The Effect of a Combined Influenza/Pneumococcal Immunization Reminder Letter


Background: The effect of a combined influenza and pneumococcal immunization reminder letter on increasing influenza and pneumococcal immunization rates, and the timeliness of receiving immunizations after receipt of a reminder letter, have not been examined. This study addresses these issues using a sample of new Medicare beneficiaries residing in Hawaii.

Methods: Newly enrolled Medicare beneficiaries in Hawaii from 25 September 1995 through 31 August 1996 were randomly assigned to one of three groups: Group 1, no letter (n=2144); Group 2, influenza immunization reminder letter only (n=2213); or Group 3, pneumococcal and influenza immunization reminder letter (n=2171). Health Care Financing Administration claims data were compared among groups.

Results: In Group 3, the influenza immunization rate increased 3.8 percentage points (n=87; p=0.017) compared with Group 1. The Group 3 pneumococcal immunization rate increased 3.5 percentage points (n=78; p<0.001) compared to Group 1 and 4.0 percentage points (n=86; p<0.001) compared to Group 2. Sixty-six beneficiaries in Group 3 received simultaneous pneumococcal and influenza immunizations, a significant difference compared to Group 1 or Group 2. Increases in immunizations were observed immediately following the reminder letters and the effect persisted for 5 to 7 weeks.

Conclusions: The combination letter increased both influenza and pneumococcal immunization rates and the simultaneous administration of immunizations without detrimental effect to influenza immunization rates. A combined reminder letter is inexpensive and recommended as part of a multicomponent campaign for adult immunization.


Introduction

The Advisory Committee on Immunization Practices recommends pneumococcal immunizations for all people aged ≥65 years and influenza immunization for all people aged ≥50 years.1,2 National health objectives for 2010 include immunizing at least 90% of people at risk for influenza and pneumococcal disease, including those aged ≥65 years.3 In 1997, the Centers for Disease Control and Prevention (CDC)4 reported that only 52% of people aged ≥65 years in Hawaii (and 45% nationwide) had ever received pneumococcal immunizations. The CDC4 also reported that 71% of people aged ≥65 years in Hawaii (and 66% nationwide) received influenza immunization in the preceding year (1996).

Reminder systems have been effective in increasing influenza immunization rates in various healthcare settings,5–11 and in the elderly population.12–14 Reminder letters to community residents have also been shown to be effective in increasing pneumococcal immunization rates.5,12 However, the effect of a combined influenza and pneumococcal immunization reminder letter on increasing influenza and pneumococcal immunization rates, and the timeliness of receiving immunizations after receipt of a reminder letter, have not been examined. This study attempts to address these issues using a sample of new Medicare beneficiaries residing in Hawaii.

Methods

Using the Health Care Financing Administration (HCFA) Enrollment Database, a total of 9052 Medicare beneficia-
ries residing in Hawaii who were newly enrolled for the period of 25 September 1995 through 31 August 1996 were selected for the study. Beneficiaries were randomized into three groups:

- Group 1 served as a control group with no immunization letter sent;
- Group 2 was sent a letter encouraging recipients to take advantage of their new Medicare benefits to receive influenza immunization; and
- Group 3 was sent a letter encouraging them to take advantage of their new Medicare benefits to receive influenza and pneumococcal immunizations.

Beneficiaries were excluded from the analysis if: (1) they were deceased or not residing in Hawaii prior to 1 January 1997 (n=58); (2) they were enrolled in a managed care plan prior to 1 January 1997 (n=1449; individual immunization data were not available for this population); or (3) they had a claims record indicating that they had received an influenza and/or pneumococcal immunization (n=1028) between 1 January 1996 to 25 September 1996 (i.e., before the reminder letter mail-out).

The study population after exclusions for Group 1 was 2144; Group 2 was 2213; and Group 3 was 2171.

The immunization reminder letters were written on State of Hawaii Department of Health letterhead and signed by the state epidemiologist. The one-page influenza immunization reminder letter was formatted in an easy-to-read, 14-point font with two prominent bullets: “Have you had your FLU shot this year?” and “Medicare covers FLU shots!” The reminder letter for pneumococcal and influenza immunizations was similar with three prominent bullets: “Have you had your FLU shot this year?”; “Be sure to get your PNEUMONIA shot too!”; and “Medicare covers FLU and PNEUMONIA shots!” Reminder letters for Group 2 and Group 3 were mailed on 26 September 1996.

