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## Use of standing orders for adult influenza vaccination: A national survey of primary care physicians

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### Abstract

**Background**—Influenza vaccination of adults remains below recommended levels. Standing orders programs (SOPs) that allow non-physician medical staff to assess eligibility and administer vaccines without an individualized physician's order are a proven method to increase vaccination rates. However, recent data on their use is not available.

**Purpose**—Investigators surveyed primary care physicians nationwide in 2009 to assess factors related to awareness and use of SOPs.

**Methods**—Using the AMA Master list, a stratified random sample of U.S. family physicians (n=820) and general internists (n=820) was selected to receive a mailed questionnaire. The inclusion criterion was providing primary care to adults in an office-based practice. The primary outcome measure, analyzed in 2010, was consistent use of SOPs.

**Results**—The survey response rate was 67% (1015/1517). Forty-two percent of respondents who immunized adults in their practices reported consistent use of SOPs. Those physicians differed in several dimensions including, awareness of recommendations and regulations regarding SOPs for vaccines, size and type of practice, number and level of training of clinical staff, attributes of the staff. The two variables in logistic regression models associated with the highest likelihood of using SOPs were awareness of recommendations to use them (OR=3.0; 95% CI=2.2–4.1) and agreement with their effectiveness (OR= 2.7, 95% CI=1.9–3.8).

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**Conclusion**—Fewer than half of physicians report using SOPs for influenza vaccination, a number that is not much higher than it was about a decade ago. Approaches to increase use of SOPs are needed.

## Keywords

Adult immunizations; influenza vaccine; standing orders

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## Introduction

Influenza causes more deaths in the United States than all other vaccine-preventable diseases combined, causing an estimated 36,000 deaths annually.<sup>1</sup> However, adult vaccination rates are moderate at 67% for those ≥65, 42% for those 50–64 years of age and 32% for those 18–49 years old with high risk conditions, with racial disparities in rates.<sup>2</sup>

Missed opportunities, namely failure to vaccinate at all visit types, and infrequent preventive care visits contribute to low rates.<sup>3;4</sup> Standing orders programs (SOPs) are a powerful way to reduce missed opportunities and to raise rates, as they enable non-physician medical personnel to assess patient immunization status and administer vaccines without direct physician involvement. Recent studies demonstrate the effectiveness of SOPs across a spectrum of outpatient settings.<sup>5;6;7</sup> When SOPs are used in combination with other strategies, immunization rates increase by approximately 16 percentage points.<sup>8</sup> The Advisory Committee on Immunization Practices (ACIP),<sup>9</sup> the Task Force for Community Preventive Services,<sup>10</sup> and the Southern California Evidence-Based Practice Center-RAND<sup>11</sup> have endorsed SOPs for improving immunization rates.

Despite this evidence, SOPs are not commonly used in the outpatient setting. Szilagyi et al. reported that in 2000–01, only 33% of a national sample of 220 physicians who reported providing adult vaccinations were using SOPs and 36% were willing to try SOPs.<sup>12</sup> That study was concurrent with the ACIP recommendation to use SOPs but predated an important change in the Medicare regulations in 2002 that allowed an exception for adult immunizations to the prohibition on SOPs for medications.<sup>13</sup> This study was designed to determine the prevalence, correlates of use and physicians' adoption readiness for SOPs for influenza vaccine in the outpatient setting nearly a decade later.

## Methods

### Questionnaire

In 2009, three focus groups of primary care physicians and nursing staff and seven key informant interviews were conducted locally in sites selected for diversity in patient populations and use of SOPs for adult immunizations. Key themes and concepts were identified in the transcripts through content analysis. These items, aspects of the Awareness-to-Adherence model,<sup>14</sup> which predicts physician behavior regarding new guidelines for care, and the diffusion of innovation theory were used to develop the survey.<sup>15;16</sup> The questionnaire consisted of 22 closed-ended questions about demographics; practice

characteristics; barriers to and facilitators of SOPs; and physician attitudes about SOPs. It was pilot-tested and revised as appropriate.

## Subjects

A national sample of 1640 outpatient-based family physicians (n=820) and general internists (n=820) were drawn from the American Medical Association's (AMA) Master List of 59,449 outpatient-based family physicians and 59,732 general internists, stratified by specialty. The survey was mailed in May 2009 with a cover letter, a \$5.00 cash incentive and a self-addressed stamped envelope. Nonrespondents received a second mailed survey approximately 8 weeks after the first. After another 8 weeks, nonrespondents were telephoned to request completion of the survey. Physicians self-excluded if they were no longer in practice or primary care, or did not treat adult patients. The protocol was approved by the University of Pittsburgh Institutional Review Board.

