Influenza Vaccination Coverage Among Health Care Personnel — United States, 2015–16 Influenza Season

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The Advisory Committee on Immunization Practices recommends annual influenza vaccination for all health care personnel to reduce influenza-related morbidity and mortality among both health care personnel and their patients (*1*–*4*). To estimate influenza vaccination coverage among U.S. health care personnel for the 2015–16 influenza season, CDC conducted an opt-in Internet panel survey of 2,258 health care personnel during March 28–April 14, 2016. Overall, 79.0% of survey participants reported receiving an influenza vaccination during the 2015–16 season, similar to the 77.3% coverage reported for the 2014–15 season (*5*). Coverage in long-term care settings increased by 5.3 percentage points compared with the previous season. Vaccination coverage continued to be higher among health care personnel working in hospitals (91.2%) and lower among health care personnel working in ambulatory (79.8%) and long-term care settings (69.2%). Coverage continued to be highest among physicians (95.6%) and lowest among assistants and aides (64.1%), and highest overall among health care personnel who were required by their employer to be vaccinated (96.5%). Among health care personnel working in settings where vaccination was neither required, promoted, nor offered onsite, vaccination coverage continued to be low (44.9%). An increased percentage of health care personnel reporting a vaccination requirement or onsite vaccination availability compared with earlier influenza seasons might have contributed to the overall increase in vaccination coverage during the past 6 influenza seasons.

The Internet panel survey was conducted for CDC by Abt Associates, Inc. (Cambridge, Massachusetts) during March 28–April 14, 2016, to provide estimates of influenza vaccination coverage among health care personnel during the 2015–16 influenza season. Similar surveys have been conducted since the 2010–11 influenza season, and survey methodology has been reported previously (*5*). Health care personnel were recruited from two preexisting national opt-in Internet sources: Medscape, a medical website managed by WebMD Health Professional Network,* and general population Internet panels operated by Survey Sampling International (SSI).† Responses were weighted to the distribution of the U.S. population of health care personnel by occupation, age, sex, race/ethnicity, work setting, and Census region.§ Because the study sample was based on health care personnel from opt-in Internet panels rather than probability samples, no statistical tests were performed (*6*). A change was considered as an increase or decrease when there was at least a 5-percentage point difference between estimates; estimates with smaller differences were considered similar.

Among the 2,396 health care personnel who started the survey from either source (Medscape or SSI) and had eligible responses to the screening questions, 2,316 (96.7%) completed the survey.¶ Fifty-seven respondents with completed surveys who reported working in "other health care settings" were excluded because examination of their other survey responses indicated that they were either unlikely to have contact with patients or that their work setting was not one of the health care settings of interest for this analysis, and one respondent was excluded because vaccination status was unknown, leaving a final analytic sample of 2,258 health care personnel.

Overall, 79.0% of respondents reported having received an influenza vaccination during the 2015–16 season, an increase of 15.5 percentage points compared with the 2010–11 season estimate, but similar to the 77.3% coverage estimate reported in the 2014–15 season (Figure) (Table 1). Coverage continued to be highest among physicians (95.6%) and lowest among assistants and aides (64.1%) (Figure). Among vaccinated health care personnel, 72.7% were vaccinated at their workplace.

*Physicians, nurse practitioners, physician assistants, nurses, dentists, pharmacists, allied health professionals, technicians, and technologists) were recruited from the current membership roster of Medscape. Additional information on Medscape is available at http://www.medscape.com.

†Assistants, aides, and nonclinical personnel (such as administrators, clerical support workers, janitors, food service workers, and housekeepers) were recruited from general population Internet panels operated by Survey Sampling International. Additional information on Survey Sampling International and its incentives for online survey participants is available at https://www.surveysampling.com.

§Population control totals of U.S. health care personnel by occupation and work setting were obtained from the Bureau of Labor Statistics, U.S. Department of Labor, Occupational Employment Statistics, May 2014 National Industry-specific Occupational Employment and Wage Estimates (http://www.bls.gov/oes/current/oessrci.htm). Population control totals by other demographic characteristics were obtained from the U.S. Census Bureau, Current Population Survey Monthly Labor Force Data, September 2015 (http://www.census.gov/programs-surveys/cps/data-detail.html).