HCFA claims data for the period 26 September 1996 through 30 December 1996 were reviewed, and encounters for influenza and pneumococcal immunization were extracted. The total number of nonduplicated HCFA immunization claims records for the entire study cohort for influenza and pneumococcal immunizations were 1259 and 274, respectively. Differences among the three groups in the proportion of each group receiving immunizations were analyzed for statistical significance using $3 \times 2$ and $2 \times 2$ chi-square tests with mid-P confidence intervals calculated using Epi Info version 6.04b15; the mean number of days between the mail-out and immunization was examined between groups using analysis of variance and Kruskal–Wallis H methods.

During the study period, the State of Hawaii Department of Health conducted routine promotional activities for influenza immunization, including press releases, immunization clinics held at pharmacies and retail stores, and health education at a large annual senior fair. In addition, pneumococcal education kits produced by the National Institute on Aging were mailed to physicians. These activities would be expected to affect members of the different study groups equally because of randomization.

### Results

The study population was 44% male and 56% female with an estimated median age of 65 years. Using HCFA coding data, the ethnic composition was 25% white, 1% black, 28% Asian, 45% Other, and less than 1% Hispanic, American Indian, or unknown. There were no significant differences in age, gender, ethnicity, or residency by ZIP code among the three groups, or within groups.

Influenza immunization rates differed significantly ($p=0.03; \chi^2 3 \times 2$) between groups. Both Groups 2 and 3, who received letters with influenza immunization information, had moderately higher influenza immunization rates than Group 1 subjects, who received no letter. Group 2 had a 2.7 percentage point ($n=71$) difference ($p=0.023$; 95% confidence interval [CI] = 2.7–3.4) compared with Group 1, while Group 3 had a 3.8 percentage point ($n=87$) difference ($p=0.017$; 95% CI = 3.1–4.6) compared with Group 1. The difference in influenza immunization rates between Group 2 and 3 was not significant.

Pneumococcal immunization rates also differed significantly ($p<0.001, \chi^2 3 \times 2$) between groups. Group 3 subjects, who received pneumococcal and influenza immunization information in their letter, had higher pneumococcal immunization rates than Groups 1 and 2, both of whom received no pneumococcal immunization information. Group 3 had a 3.5 percentage point ($n=78$) difference ($p<0.001$; 95% CI = 2.8–4.3) compared to Group 1, and a 4.0 percentage point ($n=86$)

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### Table 1. Number/percentage of immunizations for study groups, 26 September 1996 through 31 December 1996

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>%</th>
<th>95% CI</th>
<th>$p$ value</th>
<th>n</th>
<th>%</th>
<th>95% CI</th>
<th>$p$ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>367</td>
<td>17.1</td>
<td>15.6–18.8</td>
<td>—</td>
<td>68</td>
<td>3.2</td>
<td>2.5–4.0</td>
<td>—</td>
</tr>
<tr>
<td>2b</td>
<td>438</td>
<td>19.8</td>
<td>18.2–21.5</td>
<td>0.023*</td>
<td>60</td>
<td>2.7</td>
<td>2.1–3.6</td>
<td>—</td>
</tr>
<tr>
<td>3d</td>
<td>454</td>
<td>20.9</td>
<td>19.2–22.7</td>
<td>0.017*</td>
<td>146</td>
<td>6.7</td>
<td>5.7–7.8</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Total</td>
<td>1259</td>
<td>19.3</td>
<td>—</td>
<td>—</td>
<td>274</td>
<td>4.2</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*Group 1 = no letter.
*Group 2 = influenza reminder letter.
*Group 3 = combination reminder letter.
CI, mid-P confidence interval.
difference (p<0.001; 95% CI=3.2–4.9) compared to Group 2 (see Table 1).

