be comprehensive within a single institution and comparable across institutions.[14,15] This measure has now been endorsed by the National Quality Forum (NQF), a nonprofit organization dedicated to health care quality improvement that endorses pilot-tested national consensus standards for measuring and publicly reporting on performance. During the 2010–2011 influenza season, California participated in pilot testing the CDC-sponsored NQF measure with 3 other jurisdictions. The goal of the CDC pilot project was to determine the feasibility of implementing the NQF measure in various health care settings and to identify barriers to its implementation. Using the NQF measure, participating facilities reported 2010–2011 vaccination data to the CDC. The main CDC project findings will be published elsewhere.

This study analyzed the California data collected in the CDC-sponsored NQF pilot testing project to describe HCP influenza vaccination programs and vaccination coverage among employees in California participating facilities and to examine factors associated with HCP influenza vaccination.

METHODS

Study sample recruitment

This project included acute care hospitals ("hospitals" hereafter), long-term care facilities (LTCFs), dialysis centers, ambulatory surgery centers (ASCs), and physician practices (primary care or specialist offices, community health centers). A total of 318 facilities in 4 jurisdictions were initially recruited for the CDC pilot, with California recruiting 167 eligible facilities (53%). For recruitment, CDPH contacted related professional associations and existing networks (ie, CDPH Healthcare-Associated Infections Program, California Association of Health Facilities, End-stage Renal Disease Networks 17 and 18, California Ambulatory Surgery Association, California Primary Care Association, and California Sentinel Provider Program) and sent out recruitment information using online newsletters, mail, e-mail, and facsimile. Enrollment registration was received online using Survey Monkey or by facsimile. For LTCFs,CDPH mailed recruitment materials to facilities licensed by the Office of Statewide Health Planning and Development. This project was determined by the CDC, CDPH, and University of California San Francisco to be public health nonresearch activity and was exempt from Institutional Review Board review.

Data collection

Data collection was conducted using an online survey developed by the CDC on a secure Web site. Participating facilities were asked to complete 3 surveys (baseline survey, interim report, and final report) in November 2010 and January and April 2011. Primary survey questions included aggregate denominators and numerators for HCP influenza vaccination data. Denominators were the numbers of 3 types of HCP that worked at least 1 day at the health care facility between October 1, 2010, and March 31, 2011: employees, credentialed nonemployees, and other nonemployees. *Employees* were defined as all persons who receive a paycheck from the facility, whether or not they have direct patient contact. *Credentialed nonemployees* were defined as licensed practitioners affiliated with the facility who do not receive a paycheck from the facility and undergo a periodic credentialing process by the facility (eg, physicians, midlevel providers with clinical or admitting privileges, therapists with professional credentials). *Other nonemployees* were defined as all other nonemployee HCP (eg, contractors, students, trainees, volunteers). Numerators were the numbers of HCP for the following 4 influenza vaccination elements: *vaccination at the facility*, *vaccination elsewhere*, *medical contraindication*, and *declination for nonmedical reasons*. Denominator data were collected in all 3 surveys, and vaccination numerator data were collected in the second and third surveys.

The surveys also included questions about facility characteristics (eg, geographic location, ownership type, bed size) and influenza vaccination programs and policies (eg, years offered vaccine to HCP, HCP categories offered vaccine, years of measuring vaccination rates,

vaccination promotion methods, institutional policy on HCP vaccination). The surveys asked about perceived accuracy of denominator data collected using the NQF measure (*very accurate, somewhat, not at all)* and confidence about completeness of numerator data collected (*very confident, somewhat, not at all*). Additional questions about barriers to data collection and reporting are beyond the scope of this paper and will be presented elsewhere.

For each survey period, facilities were given 1 month for data submission, and weekly e-mail reminders were sent to reporting persons at participating facilities. For nonrespondents, additional follow-up calls and e-mails were made with 2 to 3 week extensions.