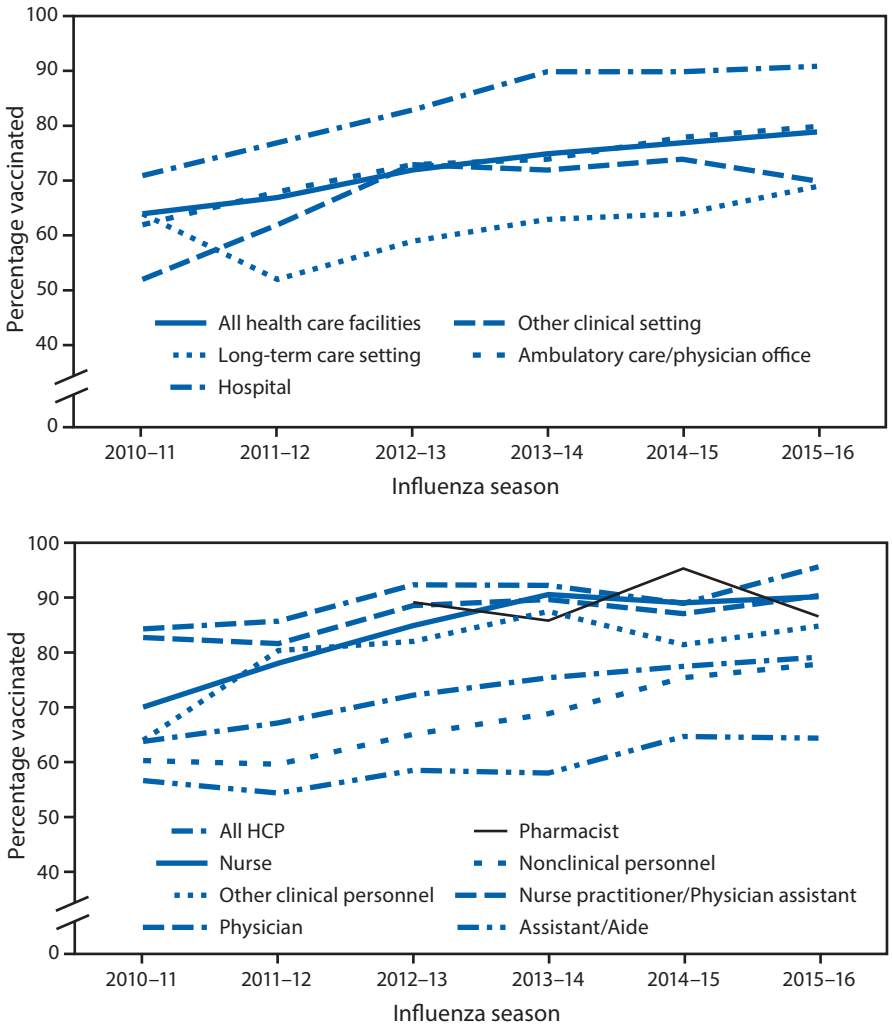
¶A survey response rate requires specification of the denominator at each stage of sampling. During recruitment of an online opt-in survey sample, such as the Internet panels described in this report, these numbers are not available; therefore, a response rate cannot be calculated. Instead, the survey cooperation rate is provided.

Coverage among health care personnel working in long-term care settings increased from 63.9% in the 2014–15 season to 69.2% in the 2015–16 season; for all other work settings, coverage in the 2015–16 season was similar to coverage in the 2014–15 season (Figure) (Table 1). Although influenza vaccination coverage has increased in all work settings since the 2011–12 season, health care providers in long-term care settings have consistently had lower coverage than health care personnel working in hospital and ambulatory care settings (Figure).