The number of people who received simultaneous influenza and pneumococcal immunizations during the study period was significantly different (p<0.001, χ² 3χ22) between groups. Both Groups 1 and 2 had similar rates of simultaneous immunization, 1.6% (n=35) and 1.4% (n=31), respectively. Sixty-six beneficiaries (3.0%) in Group 3 had simultaneous immunizations, a significant difference compared to Groups 1 or 2 (p=0.002 and p<0.001), respectively (see Table 2).

The number of days between the date of the letter mail-out and receipt of influenza and pneumococcal immunizations by group is displayed in Figures 1 and 2, respectively. As Figure 1 indicates, the timing of influenza immunizations was generally similar across all three groups, although a statistically significant difference in the mean number of days between the letter mail-out and influenza immunization was observed between Group 3 (mean=22 days) and Group 1 (mean=26 days) (Table 3). The difference between groups is much more apparent graphically for pneumococcal immunizations. The mean number of days between the mail-out and vaccination was significantly different, however, only between Group 3 (mean=29 days) and Group 1 (mean=34 days) (Table 3).

**Discussion**

In this study, mailing reminder letters for influenza or influenza and pneumococcal immunization to new nonmanaged-care Medicare beneficiaries residing in Hawaii had a modest, but significant impact on improving influenza and pneumococcal immunization levels and increased simultaneous administration of these vaccines. The addition of the pneumococcal immunization message did not appear to detract from the influenza message in the combined reminder letter.

The impact on the influenza immunization rate we observed is similar to that of a reminder letter sent to Medicare beneficiaries residing in Montana and Wyoming in 1994 (net difference of 4.3 percentage points in Montana and 7.4 percentage points in Wyoming). The impact of reminder letters or postcards on influenza immunization rates in other health provider–based interventions among elderly patients has ranged from a difference of 1 to 29.7 percentage points.

**Table 2.** Simultaneous influenza and pneumococcal immunizations by study group, September 26, 1996 through December 31, 1996

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>%</th>
<th>95% CI</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>35</td>
<td>1.6</td>
<td>1.2–2.2</td>
<td>—</td>
</tr>
<tr>
<td>2b</td>
<td>31</td>
<td>1.4</td>
<td>1.0–2.0</td>
<td>—</td>
</tr>
<tr>
<td>3c</td>
<td>66</td>
<td>3.0</td>
<td>2.4–3.8</td>
<td>0.002d</td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*aGroup 1 = no letter.
*bGroup 2 = influenza reminder letter.
*cGroup 3 = combination reminder letter.
*dCompared with Group 1 (p<0.001 compared with Group 2).

CI, mid-P confidence interval.

**Table 3.** Mean time in days to receive immunizations after mail-out of reminder letters for study groups

<table>
<thead>
<tr>
<th>Influenza immunization</th>
<th>Pneumococcal immunization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>Days 95% CI</td>
</tr>
<tr>
<td>1a</td>
<td>26  24.1–29.5</td>
</tr>
<tr>
<td>2b</td>
<td>25  23.4–27.2</td>
</tr>
<tr>
<td>3c</td>
<td>22  20.7–23.9</td>
</tr>
</tbody>
</table>

*aGroup 1 = no letter.
*bGroup 2 = influenza reminder letter.
*cGroup 3 = combination reminder letter.
*dCompared with Group 1 (Kruskal–Wallis one-way analysis of variance).
*eCompared with Group 2 (Kruskal–Wallis one-way analysis of variance).

CI, mid-P confidence interval.
The quantitative effect of a combined reminder letter was relatively modest with a net increase of 87 (3.8 percentage points difference) influenza immunizations and 78 (3.5 percentage points difference) pneumococcal immunizations compared with no letter. Pooling the three study groups, the overall immunization rate for influenza was 18% and only 4% received a pneumococcal immunization. Adding the beneficiaries that we excluded because they had received immunizations in the 9-month period preceding the reminder letters (n=1028) increased the overall immunization rates to 29% and 6% for influenza and pneumococcal immunizations, respectively. This figure is similar to 1996 data reported for all nonmanaged-care Medicare beneficiaries in Hawaii aged 65 to 74 years, where the annual rate for influenza immunization was 42.8%, and 6.3% for an initial pneumococcal immunization.17

