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Alternative Vaccination Locations: Who Uses Them and Can They Increase Flu Vaccination Rates?

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Abstract

Since many unvaccinated individuals do not regularly contact the traditional health care system, we sought to determine the role that alternative vaccination locations (e.g., workplaces and retail clinics) could play in increasing influenza vaccination coverage. Between February 14, 2008 and March 10, 2008, a 25-question influenza vaccine questionnaire was administered to a nationally representative, stratified sample of panelists. Our result found that while alternative locations are covering some segments not captured by the traditional health care system (e.g., younger, working, white individuals in metropolitan areas), they are not serving many other segments (e.g., minority, rural, or lower income patients).

INTRODUCTION

Despite the demonstrated benefits of influenza vaccine, [1–13] each year a large percentage of adults go unvaccinated.[14,15] Efforts aimed at increasing influenza vaccine coverage have focused primarily on increasing vaccination in physicians' offices (e.g., computer reminders, standing order sets, advertising campaigns)[16–24] but these efforts may have diminishing returns. Working individuals or those without any other reason to see a physician may be less willing to endure the inconvenience of making an appointment in advance and the associated work absence, travel and wait time with an appointment.[25] Alternative locations (e.g., retail stores and workplaces, could be increasingly viable because of the increasing number of retail clinics (health clinics located in retail stores that are staffed primarily by nurse practitioners) and prevalence of influenza immunization at worksites.[26–30]

Our study used data from a nationally representative survey of US adults from the 2007–2008 influenza season to better understand the potential for these alternative locations (retail clinics or worksites) to improve influenza vaccination rates. Our goals were to (1) describe the characteristics of patients who did not receive the influenza vaccine and determine the fraction of those in this group who had little contact with the medical system and therefore could benefit from an alternative location, (2) determine where vaccinated patients received the influenza

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vaccine (i.e., traditional health care location vs. alternative locations) and the characteristics of patients who were vaccinated at different locations, and (3) compare the characteristics of unvaccinated patients with those using alternative locations. Such comparisons can help identify whether alternative locations are serving populations that are not being vaccinated at traditional health care sites.

METHODS

Sample Design

We analyzed responses drawn from a nationally representative, stratified sample of panelists recruited by Knowledge Networks (KN) fielded between February 14, 2008 and March 10, 2008. This panel has been used for many previous research studies.[31–34] KN recruited panelists using random digit dialing (RDD) methods and administers surveys on a variety of topics to panelists via the internet in exchange for small financial incentives. KN provides Web-TV hardware, software, and training to households without computers. Telephone exchanges with higher fractions of African-Americans and Hispanics and elderly were oversampled. Sample weighting adjusted for potential biases such as survey non-coverage and non-response.

Measures

The 25-question questionnaire consisted of 5 major sections: receipt of influenza vaccine during the past influenza season, experiences talking to health care providers about vaccines, information and views about vaccines, demographic information, and information about health care utilization and health status.

Data Analysis

Our analysis separated patients into patients high-risk versus low-risk for influenza and patients with and without a regular health care provider. High-risk was defined using the following Centers for Disease Control and Prevention (CDC) criteria: age greater than 50 years old, significant co-morbidities, or living or working with high-risk patients. We defined patients who did not have a regular health care provider as those who indicated that they did not have a regular health care provider or did not see a physician in the previous 12 months.

Statistical analyses were conducted using STATA 10 (Statacorp, College Station, Texas) and SAS 9.1 (SAS Institute, Cary, North Carolina). Differences were considered statistically significant at a p-value less than 0.05.

RESULTS

The survey was sent to 4,458 panelists aged between 18 and over. A total of 3,043 (68 percent) panelists responded. Table 1 shows the distribution of completed surveys by ethnic and age groups. All analyses were sample-weighted in order to draw nationally representative inferences.

Characteristics of Patients Who Did Not Receive the Influenza Vaccine

Respondents who were over 50 years old, college-educated, employed, white, chronically ill, and considered CDC high risk and has a personal physician, a longer relationship with the physician, and more physician visits were significantly more likely ($p < 0.05$) to have been vaccinated (Table 2).

