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Sustained Low Influenza Vaccination Rates in US Healthcare Workers

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Abstract

INTRODUCTION—A substantial morbidity and mortality burden attributable to the influenza virus is observed annually in the United States. Healthcare workers are an occupational group at increased risk of exposure, demonstrated to transmit influenza to their patient populations, and vital to the care of these patient populations. The prevention of the spread of the flu is a significant public health concern. In the present study, we examined influenza vaccination rates and their 5-year trends within the major occupational healthcare worker groups and compared them to non-Healthcare Workers.

METHODS—Using data from the nationally representative 2004–2008 National Health Interview Survey (NHIS), US healthcare workers (n=6,394) were analyzed.

RESULTS—Seasonal influenza vaccination coverage estimates remain substantially low among all healthcare workers, highest among the health diagnosing and treating practitioners (52.3%), and lowest among other healthcare support occupations (32.0%). Among all other occupational groups, pooled influenza vaccination rates were highest for white collar workers (24.7%), and lowest for farm workers (11.7%). There were no significant upward or downward trends in influenza vaccination rates for any healthcare or other occupational worker group during the five-year survey period.

CONCLUSION—Improving these low vaccination rates among healthcare workers warrants a comprehensive national approach to influenza prevention that includes education and strong encouragement of routine annual vaccination among healthcare workers. Policy enhancements such as free provision of seasonal influenza vaccine, coverage for treatment and workers compensation for vaccine-related complications are needed.

Keywords

Flu; Vaccination; healthcare workers; occupation; epidemiology

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The influenza virus poses a substantial annual burden of morbidity and mortality in the United States, with an annual average of 200,000 influenza-related hospitalizations and 36,000 influenza-related deaths (Salgado et al, 2007). Pandemic influenza outbreaks are a significant threat to public health worldwide, as highlighted by the recent introduction of swine-derived H1N1 virus into humans (CDC, 2009). US healthcare systems, particularly hospitals, lack preparedness to adequately address the threat of pandemic influenza (Toner et al, 2006). Over the past 30 years, approximately 900,000 influenza-related deaths have occurred in the US, making influenza one of the leading causes of death among vaccine-preventable infections (Simonsen et al, 2005). Since 1984, influenza vaccination has been recommended for specific health care workers (such as nurses, doctors, and other health professionals) who experience substantial occupational risk for infection during influenza seasons (Fiore et al, 2007). These workers often continue to work when infected with influenza, and can transmit the virus to their patients. Results from a placebo-controlled clinical trial showed a cost savings of $46.85 per vaccinated worker based on the observed decreases in sick leave and visits to physicians for upper respiratory illness (Walker et al, 2006). Despite this evidence and recommendations by the Advisory Committee on Immunization Practices (ACIP) to direct vaccine first to priority groups including healthcare workers (Fiore et al, 2007), vaccination coverage among these workers has been documented to be substantially low since 2002. Our objective was to evaluate influenza vaccination rates and their 5-year trends within the major occupational healthcare worker groups using a nationally representative sample of the non-institutionalized US population, and to compare these trends to the workforce as a whole.

METHODS

Data from the 2004–2008 National Health Interview Survey (NHIS), an annual population-based survey of the entire non-institutionalized US civilian population were analyzed. The survey response rate for the study period ranged from 67.8–72.5%. Employed respondents aged 18 years and older reported on their occupation for the week prior to interview. Workers were grouped using Standard Occupational Codes (SOC) into six major healthcare worker groups (see Table 1), and were compared to blue collar, service, farmer, and other white collar worker groups. Influenza vaccination status was assessed in the NHIS interview by response to the questions: “During the past 12 months, have you had a flu vaccine (shot or spray)? A flu vaccination is usually given in the fall and protects against influenza for the season.” Given the complex sample survey design of the NHIS, analyses were performed with the SUDAAN package to take into account sample weights and design effects. For pooled prevalence estimates, sample weights were adjusted to account for the aggregation of data over multiple survey years by dividing the original weight by 5 (the number of years combined in NHIS years 2004 through 2008). To assess influenza vaccination trends within each survey period, a weighted linear regression model was fitted to the annual design-adjusted rates within occupational groups. The weight used for each annual rate was the inverse of its variance. The protocol was approved by the institutional review board of the University of Miami, Miller School of Medicine.

RESULTS

There were a total of 83,608 participants 18 years and older who reported working within the 1 week prior to their participation in the 2004 to 2008 NHIS (representing an estimated annual 141,346,672 US workers; see Table 1); 6,349 of these workers (representing an estimated annual 10,256,720 healthcare workers) were employed in the selected healthcare occupations. The overall prevalence of reported influenza vaccination for all Healthcare occupations during the survey period was 44.8%, and ranged from 32.0–52.3% for healthcare worker groups. The prevalence of reported influenza vaccination among healthcare workers was highest among the health diagnosing and treating practitioners (52.3%), and lowest among other healthcare

support occupations (e.g. Birth Attendants, Morgue Attendants, Phlebotomists, Patient Transporters) (32.0%). Among all other occupational groups, pooled influenza vaccination rates were highest for white collar workers other than healthcare workers (24.7%), and lowest for farm workers (11.7%). There were no significant upward or downward trends in influenza vaccination rates for any healthcare or other occupational worker group during the five-year survey period.