We found little difference among all three groups with regard to the timing of influenza immunizations (Figure 1). This is in contrast to the pattern of pneumococcal immunizations we observed—only Group 3 (the combined reminder letter group) had a distinguishable peak in immunizations (Figure 2). Perhaps this is not unexpected, given that the “background” level of promotional efforts afforded each of these immunizations is quite different. Annual influenza immunization campaigns are well established and already a priority for providers and third-party payers. As a consequence, the target population is generally knowledgeable on the need to receive annual influenza immunizations. A certain percentage of all groups would therefore be expected to seek immunization at the beginning of the influenza season, and the reminder letter appears to encourage slightly more individuals to do so. By comparison, pneumococcal immunization is not as widely promoted among adult healthcare providers, and the target population may not be as knowledgeable on the need to be immunized. Our combined letter mail-out to Group 3 was scheduled to coincide with the start of the annual influenza campaign and emphasized that patients could receive both vaccines at the same visit. It is not surprising then that this group had a significantly higher rate of simultaneous immunization compared to other groups and that the prominent spike in pneumococcal immunizations observed in Group 3 temporally reflected increased influenza immunizations within that group as well. Overall, the combined influenza/pneumococcal letter appears to have resulted in increased administration of pneumococcal immunizations within Group 3 for up to 5 to 7 weeks following the mail-out.

A limitation of the study is that Medicare claims data do not capture all influenza or pneumococcal immunizations. We excluded managed care members because individual immunization data were not available. In addition, although they are permitted to do so, public health clinics, private organizations, health fairs, and some hospitals sometimes may not bill Medicare for immunizations provided to Medicare beneficiaries. Consequently, these immunizations would not be counted. Because the participants were randomly assigned to the study groups, incomplete capture of claims data should have affected all groups equally and is, therefore, not likely to be a source of bias in our study.

Hawaii’s population is generally known for its unique ethnic diversity. Whether this limits the ability to generalize our findings to other populations on the mainland is a concern. We believe, however, that the similarities found among newly enrolled Medicare beneficiaries in Hawaii and those elsewhere in the United States are substantial. Therefore, we expect the findings of this study to be relevant to other populations of newly enrolled Medicare beneficiaries.

The use of combined reminder letters has potential cost savings that require further evaluation. In our project, private contractor costs for labor, materials, and mailing a reminder letter were approximately $0.36 per reminder letter. Extrapolating this figure and the findings from the assessment to the entire study population (N=6528) would cost $2350 and should result in a net increase of approximately 248 influenza and 228 pneumococcal immunizations potentially attributable to a combined reminder letter. This expense is small compared to the cost savings provided by influenza and pneumococcal immunizations.

In a large health maintenance organization study, direct savings per year averaged $73 per person immunized with influenza vaccine.18 Using this figure is a rough approximation of the cost savings that might be realized among our study population. Thus, 248 additional influenza immunizations at $73 saved per person would result in an estimated cost savings of $18,104. For people aged ≥65 years, pneumococcal immunization has been reported to save $8.27 per person immunized in a multisite study19 (these figures include vaccine and administration costs). If applied to our study, 228 additional pneumococcal immunizations at $8.27 saved per person would result in approximately $1886 in cost savings. Combining the above cost savings estimates ($19,990) and deducting the cost of the mail-out ($2350) indicates that $17,640 in healthcare expenses might be saved if the mail-out were sent to all new beneficiaries in our study. Using a modest figure of $8.27 saved per pneumococcal immunization, the project would not have been cost effective for pneumococcal immunizations alone.

Client reminder/recall systems using bulk-mail, immunization reminder letters have been shown to improve vaccination coverage in adults in multiple populations,20 and the Task Force on Community Preventive Services strongly recommends their use.21 In our population, using bulk-mailed reminder letters with a combined message promoting influenza and pneumococcal
immunization was inexpensive and significantly increased both influenza and pneumococcal immunization rates and the simultaneous administration of immunizations. Adding a pneumococcal promotional message to influenza materials did not result in a detrimental effect on influenza immunization rates. The combined reminder letter is one component of an effective adult immunization campaign that may also include provider reminders, provider and public education, standing orders, and expanded clinic hours or access.21

Shelli Beaver, HCFA epidemiologist, assisted in the data analysis. The Mountain-Pacific Quality Health Foundation assisted in the activities of this project.

References