During the 2015–16 influenza season, vaccination coverage was 96.5% among health care personnel working in settings where vaccination was required (Table 2). Overall, 37.8% of surveyed health care personnel were required to be vaccinated against influenza, similar to the percentages in the 2013–14 and 2014–15 seasons. Sixty-one percent of health care personnel working in hospitals had requirements for influenza vaccination, which is at least 27 percentage points more than the proportion in any other work setting. By occupation, physicians (51.0%), nurses (49.8%), and other clinical personnel (47.4%) reported the highest prevalences of influenza vaccination requirements in the 2015–16 season, and assistants and aides reported the lowest requirement prevalence of influenza vaccination requirements (22.5%, data not shown).

Among health care personnel whose employers did not have a requirement for vaccination, coverage was higher among personnel who worked in locations where vaccination was available at the worksite at no cost for >1 day (82.8%) or 1 day (82.1%) than among personnel who worked in locations where their employer did not provide influenza vaccination onsite at no cost but actively promoted vaccination through other mechanisms** (67.8%). Vaccination coverage was lowest (44.9%) among health care personnel working in locations where employers neither required vaccination, provided vaccination onsite at no cost, nor promoted vaccination (Table 2). Health care personnel working in ambulatory, long-term care, and other clinical settings more frequently reported that their employer neither required, provided, nor promoted

FIGURE. Percentage of health care personnel who reported receiving influenza vaccination, by work setting*,†,§ and occupation type,¶,,††,§§ — Internet panel surveys, United States, 2010–11 through 2015–16 influenza seasons**



* Respondents could select more than one work setting.
† Ambulatory care/physician office category includes physician's office, medical clinic, and other ambulatory care setting.
§ Other clinical setting category includes dentist office or dental clinic, pharmacy, laboratory, public health setting, emergency medical services setting, or other setting where clinical care or related services was provided to patients.
¶ In the 2010–11 season, dentists were included in the physician category.
** Before the 2012–13 season, separate data on pharmacists were not collected.
†† Other clinical personnel category includes allied health professionals, technicians, and technologists.
§§ Nonclinical personnel category includes administrative support staff or managers and nonclinical support staff members (e.g., food service workers, laundry workers, janitors, and other members of the housekeeping and maintenance staffs).

** Employer promoted influenza vaccination among employees through public identification of vaccinated persons, financial incentives or rewards to individual persons or groups of employees, competition between units or care areas, free or subsidized cost of vaccination, personal reminders to be vaccinated, publicizing of the number or percentage of employees receiving vaccination, or making vaccination available at special events organized on site.

TABLE 1. Percentage of health care personnel* who reported receiving influenza vaccination, by work setting and occupation type — Internet panel surveys, United States, 2014–15 and 2015–16 influenza seasons

