Standing Orders in an Ambulatory Setting Increases Influenza Vaccine Usage in Older People

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OBJECTIVES: To determine whether standing orders for influenza vaccine increase its usage in an ambulatory setting in elderly patients.

DESIGN: Retrospective analysis of influenza vaccine usage over 4 years (1999–2002).

SETTING: University ambulatory setting.

PARTICIPANTS: Overall, 912 elderly patients of two physicians who issued standing orders and 884 elderly patients of two physicians who did not do so constituted the study group.

MEASUREMENTS: Physicians were categorized as to whether they issued a verbal or written standing order to their nurses to administer the influenza vaccine to patients aged 65 and older. Rates of influenza vaccination of patients whose physicians used standing orders were compared with those of physicians who did not use standing orders.

RESULTS: Five hundred seventy-six (63%) patients of physicians who used standing orders received influenza vaccine, compared with 332 (38%) patients of physicians who did not use them (P < .001). Standing orders accounted for a significantly higher rate of influenza vaccination in each study year. Moreover, in 2001, when influenza vaccine delivery was delayed, physicians who used standing orders maintained their same rate of usage, but physicians who did not had rates of about one-half their usage of the other 3 years.

CONCLUSION: More Medicare recipients received influenza vaccine when their physicians used standing orders for its administration than when their physicians did not. Influenza vaccine represents an important prevention modality that demands widespread implementation, and standing orders can increase its usage. J Am Geriatr Soc 53: 1008–1010, 2005.

Key words: influenza vaccine; healthcare quality; ambulatory care

Influenza causes approximately 36,000 deaths in the United States each year, many of which are preventable by immunization with influenza vaccine.1 Adults aged 65 and older suffer more than 90% of the deaths attributable to pneumonia and influenza. Although influenza vaccine is 30% to 70% effective at preventing hospitalization for pneumonia and influenza in elderly people not living in nursing homes and the elderly can receive the vaccine at no cost to them as a Medicare benefit, data from 2001 reveal that only 66% of senior citizens received the influenza vaccine.3 Researchers must find ways to increase rates of influenza immunization to achieve the goal of Healthy People 2010, namely immunization of 90% of persons aged 65 and older.4

Computerized record reminders, telephone and mail reminders, education, and performance feedback are some of the methods proposed to improve immunization rates with influenza vaccine. A meta-analysis of 81 controlled clinical trials of strategies to improve the use of preventive care services revealed that organizational changes in physicians’ offices proved the most consistently effective method of increasing immunization usage.5 A standing order, where responsibility is delegated to the nurse for identifying vaccine-eligible patients and administering the vaccine to them, is one form of organizational change that can improve vaccination rates. However, most studies that have evaluated the efficacy of standing orders were conducted in inpatient, emergency department, or Veterans Affairs Medical Center settings.6–10 Few studies of standing orders have been reported in ambulatory sites.11–13 It was hypothesized that standing orders for influenza vaccine would improve vaccination rates in persons aged 65 and older treated in a university ambulatory practice.

METHODS

Study Group

A retrospective analysis of influenza vaccine usage during 4 years, 1999–2002, was conducted by searching billing records by fiscal year for patients billed the Medicare code for influenza vaccine (G0008) in a university-based practice located in Huntington, West Virginia. Huntington is the second-largest city in West Virginia and has a predominantly...
Caucasian population. The study group consisted of patients aged 65 and older treated by attending physicians alone when they were not teaching in the resident continuity clinic. Physicians were categorized as to whether they issued a verbal or written standing order to their nurses to administer the influenza vaccine to patients aged 65 and older who met criteria for the vaccine. All nurses were under the same nursing supervisor and received identical education regarding influenza vaccine, with the exception of the presence or absence of a standing order for vaccine administration. Patients aged 65 and older who received the influenza vaccine in each fiscal year were identified from among all patients in this age group who kept regular appointments with their physician or who came only to receive influenza vaccine, between September 1 and January 31, the time period when most patients would have received their influenza vaccine. Rates of influenza vaccination of 912 patients of two physicians who used standing orders were compared with vaccination rates of 884 patients of two physicians who did not use standing orders.

Statistical Analyses
Dichotomous data were compared using chi-square ($\chi^2$). The significance of differences between means was calculated using Student $t$ test for unpaired samples with unequal variances. Microsoft Excel (Redmond, WA) and the following Website were used for calculation of $\chi^2$: www.unc.edu/~preacher/chisq/chisq.htm.

The institutional review board of Marshall University Joan C. Edwards School of Medicine, which is responsible for approval of research performed in the ambulatory clinics of its practice corporation, University Physicians and Surgeons, Inc., approved this research project.

RESULTS
The patients of physicians who used standing orders were somewhat older and more likely to be female than patients of physicians who did not use standing orders (Table 1).