## Data Processing and Analyses

Data from returned surveys were entered using a double entry protocol and differences were reconciled. Mean values were imputed for the <5% of the data that were missing. Data were analyzed in 2010 by examining frequency distributions and measures of central tendency. Physicians were asked to rate their use of standing orders using the following statement: "For the purposes of this survey, standing orders refers to an office policy that allows non-physician staff to screen adults for influenza and PPV and administer either vaccine to eligible adults without getting an individual order from the patient's physician." They were then asked to respond individually for influenza vaccine and PPV, their practice's use of standing orders with these choices: "Not using standing orders, no plans to implement them," "Not using standing orders, would like to implement them," "Inconsistently using standing orders, some physicians use but not all," and "Consistently using standing orders." These four response choices for influenza vaccine SOP status formed the dependent measure in the analyses. The four groups were compared in univariate analyses ( $\chi^2$  for proportions, one-way analysis of variance for continuous measures) to identify significant correlates of SOP use. Logistic regression models were developed to examine differences between physicians reporting consistent use of SOPs and physicians in the other three groups combined. Odds ratios and 95% confidence intervals were estimated. Interaction effects were assessed but none was significant.

## Results

Of the 1640 physicians contacted by mail, 107 were deceased, no longer in practice, unknown at the practice, or not in primary care, and 16 surveys were returned as undeliverable, leaving 1517 eligible physicians. Of these, 1015 physicians returned surveys for a response rate of 67%. Participation was slightly higher among family physicians (68.9%) than internists (64.8%;  $P<.01$ ), and among board certified physicians (68.9%) than non board certified (60.7%;  $P<.01$ ). Participants and nonparticipants did not vary by age (mean=50.7 years), length of time in practice (mean=23 years), domestic vs. international training, or geographic region.

One hundred fifteen physicians (74 internists and 41 family physicians;  $P < .001$ ) reported not immunizing adults at their practices and were not included in the analyses, leaving a sample size for analysis of 900.

Internists were significantly less likely to perform influenza immunization on site; 15.4% of internists reported not vaccinating adults in their practices compared to 7.7% of family physicians ( $P < .001$ ). Excluding these, as well as a small number who did not provide information on standing orders (~2% in both groups), the prevalence of consistent use of SOPs was 42.4% (38.9% among internists and 46.3% among family physicians). Because weighting for non-response showed similar results (weighted prevalence of SOP use = 42.3%), only unweighted results are presented.

In analyses comparing the four SOP groups, physicians differed in several dimensions, including awareness of recommendations and regulations regarding SOPs for vaccines, size and type of practice, number and level of training of clinical staff, attributes of the staff such as level of teamwork and openness to innovation, and technological capabilities such as electronic medical records, electronic prompts and reminders (Table 1).

Table 2 shows the results of the logistic regression model. The most important factors associated with greater likelihood of a practice *consistently* using SOPs were: being aware of the ACIP recommendations or Medicare regulations regarding adult immunizations, agreeing that SOPs are effective, and having two or more clinical staff per physician. Other important factors were being a family physician, having an office staff that works well together and is open to innovation, having an electronic medical record (EMR), and having an immunization champion in the practice. Including additional indicators of variation in tracking influenza immunization (paper chart vs. EMR) or type of patient reminder did not change these results; hence they are not included in Table 2 (results available upon request).

## DISCUSSION

In 2000–2001, Szilagyi et al. reported that 33% of a national sample of 220 physicians who reported providing adult vaccinations, were using SOPs.<sup>12</sup> Nearly a decade later, only 42% of primary care physicians were consistently using SOPs for influenza vaccination of adults. This finding raises the question of how to improve use of SOPs in primary care.

Factors associated with consistent use of SOPs include awareness about CDC/Centers for Medicare and Medicaid Services (CMS) stance on standing orders policies, strength of agreement about the power of SOPs, staffing (i.e., number of assistants to help each clinician), and use of EMRs. The CDC has recommended SOPs for adult vaccination since 2000.<sup>9</sup> However, CMS prohibited SOPs for all medications until 2002 when CMS allowed SOPs for influenza and pneumococcal polysaccharide vaccines.<sup>13;17</sup> These changing policies may have left some physicians unsure about using SOPs for adult vaccination.

The strength of agreement about the effectiveness of SOPs was a key predictor for their adoption in these data. SOPs have resulted in larger increases in vaccination rates than either patient-oriented strategies such as education or provider-oriented strategies such as physician reminders.<sup>8;18</sup> Two aspects of the Awareness to Adherence model of physician

adoption of vaccines,<sup>14</sup> awareness of, and agreement with the effectiveness of the SOPs were associated with use of SOPs, suggesting a need for wider and more intentional dissemination of this information.

Two practice characteristics that indicate level of resources available to practices were also associated with SOPs: the number of helpers per clinician and EMR usage. Given the fact that influenza vaccination rates are frequently lower among practices in disadvantaged neighborhoods, SOPs may help reduce these disparities. Use of SOPs by nursing personnel is facilitated by EMR functions that ease record keeping and tracking of vaccination status.<sup>19</sup> CMS plans incentives for EMR usage<sup>20</sup> which may further facilitate use of SOPs and eliminate one source of resource disparity. Furthermore, targeting those who adopt EMRs for also implementing SOPs may be an efficient way to increase their use and increase adult immunization rates.