Work setting/Occupation type†	2014–15			2015–16			Percentage point difference from 2014–15 to 2015–16
	No.	Weighted %§	Weighted % vaccinated	No.	Weighted %§	Weighted % vaccinated	
Overall	**1,914**	**100**	**77.3**	**2,258**	**100**	**79.0**	**1.7**
Occupational setting/Occupation							
Hospital	681	40.4	90.4	803	39.7	91.2	0.8
Physician	99	3.6	92.1	127	3.7	99.4	7.3
NP/PA	61	0.9	93.4	50	0.9	90.0	-3.4
Nurse	70	22.1	93.4	95	23.8	94.6	1.2
Pharmacist	65	2.6	96.1	16	0.7	—¶	—¶
Assistant/Aide	51	9.8	85.8	107	8.9	88.2	2.4
Other, clinical**	195	25.3	91.6	236	23.4	94.4	2.8
Nonclinical††	124	35.5	88.1	155	38.2	87.2	-0.9
Ambulatory care/Physician office§§	746	30.2	78.4	648	27.6	79.8	1.4
Physician	223	9.7	88.2	216	10.4	95.2	7.0
NP/PA	114	2.3	85.1	92	2.4	89.1	4.0
Nurse	69	23.4	90.8	45	20.6	88.6	-2.2
Pharmacist	6	0.3	—¶	6	0.4	—¶	—¶
Assistant/Aide	27	5.8	—¶	57	9.2	62.0	—¶
Other, clinical**	151	22.0	73.6	135	22.0	81.7	8.1
Nonclinical††	142	36.2	70.4	91	34.8	72.9	2.5
Long-term care setting	406	30.6	63.9	659	29.6	69.2	5.3
Physician	26	1.3	—¶	17	0.8	—¶	—¶
NP/PA	12	0.2	—¶	7	0.2	—¶	—¶
Nurse	22	8.0	—¶	23	9.6	—¶	—¶
Pharmacist	4	0.3	—¶	1	0	—¶	—¶
Assistant/Aide	246	57.5	59.8	501	58.4	61.9	2.1
Other, clinical**	45	6.6	78.4	54	7.6	85.9	7.5
Nonclinical††	50	26.0	67.3	54	23.3	70.9	3.6
Other clinical setting¶¶	389	11.2	74.0	409	11.6	69.8	-4.2
Physician	6	0.7	—¶	4	0.6	—¶	—¶
NP/PA	5	0.3	—¶	5	0.3	—¶	—¶
Nurse	19	20.8	—¶	15	15.2	—¶	—¶
Pharmacist	47	7.0	97.6	51	9.5	85.5	-12.1
Assistant/Aide	22	10.0	—¶	42	15.4	51.2	—¶
Other, clinical**	249	31.3	73.5	257	32.9	72.5	-1.0
Nonclinical††	35	29.7	66.6	22	25.3	—¶	—¶
Overall occupation							
Physician	268	3.6	88.9	284	3.6	95.6	6.7
NP/PA	162	1.0	87.0	134	1.0	90.3	3.3
Nurse	161	18.3	89.0	168	18.5	90.1	1.1
Pharmacist	79	1.3	95.3	63	1.3	86.5	-8.8
Assistant/Aide	332	23.3	64.4	673	23.8	64.1	-0.3
Other, clinical**	565	19.5	81.3	599	18.8	84.7	3.4
Nonclinical††	322	32.8	75.2	307	32.9	77.7	2.5

Abbreviation: NP/PA = nurse practitioner/physician assistant.

* Persons who worked in a place where clinical care or related services were provided to patients, or whose work involved face-to-face contact with patients or who were ever in the same room as patients.

† Respondents could specify working in more than one setting.

§ Weights were calculated by occupation, age, sex, race/ethnicity, work setting, and Census region to represent the U.S. population of health care personnel. Work setting and overall occupation are presented as weighted estimates of the total sample. Where the groups are stratified by work setting, the estimates are presented as weighted estimates of the occupation group subsample of each work setting subgroup.

¶ Vaccination coverage estimate not reliable because the sample size was <30.

** Allied health professional, technician, or technologist.

†† Administrative support staff or managers and nonclinical support staff members (including food service workers, laundry workers, janitors, and other members of the housekeeping and maintenance staffs).

§§ Ambulatory care (physician's office, medical clinic, and other ambulatory care setting).

¶¶ Dentist office or dental clinic, pharmacy, laboratory, public health setting, emergency medical services setting, or other setting where clinical care or related services was provided to patients.

TABLE 2. Percentage of health care personnel* who received influenza vaccination, by employer vaccination policy and work setting — Internet panel surveys, United States, 2012–13 through 2015–16 influenza seasons