Influenza Vaccination Location

Of patients who received the influenza vaccine, 68.4 percent received the vaccine at a traditional health care location (i.e., physician's office, hospital, or public health clinic), 22.5 percent received the vaccine at work, and 9.1 percent received it at a retail store such as a pharmacy or grocery store. Multivariate analyses (Table 3) showed that respondents who used traditional health care locations were significantly ($p \leq 0.05$) more likely to be unemployed, not white and not African American, living in an urban (vs. rural) area, located in the Northeast, Midwest, or South, and to indicate that convenience was an important factor in deciding whether to get vaccinated. Compared to those vaccinated at traditional health care locations, respondents **vaccinated at work** were significantly ($p \leq 0.05$) more likely to live in the South, have an employer who requires influenza vaccination, and to indicate that convenience was an important factor in deciding whether to get vaccinated. Compared to those vaccinated at traditional health care locations, respondents **vaccinated at a retail store** were significantly ($p \leq 0.05$) more likely to be over 50 years of age, non-white, located in the Northeast or Midwest United States, have a designated physician, have had more than one physician visit over the prior year, and considered high risk for influenza. The p-value for living in an urban area was 0.0502. Those vaccinated at a retail store were more likely to be unsure about how many physician visits they had over the prior year.

DISCUSSION

Our survey was primarily designed to look at national influenza vaccine coverage rates with oversampling of racial minorities and subpopulations covered by the CDC/Advisory Committee on Immunization Practices influenza vaccine recommendations. As described previously, our survey appears comparable to the National Health Interview Survey (NHIS) with some added advantages of being influenza vaccination-focused and Internet-based: more rapid data collection, analysis, and modification to accommodate questions about emerging topics (e.g., vaccination in non-traditional settings) or key subgroups (e.g., employed versus non-employed).[35] Our study has limitations inherent in single year survey-based studies: e.g., recall and response bias, extrapolating sample results to the entire population, potential misunderstanding of questions, and a single year may not represent other years. Additionally, RDD recruitment will miss individuals without telephones, and an Internet-based survey may still deter those not comfortable with such technology, despite active instruction.

Consistent with other sources, our results demonstrate that many individuals, including a large number of those considered high-risk, go unvaccinated each year.[36–38] Thirty-one percent of unvaccinated respondents did not have regular contact with a health care provider (i.e., no physician visits and no personal doctor). Can alternative locations, such as workplaces and retail stores, be an effective means to improve vaccination rates? We believe yes, with some important caveats.

Alternative locations address some population segments not captured by the traditional health care system. Retail stores capture patients who are older, non-white, and high-risk for influenza. Workplaces appeal to those who value convenience in the vaccination decision. Nonetheless alternative locations are not serving many other population segments (e.g., rural or lower income patients) that do not regularly interact with the traditional health care system. In fact, retail stores are serving many individuals who have had multiple physician visits over the prior year.

It is possible that alternative locations can better serve these missed segments. Future studies may explore whether workplaces with lower income or rural employees have influenza vaccination programs. It also may be helpful to look at whether retail stores in rural or non-white communities are offering the influenza vaccine.[37,39–42] Subsequent studies could

take a closer look at the location, advertising, marketing, and staff composition of alternative locations and how these characteristics affect the types of patients who access these locations.

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TABLE 1
Sample Characteristics (unweighted n=3043)

Characteristic	Weighted % (standard error)
Demographic Characteristics	
Gender	
Male	48.0 (1.7)
Female	52.0 (1.7)
Age category	
18–30	21.8 (1.6)
31–49	31.1 (1.7)
50–64	24.7 (1.3)
>65	22.4 (1.0)
Household income	
<\$75,000	73.8 (1.5)
≥\$75,000	26.2 (1.5)
Educational status	
Less than high school	13.2 (1.1)
High School	32.3 (1.5)
Some College	27.5 (1.6)
Bachelor's or higher	26.9 (1.5)
Employment status	
Employed	59.9 (1.6)
Unemployed	40.1 (1.6)
Race	
White	69.4 (1.4)
Black	11.1 (0.8)
Other	19.6 (1.2)
Located in Metropolitan Statistical Area (MSA)	
Yes	83.7 (1.3)
No	16.3 (1.3)
Region of the United States [†]	
Northeast	18.5 (1.3)
Midwest	22.2 (1.4)
South	36.3 (1.6)
West	22.9 (1.4)
Medical Characteristics and Care seeking Behaviors	
Chronically ill	
Yes	26.2 (1.4)
No	73.8 (1.4)
Has one doctor considered his or her own personal doctor	
Yes	74.9 (1.5)
No	25.1 (1.5)
Number of years with personal provider	
Less than 1 year	11.6 (1.3)
1–2 years	17.7 (1.6)