Statistical analysis

All data were collected by the CDC, and California data were provided for analysis. The study sample included facilities that completed all 3 surveys. For vaccination coverage analysis, the final survey data were used. Descriptive statistics were used to describe facility characteristics and the influenza vaccination program. Calculation of vaccination coverage was restricted to facilities that provided complete vaccination data (vaccination at the facility and vaccination elsewhere). Facilities were excluded if the sum of 4 numerators exceeded the denominator. Mean and median HCP vaccination percentages were calculated for all facilities and by facility type. Associations between variables were examined with χ^2 tests for proportions, Kruskal-Wallis tests for comparing medians across 3 or more groups, and Mann-Whitney tests for comparing medians between 2 groups. Statistical analyses were conducted using 2-tailed tests and 95% significance levels. Data were analyzed using SAS version 9.2 (SAS Institute, Cary, NC).

RESULTS

Study sample

A total of 167 California facilities enrolled in this project. The study sample comprised 111 facilities (66.5%) that completed all 3 surveys. The sample included 34 hospitals (30.6%), 29 LTCFs (26.1%), 10 ASCs (9.0%), 30 dialysis centers (27.0%), and 8 physician practices (7.2%). The majority of these facilities was for-profit private facilities (n = 66, 59.5%) and located in urban areas (n = 58, 52.3%). The median number of employees in the participating facilities was 92 (range, 4–13,736). Among in-patient facilities (hospitals and LTCFs), 54% (n = 34) were medium-sized facilities with 75 to 250 beds, and 28.6% (n = 18) were large facilities with >250 beds. There were significant differences in facility characteristics between completed sites and drop-out sites that participated only in the first or second surveys (P <.05, data not shown): the drop-out rate was highest among physician practices (50.0%), facilities in rural areas (43.3%), facilities with 31 to 100 employees (42.9%), and in-patient facilities with <75 beds (42.1%).

Influenza vaccination programs and policies

Table 1 shows influenza vaccination programs and policies among participating facilities. All facilities except 2 ASCs (98.2%) reported providing influenza vaccine to HCP with or without charge; 86.5% have offered vaccine for at least 5 years. All hospitals included both employees and nonemployees in their vaccination programs; the majority of non-hospital

facilities offered vaccine to employees only. Among non-hospital facilities (which are not required to report vaccination data to the CDPH), 51.7% of LTCFs, 83.3% of dialysis centers, and 37.5% of physician practice facilities measured annual influenza vaccination coverage prior to this pilot. Eighty-two percent of facilities that previously measured vaccination rates reported having shared the data formally with their HCP. Regarding institutional policy, 94.1% of hospitals and 61.0% of non-hospital facilities required a written declination statement for those who declined the vaccine offered. No facilities reported a mandatory vaccination policy enforced with termination; 8 facilities (7.2%) reported that vaccination declination would result in consequences other than termination (eg, continuously wearing a face mask when in contact with patients). Multiple data sources were utilized in tracking data of employees vaccinated at the facility or elsewhere; 78.4% used paper occupational health records, and 26.1% used electronic administrative data or electronic occupational health records.

Perceptions about influenza vaccination data collection

Facilities' perceptions about collecting denominator and numerator data are presented in Figure 1. For denominators, 69.4% of the facilities reported that their systems were very accurate in tracking and counting the total number of employees; the proportion of facilities reporting high accuracy was not significantly different between hospitals and non-hospital settings (79.4% vs 64.9%, respectively, $P = .127$). On the other hand, only 40.6% and 33.3% of facilities reported that their systems very accurately counted credentialed nonemployees and other nonemployees, respectively; the proportion of facilities reporting high accuracy was significantly lower among hospitals than non-hospital settings (17.6% vs 50.6% for credentialed nonemployees, $P = .001$; 14.7% vs 41.6% for other nonemployees, $P = .006$). For employee vaccination data, 86.5% reported that they were very confident about completeness of data on the number of employees vaccinated at the facility, and the proportion of facilities reporting high confidence was significantly greater among hospitals than non-hospital settings (97.1% vs 81.8%, respectively, $P = .030$). For the other 3 numerator categories, the proportion of facilities that reported high confidence was 44.1% for employees vaccinated elsewhere, 42.3% for medical contraindication, and 56.8% for declination for nonmedical reasons; there was no significant difference between hospitals and non-hospital settings ($P > .05$).