Employer vaccination policy/Work setting	2012–13			2013–14			2014–15			2015–16		
	No.	Weighted %†	Weighted % vaccinated	No.	Weighted %†	Weighted % vaccinated	No.	Weighted %†	Weighted % vaccinated	No.	Weighted %†	Weighted % vaccinated
Vaccination requirement§	549	22.4	96.5	738	35.5	97.8	725	40.1	96.0	841	37.8	96.5
Hospital	388	37.1	95.1	520	58.2	97.7	440	64.8	97.2	510	61.0	96.5
Ambulatory care/ Physician office¶	191	20.9	99.8	252	33.6	96.4	277	34.7	96.1	258	33.9	98.7
Long-term care	61	12.8	95.8	88	20.1	98.4	104	26.0	97.3	143	23.4	93.8
Other clinical setting**	38	10.7	100	88	29.3	99.5	109	35.9	85.7	101	24.9	98.5
No vaccination requirement												
Offered onsite vaccination >1 day††	658	28.5	80.5	542	25.1	80.4	407	19.1	83.9	460	19.8	82.8
Hospital	382	37.3	81.9	261	31.4	82.0	151	21.0	86.9	173	23.8	81.8
Ambulatory care/ Physician office¶	189	27.8	82.3	183	28.6	80.7	165	23.1	87.8	152	20.8	85.1
Long-term care	115	17.3	74.8	63	11.7	71.6	57	12.4	67.3	96	16.1	80.4
Other clinical setting**	85	28.6	84.3	107	22.0	85.0	97	15.6	81.9	87	12.3	84.1
Offered onsite vaccination 1 day§§	227	9.8	67.6	169	7.6	61.6	230	9.8	73.6	254	10.9	82.1
Hospital	89	9.9	66.3	43	4.2	55.6	51	7.3	72.1	70	8.3	81.1
Ambulatory care/ Physician office¶	88	9.3	80.1	76	11.3	69.3	104	10.9	80.6	76	12.8	82.9
Long-term care	58	11.3	49.7	43	10.0	54.1	45	10.0	67.1	77	11.5	83.0
Other clinical setting**	25	7.3	—¶¶	31	6.5	72.9	50	10.8	80.4	54	14.2	85.2
Other vaccination promotion***	250	17.4	69.2	226	15.5	61.9	216	12.4	59.5	293	13.0	67.8
Hospital	77	13.4	73.4	46	5.1	80.7	24	4.4	—¶¶	39	4.6	91.0
Ambulatory care/ Physician office¶	65	13.1	76.8	66	12.2	53.5	67	10.3	60.5	62	11.9	74.0
Long-term care	83	23.6	63.2	90	29.8	62.2	83	21.6	58.5	139	21.4	63.4
Other clinical setting**	55	28.8	71.0	50	16.9	57.5	54	14.6	64.5	67	16.4	54.0
No onsite vaccination or promotion	260	21.9	40.4	207	16.3	36.8	336	18.7	44.0	409	18.4	44.9
Hospital	25	2.3	—¶¶	10	1.2	—¶¶	15	2.6	—¶¶	11	2.3	—¶¶
Ambulatory care/ Physician office¶	103	28.9	40.2	72	14.3	26.8	133	21.0	46.6	100	20.6	45.0
Long-term care	110	35.0	37.5	80	28.5	38.6	117	30.0	36.4	204	27.7	40.6
Other clinical setting**	34	24.6	48.7	51	25.3	36.9	79	23.2	53.4	100	32.1	43.4

* Persons who worked in a place where clinical care or related services were provided to patients, or whose work involved face-to-face contact with patients or who were ever in the same room as patients.

† Weights were calculated based on occupation, age, sex, race/ethnicity, work setting, and Census region to represent the U.S. population of health care personnel. Work setting and overall occupation are presented as weighted estimates of the total sample. Where the groups are stratified by work setting, the estimates are presented as weighted estimates of the occupation group subsample of each work setting subgroup.

§ Includes all respondents who indicated that their employer required them to be vaccinated for influenza.

¶ Ambulatory care (physician's office, medical clinic, and other ambulatory care setting).

** Dentist office or dental clinic, pharmacy, laboratory, public health setting, health care education setting, emergency medical services setting, or other setting where clinical care or related services was provided to patients.

†† Employer made influenza vaccination available onsite for >1 day during the influenza season at no cost to employees. Restricted to respondents without an employer requirement for vaccination.

§§ Employer made influenza vaccination available onsite for 1 day during the influenza season at no cost to employees. Restricted to respondents without an employer requirement for vaccination.

¶¶ Vaccination coverage estimate not reliable because sample size was <30.

*** Influenza vaccination was promoted among employees through public identification of vaccinated persons, financial incentives or rewards to individuals or groups of employees, competition between units or care areas, free or subsidized cost of vaccination, personal reminders to be vaccinated, publicizing the number or percentage of employees receiving vaccination, or making vaccination available at special events organized on site. Restricted to respondents without an employer requirement for vaccination or on-site vaccination.

vaccination (20.6%, 27.7%, and 32.1%, respectively), than did personnel working in hospital settings, where only 2.3% reported that their employer neither required, provided, nor promoted vaccination (Table 2).