### Strengths/Limitations

This survey is national in scope and had a high response rate for a physician survey. The questionnaire was based on theoretical models designed around physician adoption of vaccines.<sup>14</sup> However, the survey may be subject to the limitations of self-report and it may not have captured the breadth of possible correlates of use of SOPs.

### Conclusions

Standing orders programs are underused but can have a great public health impact. Further national efforts at clinician education should be considered, with particular emphasis on those practices already using or adopting an EMR. Practical toolkits to facilitate adoption of SOPs need to be evaluated.

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**Table 1**  
Physician and Practice Characteristics by Use of Standing Orders for Adult Vaccination

Physician/practice characteristic	No standing orders; no plans to implement (n=273)	No standing orders; would like to implement (n=142)	Standing orders inconsistently used (n=87)	Standing orders consistently used (n=378)	P value
<i>Physician characteristics</i>					
Family practice (%), ref. = internal medicine	48.0	57.0	55.2	59.3	.038
Aware of either ACIP recommendations or Medicare regulations allowing SOPs for immunizations (%)	35.8	41.8	63.9	70.9	<.001
Physician agrees that SOPs are effective (%)	50.6	73.9	69.8	81.4	<.001
<i>Practice characteristics</i>					
Number physicians in practice (%)					
Solo	33.1	22.5	11.6	21.8	
2-4	38.6	43.0	48.8	38.5	
5	28.3	34.5	39.5	39.8	<.001
Type of practice (%)					
Independent	57.0	50.0	40.7	47.4	
Large corporate/health system	20.6	23.2	30.2	30.7	
Other	22.4	26.8	29.1	22.0	.029
Clinical staff per provider (%)					
2	12.6	18.1	19.3	23.0	
1	66.8	65.9	66.3	66.6	
<1	20.6	15.9	14.5	10.4	.001
Primary assistant (%)					
RN/LPN	30.0	22.1	49.4	39.2	
MA	67.1	72.9	50.6	58.1	
PA/CRNP	2.3	5.0	0.0	2.7	.003
Practice has very good or excellent teamwork (%)					
Practice is open or very open to innovation (%)	70.3	65.7	57.0	83.2	<.001
Practice has immunization champion (%)	51.5	55.3	49.4	70.7	<.001
Uses electronic medical record (%)	24.5	22.6	29.8	34.0	.005
	38.7	53.2	58.5	58.7	<.001

Physician/practice characteristic	No standing orders; no plans to implement (n=273)	No standing orders; would like to implement (n=142)	Standing orders inconsistently used (n=87)	Standing orders consistently used (n=378)	P value
Immunization recording (%)					
Electronic medical record	36.4	51.4	50.6	54.4	.001
Progress notes, paper chart	57.7	45.8	48.3	41.5	.004
Electronic patient reminders (%)	6.2	8.5	13.8	16.8	.001
Computer generated provider reminders (%)	16.2	17.6	29.1	31.8	<.001

Note: ACIP=Advisory Committee on Immunization Practices; Column percentages are shown for type of practice.



**Table 2**

Correlates of Use of Standing Orders Programs (SOPs) from Logistic Regression

Survey Variables	Physicians reporting consistent use of SOPs for influenza immunization vs. all others (n=880) OR (95% CI)	P value
<i>Individual Physician Factors</i>		
Family Medicine, ref. = Internal Medicine	1.35 (0.99, 1.84)	.056
Aware of ACIP recommendations or Medicare regulations	<b>3.02 (2.22, 4.11)</b>	<b>&lt;.001</b>
Agrees that standing orders are effective	<b>2.69 (1.90, 3.81)</b>	<b>&lt;.001</b>
<i>Practice factors</i>		
Number of physicians in practice, ref. = solo		
2-4	1.08 (0.71, 1.66)	.710
5	1.22 (0.77, 1.95)	.390
Clinical staff, ref. = <1 helper/provider		
1 helper/provider	<b>1.90 (1.20, 3.03)</b>	<b>.007</b>
2 helpers/provider	<b>2.52 (1.44, 4.38)</b>	<b>.001</b>
Primary assistant, ref. = Medical assistant RN, LPN, PA, CRNP	1.16 (0.84, 1.58)	.370
Practice staff very open or open to innovation or change	<b>1.60 (1.13, 2.26)</b>	<b>.008</b>
Teamwork in practice excellent or very good	<b>1.57 (1.06, 2.33)</b>	<b>.026</b>
Electronic medical record used	<b>1.47 (1.06, 2.03)</b>	<b>.021</b>
Immunization champion on site	<b>1.40 (1.00, 1.97)</b>	<b>.049</b>
Type of practice, ref. = Independent		
Large corporate/health system	1.29 (0.87, 1.91)	.210
Other	0.85 (0.56, 1.27)	.510

Model  $R^2 = .24$