Influenza vaccination coverage for employees

Of the 111 facilities, 91 facilities (82.0%) provided complete employee vaccination data; only 59 facilities submitted complete data for credentialed nonemployees and 48 facilities for other nonemployees. Considering the small sample size and the perceived low accuracy of nonemployee data reported by facilities, only employee vaccination findings are presented here.

The mean employee influenza vaccination percentage in the 91 facilities was 60.7% (standard deviation, 21.8). Of all employees who were vaccinated, 88.7% received the vaccine at the facility (data not shown). Figure 2 shows the distribution of influenza vaccination coverage by facility type. The Healthy People 2010 goal of 60% vaccination was met by 51.7% (n = 47) of all participating facilities (hospitals, 50.0%; LTCFs, 36.4%;

ASCs, 50.0%; dialysis centers, 60.0%; and physician practices, 83.3%). The Healthy People 2020 goal of 90% vaccination was met by only 9 facilities (9.9%).

Table 2 presents the mean and median influenza vaccination percentages by facility characteristics: some variations were found, but none of the facility characteristics were significantly associated with vaccination coverage ($P > .05$). The mean vaccination percentage was highest among physician practices (77.2%) and lowest among LTCFs (54.7%) and lower in rural settings (51.8%) than suburban (67.3%) and urban (59.7%) settings. Facilities requiring declination statements had a higher vaccination percentage than facilities without declination statement requirement (62.1% vs 54.5%, respectively).

Table 3 presents vaccination promotion methods used by participating facilities and the influenza vaccination coverage by promotion methods. All facilities but 1 ASC provided vaccine at no cost to HCP. Most hospitals used multiple methods including education about the risks and benefits of vaccination (97.1%), provision of vaccination in common areas (91.2%), provision of vaccination during night or weekend shifts (97.1%), and use of mobile vaccination carts (94.1%). For non-hospital settings, the most commonly used promotion methods were education about the risks and benefits of vaccination (85.5%) and setting an example by vaccinating key personnel or leadership (71.1%). Influenza vaccination coverage was compared by promotion method; adjustments for facility characteristics were not conducted because no variables were significant for vaccination coverage (Table 3). Influenza vaccination coverage was significantly higher among facilities that provided risks/benefits education, provided personal reminders, tracked unit- or department-level vaccination rates, and provided feedback to facility administrators or board members ($P < .05$). Facilities that used peer vaccinators tended to have higher vaccination coverage than facilities that did not, although differences were not statistically significant ($P = .068$).

DISCUSSION

The Healthy People 2020 goal of 90% HCP influenza vaccination reflects enhanced recognition of influenza vaccination as a key measure to prevent health care-associated influenza infection and to maintain a healthy workforce in health care settings. This study analyzed the 2010–2011 season employee influenza vaccination data obtained from 91 self-selected California health care facilities. Study findings suggest variations in influenza vaccination coverage (although not statistically significant) across different types of facilities, with substantial challenges in reaching the Healthy People 2020 goal.

Our findings of the overall employee vaccination coverage (60.7%) was relatively similar to the national level of 63.5% found in a CDC study for the 2010–2011 season.[11] Both findings demonstrated improvement of HCP vaccination coverage compared with the 2004 to 2008 NHIS data of 36.8% to 49.0%.[9] It should be noted that our findings were based on facility-level aggregate data including only employees on the payroll system of the facility and excluding nonemployees, whereas the CDC and NHIS studies used individually self-reported survey data without restriction.