DISCUSSION

Overall, there was no significant upward trend in vaccination rates among all healthcare workers during the 2004–2008 survey period. The prevalence of influenza vaccination remains low, with healthcare workers employed as other healthcare support occupations reporting the lowest rate of influenza vaccination. Findings from the present study are consistent with other national self-report influenza vaccination receipt rates. Of note, even the least-vaccinated healthcare worker group had relatively higher vaccination coverage rates than any other non-healthcare worker group; this study finding may be due to higher awareness of ACIP recommendations or ready access to vaccines at the workplace (Lindley et al, 2007). Given the lack of increase in the coverage rates of all healthcare workers over the last few years, as well as their potential occupational exposure risk and the risk of infecting their patients (Nichol et al, 1995), discussions concerning the mandating of influenza vaccination with an opt-out provision should be considered in this and possibly other worker groups with high influenza exposure and transmission risks (Wynia, 2007). Such mandates with opt-out options, for example, have substantially increased the coverage of hepatitis B vaccination that has been required by the Occupational Health and Safety Administration's bloodborne pathogen standard for employers and workers (Agerton et al, 1995). At the present time, seven states (Alabama, California, Maine, New Hampshire, New York, Rhode Island, and Tennessee) have laws mandating that healthcare workers either be provided or receive influenza vaccination; nonetheless, data about the enforcement of and the effectiveness of these mandates are warranted (Lindley et al, 2007). The NHIS is limited by the self-reported nature of the respondent's flu vaccination status, however previous studies have shown the sensitivity and specificity of self-reported adult influenza vaccination to be reliable measures. Despite these limitations, the ability to use large sample sizes, the nationally representative nature of the database, and the timely annual assessment make these NHIS data uniquely useful for assessing the prevalence of flu vaccination by US healthcare worker groups, including worker subpopulations.

CONCLUSION

Health education programs on the effectiveness and safety of the influenza vaccine (as well as other issues of protection and prevention of influenza transmission and exposure) are critical to the health and protection of the healthcare workers themselves, as well as their patients and communities. Findings from studies conducted by the California Department of Health Services and the Mayo Clinic in Rochester, Minnesota underscore how organizational change (e.g., separate clinics devoted to prevention), free vaccine, and gift incentives are particularly effective methods of increasing vaccination among adults (Stone et al, 2002). In addition, similar studies highlight how interventions that are used to increase coverage among HCWs (including standing orders, reducing out-of-pocket costs, encouragement from unit manager, and higher influenza knowledge), in conjunction with education, are effective at improving vaccination rates (Mehta et al, 2008). Given the growing concerns of a worldwide influenza pandemic, thorough evaluation of vaccine mandates with opt-out options and empowering the front line healthcare workforce with the knowledge base and access to influenza vaccination and usage are paramount.

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Table 1

Pooled and Annual Seasonal Influenza Vaccination Coverage Estimates in US Healthcare Providers: National Health Interview Survey 2004–2008

Occupational Group	Sample N	Estimated US Population	Overall Vaccination Coverage Estimates [95% CI]	Annual Vaccination Coverage Estimates					Slope ± SE	p- value
				2004	2005	2006	2007	2008		
Healthcare Occupations										
Health diagnosing and treating practitioners: *e.g. doctors, dentists, nurses, veterinarian*	2,794	4,764,787	52.3 [50.1–54.5]	54.3	40.5	50.5	56.5	58.6	1.72±2.23	0.50
Other healthcare practitioners & technical occupations: e.g. acupuncturists, nurse anesthetists, naturopaths	38	66,723	49.0 [31.4–66.6]	49.0[a]	26.0[a]	62.1[a]	53.0[a]	75.8	*b*	*b*
Occupational, physical therapist assistants & aides	37	63,392	48.8 [28.0–69.6]	72.0	38.2	15.8[a]	0.0	85.9	*b*	*b*
Health technologists and technicians: e.g. audiometrist, first-aid attendant, sanitary technician	1,323	2,233,585	42.1 [38.9–45.3]	38.6	40.3	35.8	46.8	47.7	2.28±1.13	0.14
Nursing, psychiatric, and home health aides	1,447	1,963,467	36.6 [33.5–39.7]	38.1	31.5	34.4	42.2	36.0	0.22±1.23	0.88
Other healthcare support occupations: *e.g. birth attendants, phlebotomists, transporters*	710	1,164,766	32.0 [27.3–36.7]	34.8	22.2	34.2	33.1	32.9	0.32±2.21	0.89
Total Healthcare Occupations	6,349	10256721	44.8 [40.1–49.5]	45.5	36.8	42.6	49.0	49.0	0.06±2.81	0.98
Other Occupational Groups										
All Other White Collar Workers	43,335	74,502,098	24.7 [24.2–25.2]	31.2	14.1	22.5	24.0	28.3	0.13±2.95	0.97
All Service Workers	13,976	22,278,307	20.3 [19.4–21.2]	25.5	13.5	18.0	20.7	21.3	−0.43±1.97	0.84
All Blue Collar Workers	19,232	33,231,141	18.3 [17.6–19.0]	26.4	8.7	15.4	18.5	18.2	−1.26±3.15	0.72
All Farm Workers	716	1,078,406	11.7 [9.0–14.4]	20.9	5.7[a]	6. 9[a]	7.7[a]	10.7[a]	−1.81±2.34	0.50
Total All Workers	83,608	141,346,672	23.9 [23.5–24.2]	30.0	14.3	21.3	23.9	26.5	0.06±2.81	0.98

[a]Estimates have a relative standard error ≥ 30% and should be used with caution, as they do not meet NCHS standards of reliability or precision (NCHS, 2008).

[b]Trends were not calculated when the sample size for any individual survey year fell below 45.