

## Effect of Repeated Annual Reminder Letters on Influenza Immunization Among Elderly Patients

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Since 1975 at least 14 studies have evaluated mailed reminders as a means of increasing influenza vaccine utilization among the elderly and other high-risk groups.<sup>1-15</sup> They include six randomized controlled trials,<sup>1-6</sup> one cohort study,<sup>7</sup> two before-after studies,<sup>8-10</sup> and five descriptive studies.<sup>11-15</sup>

Of the nine controlled studies,<sup>1-10</sup> all but two randomized controlled trials<sup>4,6</sup> and one before-after study<sup>10</sup> showed a clinically and statistically significant effect of mailed reminders on the influenza immunization rate. In one negative randomized controlled trial,<sup>4</sup> the control group vaccination rate was unusually high (54%). In the second negative randomized controlled trial (published as a letter to the editor),<sup>6</sup> the intervention appears to have been weak, consisting simply of the message "ask your doctor for a flu shot if you did not get one this fall" printed on routine preappointment postcard reminders.

The single negative before-after study<sup>10</sup> was seriously flawed with respect to outcome assessment in that vaccination before and after intervention was measured differently. This study is the only one in which the effect of repeated mailed reminders was examined. During a 3-year period in a family medicine teaching center and 2 years in a private family practice, there appeared to be no upward trend in immunization in the teaching center and a small (and not statistically significant) increase from 26.1% to 31.7% in the private practice setting.

In summary, although the short-term effectiveness of mailed reminders seems well established (at least when the baseline level of immunization is less than 35%), the effect of repeated annual reminders is unclear. We undertook the present study in order to address this uncertainty.

### Methods

The study setting was a university-affiliated, Canadian family medicine center at which influenza vaccine reminder letters have been in use since the 1982 to 1983 influenza season. The center's clinical services are funded on a capitation basis by the Ontario Ministry of Health. Influenza immunization is available to seniors free of charge.

In September 1982, reminder letters were sent for the first time from physicians to their noninstitutionalized patients aged 65 years and older encouraging influenza vaccination and inviting them to attend one of a series of drop-in influenza vaccination clinics. A 75% systematic sample of nonattenders at the vaccination clinics was subsequently contacted by telephone and invited to attend a second series of clinics. Among elderly, noninstitutionalized, nonhousebound patients, the vaccination rate rose from a level of 17% for the 1981 to 1982 influenza season to 43% for the 1982 to 1983 influenza season following the reminder letters, and to 52% after telephone follow-up of letter nonresponders.<sup>8</sup> In subsequent years annual mailed reminders and drop-in vaccination clinics have been continued without telephone follow-up to nonresponders.

To assess the effect of repeated reminders on influenza immunization levels, we determined the proportion of noninstitutionalized patients aged 65 years or older who were vaccinated during the 1987 to 1988 influenza season after reminders had been in use for 6 years. Reminder letters were not sent to patients known by the reception or nursing staff to have left the practice, to be terminally ill, or to reside in a long-term care institution. Influenza vaccination forms were completed for patients immunized at the vaccination clinics or in the course of office visits made for other reasons.

In the spring of 1988, the charts of all patients who had been sent a reminder letter but had not been immunized according to the influenza vaccination forms were

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Table 1. Influenza Immunization During the 1987 to 1988 Influenza Season by Number of Annual Reminders

| Number of Reminders* | Vaccination No. (%) |
|----------------------|---------------------|
| 1                    | 32/76 (42.1)        |
| 2                    | 34/66 (51.5)        |
| 3                    | 27/50 (54.0)        |
| 4                    | 23/36 (63.9)        |
| 5                    | 23/49 (46.9)        |
| 6                    | 67/117 (57.3)       |

\*Among subjects who have received 6 annual reminders, the first mailed reminder (1982-83) was supplemented by a telephone reminder for a 75% systematic sample of those who failed to respond (see Methods).

Overall  $\chi^2$  (5 df) = 6.9,  $P = .23$ ; component due to linear trend:  $\chi^2 = 2.9$  (1 df),  $P = .09$ .

reviewed. The objectives of this review were to look for any documentation of influenza vaccination that had not been recorded on an influenza vaccination form and to identify ineligible patients who had been sent a reminder letter. If there was uncertainty about whether a patient had remained in the practice during the vaccination period, the patient was telephoned and asked. Patients who could not be reached were counted as eligible.

Based on age and date of joining the practice, we determined the number of annual reminders received by each eligible subject. We then examined the relationship between number of annual reminders received and influenza vaccinations given during the 1987 to 1988 influenza season. Statistical significance was assessed using an  $\alpha$  of 0.05. In a logistic regression analysis, age was found not to be a significant confounder and was therefore ignored in subsequent analyses.

## Results

Following exclusion of patients who were known to be ineligible, the target population for influenza vaccination for the 1987 to 1988 influenza season was 394. Of 448 letters sent, 46 were mailed to ineligible subjects (28 were in nursing homes, nine had left the practice before September 30, 1987, five were less than 65 years of age, four were hospitalized during October 1987, one was terminally ill, and three had died). Eight letters were returned as undeliverable.

Two hundred six eligible subjects (52.3%) were vaccinated. This compares with a vaccination rate of 51.7% during the 1982 to 1983 influenza season following the initial mailed reminder and telephone follow-up of a 75% systematic sample of nonresponders.

The relationship between number of annual reminders and likelihood of vaccination is displayed in Table 1. Differences between groups were not statistically significant [overall  $\chi^2$  (5 df) = 6.9,  $P = .23$ ]. No linear trend

toward a higher immunization rate with an increasing number of reminders was demonstrated [ $\chi^2$  for linear trend = 2.9 (1 df),  $P = .09$ ].

## Discussion

Our results indicate distinct limitations of mailed influenza vaccine reminders. Despite the use of annual reminders over a 6-year period, just over half of the non-institutionalized elderly patients in this group practice were vaccinated during the 1987 to 1988 influenza season. Based on our analysis of the relationship between the number of reminders and the likelihood of vaccination, repeated annual reminders appear to produce either no cumulative effect or, at most, a small cumulative effect over time. Mailed reminders are, in themselves, clearly insufficient to produce satisfactory vaccination levels. Alternative or additional interventions will need to be developed in order to achieve significantly higher levels of vaccine acceptance.

Our results do not lead us to recommend the abandonment of annual reminders, particularly in light of the findings by McDowell and colleagues.<sup>16</sup> In their study of elderly patients who received one of three types of influenza vaccine reminders on a one-time basis, the vaccination rate rose to 45.5% from a baseline level of 11.1% and then fell to 19.0% 1 year later in the absence of repeat reminders.

Mailed reminders are of undoubted value in the promotion of influenza vaccination.<sup>1-3,5,7-9</sup> However, they should be viewed as but one potential element in an overall strategy designed to deal with current low levels of influenza immunization among elderly North Americans.<sup>17-19</sup>

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