The employee vaccination coverage among 30 hospitals in this study (64.0%) was very similar to that reported under the mandatory California influenza reporting system (64.3% among 350 hospitals).[11] In the CDPH analysis of mandated influenza reporting, the employee vaccination coverage in California hospitals increased from 55% in the 2008–2009 season to 63% in the 2009–2010 season and remained stable (64%) in the 2010–2011 season.[13,16] Regarding the Healthy People 2010 goal of 60% influenza vaccination coverage among HCP, the proportion of California facilities that met the goal decreased from 63% in 2009–2010 to 50% in 2010–2011.[13] Data from the 2011 CDC study also showed a minimal increase in HCP vaccination coverage from the previous season.[11] The increase found in the 2009–2010 season could be attributed to the impact of the 2009 H1N1 pandemic and increased awareness around influenza vaccination; however, the impact of this heightened awareness has apparently not continued into the 2010–2011 season.

This study found that LTCFs had the lowest mean employee vaccination coverage (54.7%) as well as the lowest proportion of facilities that met the Healthy People 2010 goal (36.4%). Considering the fact that LTCF residents are at increased risk for severe complications from influenza,[17] our findings, although not significant, suggest the need of a targeted effort to improve HCP vaccination coverage among LTCFs. Except for physician practices, this study also found lower HCP vaccination coverage levels in non-hospital settings than in acute care hospitals, consistent with the CDC study findings.[11] In California, the current mandate requires all health care facilities to offer influenza vaccination to employees, but HCP vaccination data reporting is required only for acute care hospitals. Our findings suggest that the state reporting requirements may have contributed in part to improve hospital influenza vaccination programs and outcomes.

This study found that both hospitals and non-hospital settings used various methods to promote influenza vaccination among employees. Employee education, use of personal reminders, vaccination data tracking, and feedback to management were found to be particularly effective methods significantly associated with higher employee influenza vaccination coverage. The study findings also suggest that providing vaccination using peer vaccinators may contribute in part to increased employee vaccination. The effectiveness of various vaccination promotion methods including provision at no cost, education, and reminders have been documented in the literature.[18–23] On the other hand, the effectiveness of declination statements has not been consistently demonstrated.[18,24,25] This study found no significant difference in employee vaccination coverage between facilities requiring declination statements and facilities that did not. These findings suggest that simple requirement of a declination statement plays a minimal role in employee’s decision about influenza vaccination and that facilities need to use comprehensive methods combining multiple effective strategies.

Finally, our study findings suggest that tracking nonemployee data is challenging for many health care facilities. For employee data, about 70% of facilities expressed high confidence about data accuracy; hospitals reported somewhat higher, although not significantly different, confidence than non-hospital settings. On the other hand, for nonemployee data, the majority of facilities expressed low confidence about the data accuracy; despite experiences in data collection and reporting, hospitals showed lower confidence than non-

hospital settings. This finding is understandable because hospitals are more complex in composition and number of nonemployee personnel. Without a well-established system for nonemployees, tracking data accurately and completely would be extremely difficult.

This study has several limitations. First, this study included only a small number of health care facilities that volunteered for participation; thus, the findings may not be representative of all California health care facilities, especially for physician practices and ASCs. Second, this study was originally not designed to estimate vaccination coverage but to evaluate the feasibility of a reporting measure. Because participants were aware of this purpose, the accuracy of the reported data may be affected. Third, this study was based on facility-level data reported by facility representatives. The level of data accuracy largely relied on the data tracking system of each facility. Reported denominators and numerators may not fully capture the actual numbers of employees in the facility (eg, employees on leave, final status of employees who deferred vaccination). Last, because of the small sample size, this study might not have enough power to detect significant differences.

In conclusion, this study identified a substantial gap between current employee vaccination coverage in California health care facilities and the Healthy People 2020 goal. Health care facilities need to evaluate their vaccination programs and policies and use comprehensive promotion methods to improve HCP vaccination coverage. Finally, health care facilities should establish a system for better data tracking and quality data reporting.

