

Enhancing Influenza Immunization

Postcard and Telephone Reminders and the Challenge of Immunization Site Shift

Rick D. Kellerman, MD; Charles T. Allred, MD; Larry E. Frisch, MD, MPH

Objective: To determine if postcard and telephone reminders increased the rate of influenza immunization of Medicare beneficiaries.

Design: Before and after trial (postcard reminders) with systematically allocated control group (telephone reminder intervention).

Setting: A semirural family practice residency program.

Patients and Other Participants: All 475 noninstitutionalized persons older than 65 years who had received at least 1 office service in the previous 2 years.

Intervention: In September 1996, each of 475 patients received a postcard urging prompt influenza immunization. Those not responding within 1 month were systematically allocated either to a group receiving further telephone contact or to a control group. At the time of telephone contact, any offered information about influenza immunization received outside the Smoky Hill Family Practice Center, Salina, Kan, was recorded.

Main Outcome Measures: We measured the percent-

age of change in practice-administered influenza immunizations compared with the baseline rate of the preceding 2 years; the difference in immunization rates between the telephone intervention group and controls; and the number of patients contacted by telephone who reported receiving influenza immunization at a site other than the Family Practice Center.

Results: Twenty-eight percent of patients who received a postcard obtained office influenza immunizations within 1 month, but no additional immunizations could be attributed to the telephone intervention. Thirty-five percent of patients contacted by telephone reported receiving influenza immunization at a site other than the Family Practice Center.

Conclusions: The postcard intervention was associated with a significant increase in the office immunization rate. This increase may have been confounded by "site shift" in which individuals came to the office for an immunization that they might otherwise have received at other community sites.

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From the Department of Family and Community Medicine, University of Kansas School of Medicine, Wichita (Drs Kellerman and Frisch), and the Smoky Hill Family Practice Center, Salina, Kan (Dr Allred).

EPIDEMIC INFLUENZA is a major health problem in the United States, resulting in as many as 200 000 hospitalizations yearly, many thousands of deaths, and many millions of dollars of health care expenditures. The morbidity and mortality attributable to influenza is not randomly distributed but occurs primarily among definable high-risk groups of individuals, primarily older adults. Depending on variations in influenza severity, 18 000 to 36 000 influenza-related deaths occur each year among persons aged 65 years or older.¹ The incidence and severity of influenza outbreaks can be greatly modified by immunization, which, particularly when targeted to older persons and certain other high-risk groups, offers an important opportunity to reduce costs, morbidity, and mortality. Govaert et al² demonstrated a reduction greater

than 50% in clinical and serological influenza cases in immunized persons older than 60 years. Nichol et al³ reported a 50% reduction in all-cause mortality for those immunized as well as 30% to 40% reductions in hospital admissions for pneumonia, respiratory infection, and congestive heart failure. Depending on risk group and year studied, Nichol et al⁴ found that each influenza immunization could save up to \$171 in foregone health care costs. Other estimates suggest that immunization can result in a 70% reduction in hospitalization and an 85% reduction in deaths among older persons residing in the community.

While such potential benefits from immunization have been recognized for many years, until the last decade, influenza immunization rates have remained low. As recently as 1988, only 28% of older persons in the United States had docu-

SUBJECTS, MATERIALS, AND METHODS

The Smoky Hill Family Practice Center is a residency teaching site affiliated with the University of Kansas School of Medicine, Wichita, and located in Salina, approximately 100 miles from the nearest major metropolitan area. The practice provides health care to approximately 5000 individuals and almost 500 older patients. With the assistance of the Kansas Foundation for Medical Care, Topeka, in 1996, the Family Practice Center initiated an influenza immunization project designed to increase immunization rates among the practice's older patients.

The project began by identifying all active patients of the practice aged 65 and older. Active patients were defined as those who had received at least 1 office service within the preceding 2 years, were noninstitutionalized, and were living in the community. Patients living in nursing homes were excluded from the study. In the third week of September 1996, each of these individuals was sent a postcard describing the availability of influenza immunizations administered at the Smoky Hill Family Practice Center. Patients were strongly encouraged to obtain immunization for the current influenza season and to consult with Family Practice Center staff if they had questions. During the influenza season, as in previous years, established patients could receive an immunization on a walk-in basis without a physician appointment. The availability of this service was emphasized in the postcard and during the telephone intervention described subsequently.