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Characteristic	Weighted % (standard error)
3-4 years	17.6 (1.5)
5 or more years	53.2 (1.9)
Number of visits to doctor or clinic in last year	
0	19.6 (1.5)
1	15.5 (1.2)
2-4	44.5 (1.7)
5 or more	17.4 (1.3)
Unsure	2.9 (0.6)
High Risk: CDC recommends these individuals receive vaccine	
Yes	54.9 (0.9)
No	45.1 (0.9)

[†]United States Census Regions (http://www.census.gov/geo/www/us_regdiv.pdf)

TABLE 2

TABLE 2: Characteristics of individuals who received the vaccine

Characteristic	Weighted % (standard error)	p-value*
Total Sample	37.6 (1.6)	-
<i>Demographic Characteristics</i>		
Gender		
Male	37.8 (2.3)	0.88
Female	37.8 (2.2)	
Age category		
18–30	23.3 (3.6)	<0.001 (<0.0001)
31–49	22.8 (3.0)	
50–64	42.4 (2.7)	
>65	66.6 (2.1)	
Household income		
<\$75,000	37.0 (1.8)	0.53
≥\$75,000	39.3 (3.2)	
Educational status		
Less than high school	32.5 (3.6)	0.008 (0.08)
High School	41.3 (2.7)	
Some College	30.6 (2.8)	
Bachelor's or higher	42.8 (3.3)	
Employment status		
Employed	45.6 (2.3)	<0.001
Unemployed	32.3 (2.1)	
Race		
White	40.8 (2.1)	0.002
Black	32.1 (2.9)	
Other	29.4 (2.9)	
Located in Metropolitan Statistical Area (MSA)		
Yes	37.4 (1.7)	0.79
No	38.6 (4.0)	
U.S. Census Region [†]		
Northeast	45.5 (4.0)	0.1
Midwest	38.1 (3.4)	
South	35.8 (1.5)	
West	33.5 (3.1)	
<i>Medical Characteristics and Care seeking Behaviors</i>		
Chronically ill		
Yes	52.4 (2.9)	<0.001
No	31.8 (1.8)	
Has one doctor considered his or her own personal doctor		
Yes	42.1 (1.8)	<0.001
No	24.0 (3.1)	
Number of years with personal provider		

Characteristic	Weighted % (standard error)	p-value [*]
Less than 1 year	29.7 (5.4)	<0.001 (<0.001)
1–2 years	34.9 (4.2)	
3–4 years	40.1 (4.4)	
5 or more years	47.7 (2.5)	
Number of visits to doctor or clinic in last year		
0	16.3 (3.1)	<0.001 (<0.001)
1	32.6 (4.0)	
2–4	45.8 (2.9)	
5 or more	46.1 (3.2)	
Unsure	28.9 (9.0)	
High Risk: CDC recommends these individuals receive vaccine		
Yes	50.5 (1.9)	<0.0001
No	21.9 (2.5)	

* P-values are based on Rao-Scott Chi Square tests comparing the distributions of characteristics of people receiving the influenza vaccine to those who did not receive the influenza vaccine. P-values in parentheses correspond to the Cochran-Armitage trend test performed on ordinal variables.

[†] United States Census Regions (http://www.census.gov/geo/www/us_regdiv.pdf)

TABLE 3
 Predicting the Likelihood of Receiving an Influenza vaccination at a Traditional Location, a Retail Clinic, or the Workplace among vaccinated individuals: Multivariate Results.