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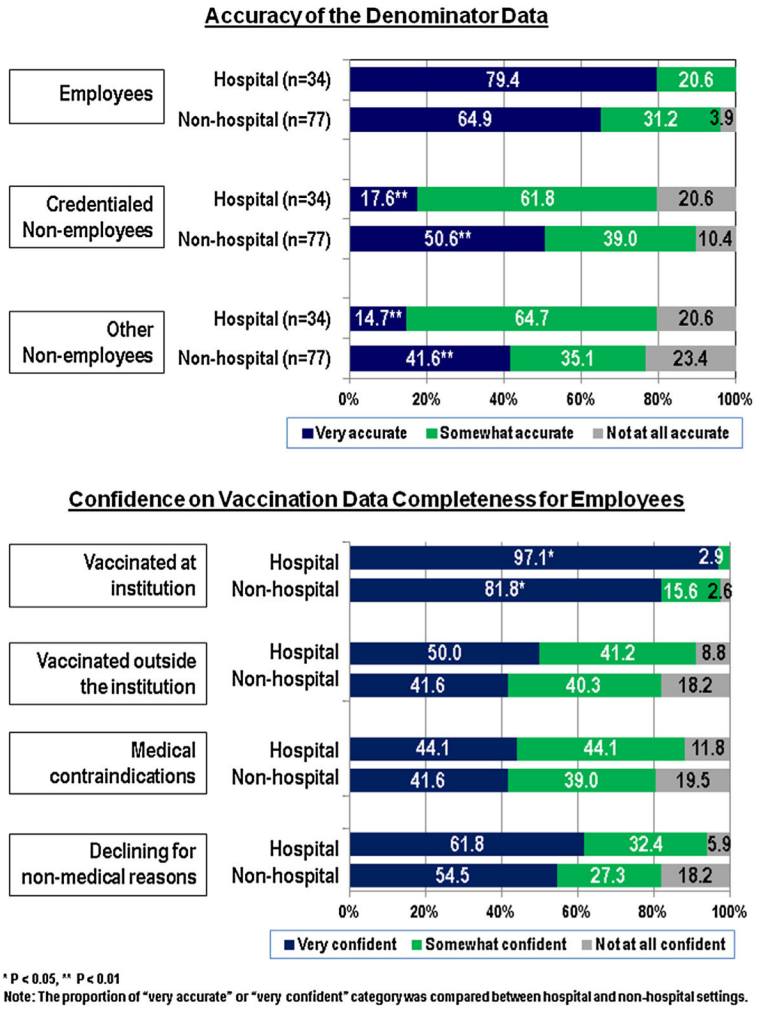

Fig 1.

Perception of influenza vaccination data collection for reporting (n = 111).

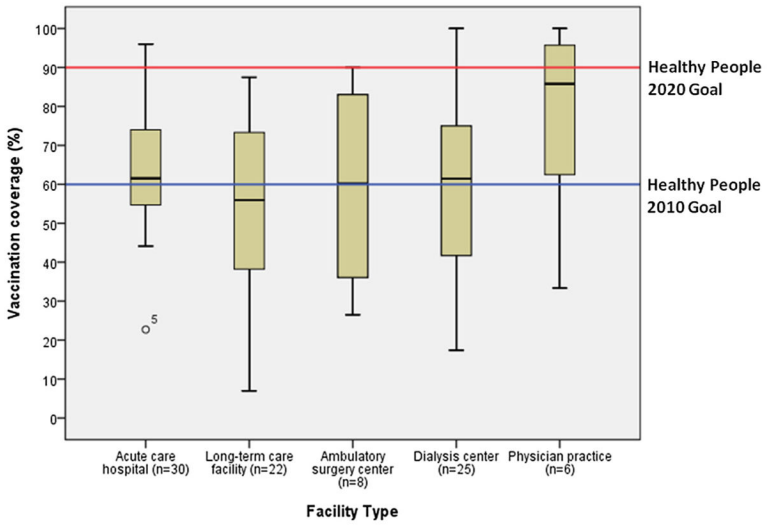

Fig 2.