The effectiveness of this postcard reminder was evaluated after 1 month. Half of those who had not received an influenza immunization at the Family Practice Center within 1 month after the postcard intervention were reminded by telephone intervention of the need and availability of

influenza immunization. Whether or not to telephone a nonimmunized patient was determined in the following systematic manner: (1) All patients were alphabetized by last name. (2) Patients who shared the same last name and address were regarded as members of a single household. (3) Based solely on the alphabetized list, alternating households were selected to receive or not to receive a telephone intervention. (4) The 1-month post-postcard immunization status of all older patients of the Family Practice Center was assessed, and all nonimmunized persons from 1 of 2 groups received a telephone intervention. The intervention consisted of a maximum of 2 telephone calls, the first occurring as closely as possible to 1 month following the postcard intervention; the second, after several days if the first telephone intervention was unsuccessful. A telephone intervention was regarded as successful if contact was made with the sought individual, a message was left with another individual, or a message was left on an answering machine. Second calls were not made when a disconnected number was reached or when the individual answering the telephone did not know the person being sought. For the purposes of this study, only immunizations administered at the Family Practice Center were considered in assessing the study's outcome. During the telephone intervention, Family Practice Center staff recorded any patient comments about prior immunization for that season or subsequent intentions for immunization.

While 2 systematically allocated groups were established for the telephone intervention (telephoned and non-telephoned [control] group), the postcard intervention was compared with a cohort based on the 2 previous years of Family Practice Center influenza immunization experience. The immunization rate for persons aged 65 years and older for the preceding 2 years was determined retrospectively, and this was used as an historical baseline against which to compare the results of the 1996 intervention.

mented influenza immunization.⁵ The *Healthy People 2000* objectives set a national immunization rate goal of 60% among Medicare beneficiaries.⁶ By 1993, the first year that Medicare paid for influenza immunization, the rate had risen to 50%.⁵ Subsequently, the rate has continued to increase, and by the end of the 1996 influenza season, the goal of administering influenza immunizations to 60% of Medicare beneficiaries had generally been achieved. Two challenges for coming years are to maintain these hard-won immunization gains and to further increase immunization levels above the 60% threshold.

A number of different local practice-based approaches have been devised to increase immunization rates within individual clinics. We describe the use of a combination of postcards followed by telephone reminders for those remaining unimmunized to increase office influenza immunization rates among older patients of a semirural family practice residency in Kansas.

RESULTS

Four hundred seventy-five older patients were identified within the practice and received postcards sent to their most recent known address. All postcards were

mailed on September 23, 1996, and 1 month later, medical records were examined to see which patients had come to the practice for influenza immunization. At the time of this initial record review, 105 older individuals (22%) had received immunizations at the Family Practice Center. Three hundred seventy did not receive immunizations at the Family Practice Center after the 1-month observation period. Of these, 154 were in households selected to receive up to 2 follow-up telephone reminders. Calls were made to telephone numbers on record for these individuals. As given in the **Table**, 101 (66%) of 154 persons in the telephoned group were successfully contacted. Eighty-five were contacted directly or through messages left "in-person" with another household member, and 16 were contacted by leaving a message on an answering machine. No individual contacted by an answering machine message subsequently came to the center for an influenza immunization. The rate of subsequent immunizations among those contacted directly or through in-person messages was 8.2%, not significantly different from the rate of 8.8% in the nontelephoned group. While speaking with the 85 individuals who apparently had not received immunizations and who were successfully contacted by telephone 1 month after the

Results of Interventions

Intervention	Total No.	Received Immunization, No. (%)
Postcard reminder	475	105 (22)*
Randomized to receive telephone call†	154	11.0 (7.1)
Successful contact made	101	7.0 (6.9)
Direct or "in-person" message	85	7.0 (8.2)
Answering machine message	16	0 (0)
No contact made	53	4.0 (7.5)
Randomized to not receive telephone call†	216	19.0 (8.8)
Total	475	135 (28)

*Within 1 month.