Variable	Received Vaccine at Traditional Location (weighted n=729) Odds Ratio (95% Confidence Interval)	Received Vaccine at Retail Store (weighted n=104) Odds Ratio (95% Confidence Interval)	Received Vaccine at Workplace (weighted n=257) Odds Ratio (95% Confidence Interval)
Gender			
male	1.00	1.00	1.00
female	1.11 (0.71, 1.73)	1.29 (0.7, 2.38)	0.68 (0.31, 1.5)
Age			
18–30	1.00	1.00	1.00
31–49	2.20 (0.9, 5.35)	0.35 (0.07, 1.77)	0.42 (0.14, 1.25)
50–64	0.84 (0.36, 1.94)	3.46 (1.21, 9.88)	1.06 (0.34, 3.26)
65 and older	1.32 (0.53, 3.31)	4.89 (1.35, 17.68)	0.26 (0.06, 1.18)
Household Income Category			
less than \$75k	1.00	1.00	1.00
more than \$75k	1.08 (0.65, 1.82)	0.71 (0.34, 1.51)	1.59 (0.72, 3.51)
Education			
less than hs diploma	1.00	1.00	1.00
high school diploma	1.10 (0.56, 2.16)	0.64 (0.24, 1.74)	1.17 (0.26, 5.21)
some college	0.73 (0.36, 1.48)	1.23 (0.44, 3.44)	0.53 (0.12, 2.41)
college degree	0.54 (0.26, 1.1)	1.99 (0.74, 5.37)	0.96 (0.21, 4.35)
Employment			
employed	1.00	1.00	
unemployed	2.88 (1.77, 4.7)	1.81 (0.81, 4.02)	
Race			
white			
black	1.69 (0.88, 3.22)	0.12 (0.04, 0.34)	1.06 (0.37, 3.09)
Hispanic/other	2.16 (1.22, 3.83)	0.32 (0.15, 0.72)	0.78 (0.3, 2.05)
Live in Metropolitan Area			
yes	0.46 (0.24, 0.87)	2.61 (1, 6.83)	1.54 (0.48, 5.01)
no	1.00	1.00	1.00
Region of United States[†]			
West	1.00	1.00	1.00
Northeast	3.30 (1.75, 6.22)	0.15 (0.06, 0.37)	0.56 (0.18, 1.8)
Midwest	2.19 (1.16, 4.14)	0.32 (0.13, 0.75)	0.84 (0.29, 2.39)
South	3.15 (1.71, 5.81)	0.55 (0.24, 1.25)	0.30 (0.11, 0.84)
Has Designated Physician or Health Care Provider			
yes	1.17 (0.62, 2.21)	4.44 (1.48, 13.37)	0.41 (0.15, 1.12)
no	1.00	1.00	1.00
Number of Visits to Health Care Provider in Last Year			
none	1.00	1.00	1.00
1	0.44 (0.18, 1.08)	0.34 (0.11, 1.09)	4.09 (0.9, 18.65)
2–4	0.94 (0.43, 2.06)	0.31 (0.12, 0.77)	1.03 (0.24, 4.43)

Variable	Received Vaccine at Traditional Location (weighted n=729) Odds Ratio (95% Confidence Interval)	Received Vaccine at Retail Store (weighted n=104) Odds Ratio (95% Confidence Interval)	Received Vaccine at Workplace (weighted n=257) Odds Ratio (95% Confidence Interval)
5 or more	1.21 (0.49, 3.02)	0.16 (0.06, 0.48)	0.56 (0.1, 3.1)
unsure	0.14 (0.03, 0.59)	0.01 (<0.001, 0.35)	8.77 (1.09, 70.31)
High Risk: CDC recommends these individuals receive vaccine			
yes	1.54 (0.7, 3.37)	0.24 (0.08, 0.76)	0.63 (0.24, 1.65)
no	1.00	1.00	1.00
Employer Requires Vaccine			
yes			7.88 (3.44, 18.05)
no			1.00
Cost of vaccine is important factor in deciding whether to get vaccinated			
yes	0.85 (0.53, 1.36)	1.53 (0.69, 3.4)	0.87 (0.42, 1.78)
no	1.00	1.00	1.00
Convenience of getting vaccine is important factor in deciding whether to get vaccinated			
yes	0.47 (0.25, 0.89)	0.90 (0.36, 2.27)	5.13 (1.61, 16.36)
no	1.00	1.00	1.00
Knowing where to get the vaccine was an important factor in deciding whether to get vaccinated			
yes	1.33 (0.65, 2.72)	0.60 (0.25, 1.43)	0.80 (0.26, 2.48)
no	1.00	1.00	1.00

[†]United States Census Regions (http://www.census.gov/geo/www/us_regdiv.pdf)