Box plot of employee influenza vaccination coverage (%) in health care facilities during the 2010–2011 season: Range and 25th, 50th, and 75th percentiles (n = 91).

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Table 1

Health care personnel influenza vaccination program characteristics by facility type

Characteristic	Total (n= 111)		ACH (n= 34)		LTCF (n = 29)		ASC (n= 10)		DC (n= 30)		PP (n = 8)	
Prior experience offering influenza vaccine to HCP, n (%)												
None	2	(1.8)	0	(0)	0	(0)	2	(20.0)	0	(0)	0	(0)
1–4 years	13	(11.7)	3	(8.8)	3	(10.3)	2	(20.0)	5	(16.7)	0	(0)
5 years or more	96	(86.5)	31	(91.2)	26	(89.7)	6	(60.0)	25	(83.3)	8	(100)
HCP offered influenza vaccine in 2010–2011 season, n (%)												
Full-time employees	109	(98.2)	34	(100)	29	(100)	8	(80.0)	30	(100)	8	(100)
Part-time employees	106	(95.5)	34	(100)	29	(100)	8	(80.0)	27	(90.0)	8	(100)
Nonemployees, credentialed*	66	(59.5)	34	(100)	12	(41.4)	8	(80.0)	9	(30.0)	3	(37.5)
Nonemployees, other*	54	(48.6)	30	(88.2)	10	(34.5)	4	(40.0)	8	(26.7)	2	(25.0)
Prior experience measuring HCP vaccination, n (%)												
None	34	(30.6)	0	(0)	14	(48.3)	10	(100)	5	(16.7)	5	(62.5)
1 year (in 2009–2010 season)	9	(8.1)	1	(2.9)	3	(10.3)	0	(0.0)	4	(13.3)	1	(12.5)
2–4 years	30	(27.0)	19	(55.9)	5	(17.2)	0	(0.0)	4	(13.3)	2	(25.0)
5 years or more	38	(34.2)	14	(41.2)	7	(24.1)	0	(0.0)	17	(56.7)	0	(0)
Formally share influenza vaccination rates with HCP, n (%)†												
Yes	63	(81.8)	25	(73.5)	12	(80)	0	(0.0)	24	(96.0)	2	(66.7)
Institutional policy on HCP influenza vaccination, n (%)												
Recommended but not required	27	(24.3)	2	(5.9)	6	(20.7)	2	(20.0)	13	(43.3)	4	(50.0)
Declination required with no consequences	71	(64.0)	25	(73.5)	20	(69.0)	6	(60.0)	16	(53.3)	4	(50.0)
Declination required with consequences‡	8	(7.2)	7	(20.6)	1	(3.4)	0	(0.0)	0	(0)	0	(0)
No policy	3	(2.7)	0	(0)	1	(3.4)	2	(20.0)	0	(0)	0	(0)
Other§	2	(1.8)	0	(0)	1	(3.4)	0	(0.0)	1	(3.3)	0	(0)
Data sources used to track employee vaccination, n (%)‖												
Paper occupational health records	87	(78.4)	31	(91.2)	26	(89.7)	8	(80.0)	20	(66.7)	2	(25.0)
Electronic administrative or occupational health records	29	(26.1)	17	(50.0)	3	(10.3)	1	(10.0)	7	(23.3)	1	(12.5)
Self-report by personnel (eg, survey)	29	(26.1)	5	(14.7)	6	(20.7)	3	(30.0)	12	(40.0)	3	(37.5)
Registry data or database	10	(9.0)	2	(5.9)	2	(6.9)	0	(0)	4	(13.3)	2	(25.0)

ACH, Acute care hospitals; *ASC*, ambulatory surgery centers; *DC*, dialysis centers; *HCP*, health care personnel; *LTCF*, long-term care facilities; *PP*, physician practices.

