BRIEF REPORTS

Do People Who Intend to Get a Flu Shot Actually Get One?

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BACKGROUND: Vaccination against seasonal influenza is far from universal among groups specifically recommended for vaccine. There is little research to guide communication with patients about vaccination.

OBJECTIVE: To assess the utility of the self-reported intention to be vaccinated against seasonal influenza in predicting vaccine uptake, reasons for being unvaccinated, and willingness to be vaccinated based on a doctor's recommendation.

METHODS: We analyzed data from a subset of respondents (n=1,527) specifically recommended by the ACIP for vaccination against seasonal influenza who participated in two national surveys of adults age 18 and older conducted in November 2008 and March 2009.

RESULTS: Over half who intended to be vaccinated had been vaccinated. Compared to those without intentions, those with intentions were one-fifth as likely ($p<0.01$) to cite lack of need and five times more likely ($p<0.01$) to cite "not getting around to being vaccinated" as main reasons for not being vaccinated. Roughly two-fifths of those without the intention to be vaccinated indicated a willingness to be vaccinated based on a doctor's recommendation.

CONCLUSIONS: Asking simple questions about the intention to be vaccinated against seasonal influenza may be an efficient means of identifying patients with whom extended discussion of vaccine benefits is warranted.

KEY WORDS: flu vaccination; self-reported intentions; study.

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INTRODUCTION

Despite well-documented evidence regarding effectiveness and safety, uptake of seasonal influenza vaccine among adults in the U.S. falls far short of targeted rates^{1,2}. Efforts to expand uptake have traditionally focused on prompting providers to adopt administrative practices that facilitate the identification and

vaccination of patients for whom vaccine is specifically recommended³. These efforts include the implementation of standing order sets and systems for flagging medical records and for generating computerized reminders. There has been little focus to date on the development of strategies for helping patients understand the benefits and risks of vaccination, how to access vaccines, and how to pay for them. Yet, effective patient-provider communication is now viewed as a primary means of assuring that patients receive recommended clinical preventive services⁴⁻⁶.

Effective and efficient communication about vaccines and vaccination requires simple strategies for identifying which patients are least and most inclined to be vaccinated. Such information can assist health care providers to rapidly focus conversations on unvaccinated patients' specific concerns and to target efforts in ways that are most likely to result in increased uptake.

This brief paper informs the development of targeted strategies for communicating with patients about seasonal influenza vaccination by assessing the value of asking unvaccinated individuals whether they intend to be vaccinated against seasonal influenza in predicting actual vaccination, patient concerns about and barriers to vaccination, and willingness to be vaccinated based on a provider recommendation.

METHODS

We fielded two nationally representative surveys of adults age 18 and older in order to measure uptake of seasonal influenza vaccine and understand intentions and motivations for being vaccinated at two points during the 2008-influenza vaccination season. The two surveys were fielded by Knowledge Networks, a company that operates an online panel of households who have agreed to respond regularly to surveys in exchange for financial compensation⁷. Knowledge Networks samples panelists with known probability using combined random digit dialing methods and address-based sampling to capture cell phone-only households⁸. Panelists not using computers at the time of recruitment are provided with WebTV® or laptop computer, training in how to use these, and free internet access. Self-reported influenza vaccination rates based on the Knowledge Networks panel have been shown to be similar to those based on data from the National Health Interview Survey⁹.

The mid-season survey was fielded November 10–19, 2008 with 66% of sampled panelists responding. The end-of-season survey was fielded March 4–April 7, 2009 with 68% of sampled panelists responding. The end-of-season survey included a random, overlap sample of panelists who also participated in the mid-season survey. The response rate among the overlap sample was 75%, yielding a sample of 1,799 respondents with both mid-season and end-of-season data. We analyzed data from the subgroup of respondents in the overlap sample specifically recommended for seasonal influenza vaccination

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Table 1. Influenza Vaccine Uptake Among U.S. Adults Age 18 and Older Specifically Recommended for Vaccine¹ by Stated Intention to Be Vaccinated

Influenza vaccination status	Unweighted number of respondents	Percent of all ACIP indicated adults ^a (95% CI)	Estimated number in millions ^b
Vaccinated at midseason	631	36.9% (32.3%–41.6%)	58.5 (50.8–67.0)
Intended to be vaccinated at midseason	276	16.9% (13.6%–20.7%)	26.9 (21.6–33.3)
Vaccinated by end-of-season	158	10.0% (7.4%–13.3%)	15.9 (11.7–21.3)
Unvaccinated by end-of-season	118	6.9% (5.0%–9.5%)	11.0 (7.9–15.2)
Did not intend to be vaccinated at midseason	620	46.3% (41.1%–51.5%)	73.6 (63.9–84.1)
Vaccinated by end-of-season	28	1.6% (0.9%–3.0%)	2.6 (1.4–4.8)
Unvaccinated by end-of-season	592	44.6% (39.5%–49.9%)	71.0 (61.3–81.5)
Total	1,527	100.0%	159.1 (147.8–169.4)

^aAll estimates are based on logistic regression and weighted to be nationally representative

^bTotal population estimates are obtained by scaling up weighted population shares based on estimates of the total U.S. adult population as of November 1, 2008

(n=1,527). The Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices specifically recommends vaccination against seasonal influenza for those 50 and over, those with high-risk health conditions, and those having close personal contact with high-risk individuals¹.