When data from all 4 fiscal years were combined, physicians who used standing orders had a significantly higher rate of influenza vaccination (63%) than physicians who did not (38%; $\chi^2 = 117.7$, degrees of freedom ($df$) = 1, $P < .001$) (Table 2). A higher rate of influenza vaccination was also observed for each individual year in patients with standing orders than in patients with no standing orders (Table 2).

In 2001, vaccine was received late because of pharmaceutical manufacturing delays. Physicians who used standing orders maintained their high rate of influenza immunization in 2001, whereas physicians who did not use standing orders gave only half as much vaccine that year than in the other 3 study years (59% vs 22%; $\chi^2 = 66.5$, $df = 1$, $P < .001$).

DISCUSSION
The results of this study provide evidence that standing orders for the administration of influenza vaccine are associated with higher immunization rates in an ambulatory setting. Several previous studies have shown that standing orders increase vaccine usage in the hospital. In a study in six community hospitals, standing orders more effectively increased influenza vaccination (40.3%) than did chart reminders (17%) or physician education (7%). A multimodality approach to improving vaccination rates was employed at the Minneapolis Veterans Affairs Medical Center, including standing orders, special influenza clinics, vaccination stations, and outpatient mailings, resulting in a 58% influenza vaccination rate in the standing orders clinic, compared with 30% in a control clinic, a result similar to the findings of the current study. Subsequently, it was shown that standing orders in the inpatient setting could increase vaccination rates to 86.4%. The nurses at the Cook County Hospital emergency department who were given standing orders and monetary incentives to improve influenza vaccine usage raised vaccination rates to 65.9%. Even though difficulties with growing and processing the influenza A (H3N2) vaccine strain delayed the distribution of influenza vaccine in 2001, the current study showed that physicians who used standing orders were able to maintain high usage of influenza immunization, whereas physicians who did not use standing orders lost opportunities to provide influenza protection. In this case, standing orders provided the needed system to encourage influenza vaccination despite the delay in vaccine distribution that appeared to serve as a barrier to physicians who did not use standing orders.

This study had several limitations. A retrospective review, which is not as strong as a prospective randomized

Table 1. Age and Sex of Persons Aged 65 and Older Immunized with Influenza Virus Vaccine

<table>
<thead>
<tr>
<th>Year</th>
<th>n</th>
<th>Mean Age</th>
<th>Female, %</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>169</td>
<td>79</td>
<td>73</td>
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<tr>
<td>2000</td>
<td>201</td>
<td>79</td>
<td>74</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2001</td>
<td>256</td>
<td>79</td>
<td>76</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2002</td>
<td>286</td>
<td>79</td>
<td>79</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

* Two-sided $t$ test.

† Chi-square.

Table 2. Proportion of Persons Aged 65 and Older Immunized with Influenza Virus Vaccine According to Standing Orders

<table>
<thead>
<tr>
<th>Year</th>
<th>n Immunized, %</th>
<th>n Immunized, %</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n Immunized, %</td>
<td>P-value</td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>169 59</td>
<td>216 40</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2000</td>
<td>201 60</td>
<td>187 39</td>
<td>&lt;.001</td>
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<tr>
<td>2001</td>
<td>256 59</td>
<td>218 22</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2002</td>
<td>286 72</td>
<td>263 48</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>All years</td>
<td>912 63</td>
<td>884 38</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

* Chi-square.
trial, was conducted. The billing records were limited as a full resource of influenza vaccine administration in persons aged 65 and older because they could not account for patients who may have received the vaccine in another location, such as the local health department. This may have lead to falsely low rates of immunization in both groups. Because billing records were used, additional confounding factors such as patient refusal of the vaccine or egg allergy were not taken into consideration. Cost of the vaccine was not a concern because Medicare pays all costs for seniors.

Although the study group of patients was sufficiently large to demonstrate a significant difference, the number of physicians in the study was small and may have contributed to the differences in patient demographics. Both physicians in the standing orders group were women, and one physician in the no standing orders group was a man. When the proportion of female patients in each physician’s practice was calculated, the three female physicians’ practices consisted of three-quarters women, compared with the male physician, whose practice was evenly divided between female and male patients. Additionally, there was one nurse for the standing orders physicians and two nurses for the no standing orders physicians. This may have introduced a bias into the study results if, for example, one nurse was more or less proactive about giving influenza vaccine in spite of the presence or absence of standing orders.

The Advisory Committee on Immunization Practices recommends using standing orders for influenza immunization in inpatient and ambulatory settings. A nationwide survey of physician practices revealed that only 30% of physicians use standing orders in their ambulatory practice. Recently, the Centers for Medicare and Medicaid Services removed the physician signature requirement for the administration of influenza and pneumococcal vaccines to Medicare and Medicaid patients in hospitals, long-term care facilities, and home health agencies. The removal of this barrier to the use of standing orders in these settings facilitates increased usage of standing orders for administration of influenza vaccine. Standing orders do not raise costs and could easily be instituted in ambulatory care practices. Influenza vaccine represents an important prevention modality that demands widespread implementation, and standing orders can increase its usage.

REFERENCES