Discussion

The overall estimate of influenza vaccination coverage among health care personnel during the 2015–16 season was 79.0%, similar to the previous two influenza seasons. The percentage of employers with a vaccination requirement has not changed

Summary

What is already known about this topic?

The Advisory Committee on Immunization Practices recommends annual influenza vaccination for all health care personnel to reduce influenza-related morbidity and mortality in health care settings. For the 2014–15 influenza season, the estimated overall influenza vaccination coverage among health care personnel was 77.3%.

What is added by this report?

Influenza vaccination coverage among health care personnel during the 2015–16 influenza season, assessed using an opt-in Internet panel survey, was 79.0%, similar to coverage during the 2014–15 season. Coverage was highest among physicians, nurse practitioners/physician assistants, nurses, pharmacists, and health care personnel working in hospital settings. Coverage was lowest among assistants and aides and personnel working in long-term care settings. Employer vaccination requirements and offering vaccination at the workplace at no cost were associated with higher vaccination coverage.

What are the implications for public health practice?

Employer vaccination requirements, offering influenza vaccination onsite at no cost, or both can achieve high health care personnel vaccination coverage. Implementing comprehensive evidence-based worksite intervention strategies will be important to ensure health care personnel and patients are protected against influenza.

substantially since the 2013–14 season. As in previous influenza seasons, higher influenza vaccination coverage among health care personnel was associated with employer vaccination requirements and with access to vaccination at the workplace at no cost (*5*), highlighting the value of vaccination requirements and access to influenza vaccination at the worksite as effective tools for increasing overall coverage.

Coverage among health care personnel working in long-term care settings increased compared with the 2014–15 season, and has increased by approximately 17 percentage points since the 2011–12 influenza season. Although low, this is the only setting with an appreciable increase in coverage compared with last season. Influenza vaccination among health care personnel in long-term care settings is especially important because influenza vaccine effectiveness is generally lowest in the elderly (*3*). In addition, multiple studies have demonstrated that vaccination of health care personnel in long-term care settings confers a health benefit to patients, including reduced risk for mortality (*2–4*). Health care personnel working in long-term care settings consistently are the least likely to report that their employer either required or promoted vaccination, or made vaccination available onsite at no cost.

Implementing strategies shown to improve vaccination coverage among health care personnel in a workplace, including vaccination requirements or offering onsite vaccinations at no cost over multiple days, can help protect long-term care patients from influenza (*7*). Employers can use the long-term care web-based toolkit[††] developed by CDC and the National Vaccine Program Office to access resources, strategies, and educational materials for increasing influenza vaccination among health care personnel in long-term care settings.

The findings in this report are subject to at least three limitations. First, the study used a nonprobability sample of volunteer health care personnel members of Medscape and SSI Internet panels. Second, vaccination status was self-reported and might be subject to recall bias. Finally, coverage findings from Internet survey panels have differed from population-based estimates from the National Health Interview Survey in past influenza seasons (*8*,*9*). These limitations might affect the representativeness of these findings to the U.S. population of health care personnel (*10*).

The highest influenza vaccination coverage among health care personnel continues to be reported in worksites with employer requirements for vaccination. Health care personnel working in long-term care settings had the largest increase in vaccination coverage; despite these increases, this group continues to have the lowest levels of coverage. Employer vaccination requirements likely contributed to the observed gradual increase in vaccination among health care personnel working in settings with the lowest coverage. In the absence of vaccination requirements, expanding the number of health care locations offering vaccination onsite, over multiple days, and at no cost might help sustain and improve influenza vaccination coverage among health care personnel, including in long-term care settings. Employers and health care administrators can make use of the *Guide to Community Preventive Services*, which presents evidence to support onsite vaccination at no or low cost to health care personnel to increase influenza vaccination coverage among health care personnel (*7*).

[††] http://www.cdc.gov/flu/toolkit/long-term-care/index.htm.

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