[*] The percentages were calculated including all facilities regardless of whether the facility had the type of HCP.

[†] The percentage is calculated among the facilities that previously measured vaccination rates (n = 77).

[‡] Consequences include any measure (eg, use of mask) other than termination or resignation.

[§] The 2 sites recommend vaccination, but the information on declination requirement was not provided.

[||] Employee vaccination refers to employees vaccinated at the facility or elsewhere. Responses can include more than 1 category.

Table 2

Employee influenza vaccination by facility characteristics: n = 91

Variable	No.	Mean % (SD)	Median %	*P* value*
Facility type				
Acute care hospital	30	64.0 (16.2)	61.6	.242
Long-term care facility	22	54.7 (22.3)	56.0	
Ambulatory surgery center	8	59.4 (25.8)	60.3	
Dialysis center	25	58.6 (23.9)	61.5	
Physician practice	6	77.2 (25.8)	85.8	
Area				
Urban	52	59.7 (22.8)	60.3	.104
Suburban	26	67.3 (18.0)	64.7	
Rural	13	51.8 (22.0)	51.6	
Ownership				
Privately owned: for profit	55	60.6 (24.1)	61.5	.786
Privately owned: not for profit	27	59.7 (16.3)	59.9	
Publicly owned: government	9	64.5 (22.6)	67.1	
Number of employees				
1–30	29	61.4 (24.1)	62.5	.618
31–100	15	57.7 (26.6)	61.0	
101–500	22	56.5 (19.9)	56.6	
>500	25	65.4 (17.1)	66.1	
Years measured vaccination rates				
None	25	57.2 (24.4)	59.6	.632
1 year	9	58.7 (25.2)	50.0	
2–4 years	25	65.7 (17.1)	68.1	
5 years or more	32	60.1 (22.2)	61.1	
Require declination statement				
Yes	67	62.1 (18.6)	61.0	.254
No	22	54.5 (28.7)	45.1	

SD, Standard deviation.

*Kruskal-Wallis test or Mann-Whitney test was used for the comparisons of medians.

Table 3

Promotion methods used for influenza vaccination campaign and median employee influenza vaccination percentages of health care facilities

	Facilities that used the method (n = 111), n					Median vaccination percentage (n = 91)		
Variable	**ACH (n = 34)**	**LTCF (n = 29)**	**ASC (n = 10)**	**DC (n = 30)**	**PP (n = 8)**	**Facilities that used the method**	**Facilities that did not use the method**	***P* value**
Provide vaccination at no cost to health care personnel	34	29	9	30	8			
Provide education on the risks/benefits of flu vaccination	33	28	6	24	7	62.5	49.1	.022
Set an example by vaccinating key personnel/leadership	19	22	7	19	6	63.2	57.3	.098
Provide vaccination during night and/or weekend shifts	33	20	0	6	5	61.7	60.2	.208
Provide vaccination in common areas	31	14	3	8	2	60.9	61.5	.203
Provide vaccination at meetings, conferences, grand rounds	30	8	0	4	3	59.9	61.3	.638
Provide vaccination using mobile vaccination carts	32	2	1	1	4	66.1	59.9	.144
Provide vaccination using peer vaccinators	22	8	3	13	5	68.1	59.3	.068
Use materials such as posters, buttons, flyers, and others	26	16	2	12	4	59.9	62.0	.952
Provide personal reminders	19	7	3	6	3	68.9	59.6	.038
Track unit or department-level vaccination rates	22	8	2	18	3	70.0	54.5	.020
Provide feedback to facility administrators or board members	29	5	1	10	3	70.0	56.9	.020

ACH, Acute care hospitals; *ASC*, ambulatory surgery centers; *DC*, dialysis centers; *LTCF*, long-term care facilities; *PP*, physician practices.