Respondents of both surveys were asked whether they had been vaccinated against influenza during this flu season. Unvaccinated respondents to the mid-season survey were asked whether they intended to be vaccinated during the remainder of the season. Respondents who remained unvaccinated in the end-of-season survey were asked to indicate the main reasons for not being vaccinated from a pre-specified list of reasons and whether they would be willing to be vaccinated based on the strong recommendation of a healthcare provider.

Both surveys were stratified to ensure balance across geographic regions and adequate representation of the elderly and members of racial and ethnic subgroups^{10,11}.

We used logistic regression (without covariate adjustments) to derive confidence intervals around point estimates in order to bound the intervals between zero and one. Wald tests were used to test the significance of differences in influenza vaccine uptake across groups. Estimates of the total number of adults within each group were obtained by scaling-up corresponding population shares estimated from our survey data based on the size of the total adult population as of November 1, 2008².

All analyses were conducted using post-stratification weights to produce nationally representative estimates adjusting for stratification and non-response⁷. All calculations were performed using STATA/SE 10.1 This study was conducted with the approval of the RAND Corporation's Institutional Review Board.

RESULTS

By midseason, an estimated 36.9% of the 159.1 million U.S. adults for whom influenza vaccine was specifically recom-

mended had been vaccinated, and another 16.9% (26.9 million) of recommended adults said they intended to do so by the end of the season. Just over half of those who intended to be vaccinated followed through (Table 1). The largest share of recommended adults (44.6%) did not intend to be vaccinated at midseason and almost all remained unvaccinated by the end of the season.

Main reasons for not being vaccinated were strongly associated with stated intentions to be vaccinated expressed at midseason (Table 2). Adults who reported that they did not intend to be vaccinated were significantly more likely to report a perceived lack of need as the main reason for not being vaccinated (22.5% vs. 4.1%, $p=0.003$). A lack of belief in flu vaccine was more commonly cited among those who did not intend to be vaccinated at midseason than among those who did intend to be vaccinated, although this difference was not statistically significant (23.2% vs. 11.6%, $p=0.195$). By contrast, those who intended to be vaccinated were more likely to cite not getting around to it as the main reason for non-uptake (50.4% vs. 9.9%, $p<0.001$).

Vaccination intentions were also strongly associated with receptivity to provider recommendations (not shown). Unvaccinated adults who still intended to be vaccinated at midseason were almost twice as likely as those without intentions to express willingness to be vaccinated based on a strong recommendation from a health care provider (80.9% vs. 43.7%, $p=0.001$). Nonetheless, almost half of those without intentions appear at least receptive to provider recommendations.

DISCUSSION

Effective and efficient communication in office-based settings about the benefits, risks, and logistics of vaccination will be vital to the success of this effort. Using nationally representative survey data, we observed strong associations between the intention to be vaccinated against seasonal influenza at

Table 2. Main Reason for Not Being Vaccinated Against Influenza During the 2008–09 Season by Intention to Be Vaccinated at Mid-season Among U.S. Adults Age 18 and Older Specifically Recommended for Vaccine¹

Main reason	Percent not intending to be vaccinated at midseason ^a (95% CI)	Percent intending to be vaccinated at midseason ^a (95% CI)	p-value
Don't need flu vaccine	22.5% (16.4%–30.0%)	4.1% (1.3%–12.3%)	0.003
Don't believe in flu vaccine	23.2% (16.5%–31.6%)	11.6% (3.8%–30.1%)	0.195
Didn't get around to being vaccinated	9.9% (5.8%–16.4%)	50.4% (34.6%–66.2%)	<0.001

^aAll estimates are based on logistic regression and weighted to be nationally representative

midseason and actual vaccination status at the end of the season, reasons for not being vaccinated, and openness to provider recommendations.

The validity of our findings rests on the independence of our two samples. To explore this issue we tested whether participation in the mid-season survey and being asked questions about the intention to be vaccinated served to influence late season vaccine uptake. We found no evidence that the mid-season survey influenced overall uptake or late season uptake in models with and without socio-demographic covariates. We suspect the lack of measurable intervention effect reflects the time and effort required to be vaccinated outside of a regularly scheduled office visit.

The associations among intentions, uptake, and attitudes demonstrate the potential value of asking patients simple questions about their intentions to be vaccinated and using responses to target and formulate vaccine-related discussions. Our finding that the majority of those who intended to be vaccinated appeared amenable to provider recommendations suggests that it may be reasonable to consider this group "low hanging fruit" in developing strategies to expand uptake. Making vaccination convenient to those who intend to be vaccinated by administering influenza vaccines available onsite (as part of routine practice or by partnering with a community vaccinator) or by offering practical advice about where and when to be vaccinated might be effective in helping millions of additional adults to be vaccinated who would not otherwise be.

Persuading the two in five adults recommended for seasonal influenza vaccine who were not inclined to be vaccinated is likely to pose a substantially greater challenge. Our results suggest that at midseason, only 2% of those who do not intend to be vaccinated were vaccinated by the end of the season and that a lack of perceived benefit and need may play a key role in explaining low uptake. Moreover, less than half of those who did not intend to be vaccinated indicated willingness to do so based on a strong provider recommendation. Thus, persuading those disinclined to be vaccinated will likely require changing patients' fundamental beliefs about the benefits and risks of both types of vaccine. Advice and assurance from one's own healthcare provider that is echoed by public health authorities, such as the U.S. Surgeon General, may likely be required.

In summary, our findings suggest that asking simple questions about patients' intentions to be vaccinated may help to quickly identify which patients are least and most inclined to be vaccinated and to rapidly focus conversations on

patients' specific concerns and to target efforts in ways that are most likely to result in uptake of influenza vaccines.

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