†One month after postcard.

postcard reminder, Family Practice Center staff determined that 30 of these individuals (35%; 95% confidence limits, 30%-41%) reported already having been immunized at another site during the current influenza season.

Of the 216 persons in households assigned to the nontelephoned group, 19 received an influenza immunization at the Family Practice Center more than 1 month after the postcard intervention. When analyzed by the intention to treat, there was no significant statistical difference in immunization rates between the telephoned (7.1%) and nontelephoned group (8.8%).

By the end of 1996, the number of immunizations administered to Medicare beneficiaries in the Family Practice Center during the influenza season was 135, a practice immunization rate of 28%. This 57% increase over the 18% practice rate observed during each of the 2 previous years was statistically significant ($P < .001$).

COMMENT

This study shows that a postcard intervention was temporally associated with a significant increase in influenza immunization rates among Medicare beneficiaries. This improvement might plausibly be attributed to the postcard intervention because others have shown mailed reminders to be comparably effective. For example, Larson et al⁷ reported that a similar mail intervention nearly doubled their immunization rates among older patients. Frank et al⁸ found that a mailed reminder increased immunization rates among uninstitutionalized older Canadians from 17% to 43%. As with our study, Frank et al⁸ used historical control data to show this difference, though in contrast to our findings of no effect, a follow-up telephone intervention to nonresponders increased the immunization rate by an additional 12%. Brimberry⁹ described that either mail or telephone reminders could significantly increase immunization rates in comparison to a nonintervention control group. His study suggested that telephone intervention was somewhat more effective than mail intervention when contact was effectively made, but no attempt was made to use the 2 techniques together in sequence.

In 1992, Moran et al¹⁰ were unable to demonstrate any effect of mailed reminders, but did find subse-

quently that attractively illustrated brochures had a modest effect in increasing immunization compliance.¹¹ In 1996, Berry and Murthy¹² were able to increase their immunization rate significantly by a combination of mailed reminders, improved access to care, and reminders to providers.

Consequently, our finding that immunization rates increased following a postcard mailing was consistent with nearly all previously reported studies using similar methods. The failure to demonstrate significant further increase in immunization rates with a subsequent telephone intervention is inconsistent with the experience of at least some other investigators. We do not believe that bias was introduced by the nonrandom systematic selection of patients into the telephoned and nontelephoned groups, but we cannot exclude this possibility. Arguably the most striking result of our study is that while we could show an immunization rate 57% higher than that of previous years, the immunization rate of Medicare beneficiaries of the Family Practice Center remained surprisingly low—28%—far below the *Healthy People 2000* goal of 60%.⁶ While 1996 Medicare rates were not available from the Health Care Financing Administration (HCFA) at the time of this writing, the 1994 and 1995 rates for Saline County, Kan, (where most of the practice's population lives) were 53.5% and 56.1%, respectively (HCFA, oral communication, November 1998).

Clearly, the immunization rates for our practice, while increasing dramatically following the postcard intervention, remained well below those documented 1 and 2 years previously for Saline County as a whole. There are at least 3 alternative explanations for the low immunization rate among Medicare beneficiaries of the Family Practice Center. First, it is possible that the HCFA rates for the county are somehow incorrect. Second, as a residency program, our practice may be demographically unrepresentative of the county as a whole and hence actually have a lower rate. Third, Family Practice Center patients may have received their influenza immunizations through other public or private sources. Although we lacked the resources to independently audit HCFA records, we have no reason to believe that Medicare error explains the large differences seen between practice and county rates. There may be demographically defined groups of older individuals who remain disproportionately unimmunized against influenza. For example, HCFA influenza immunization data consistently show much lower rates for African Americans both nationally and in Saline County. While, as a resident teaching site, the Family Practice Center patient mix may differ from that of the county as a whole, demographic factors alone are unlikely to be responsible for the large observed difference between practice and county immunization rates. This leaves the remaining alternative as the most likely explanation: practice enrollees may have commonly received their immunizations from nonpractice community sources. Our study allows us to estimate that most of the practice immunization shortfall is accounted for by this mechanism.

As noted previously, 30 of 85 individuals who apparently did not receive an immunization (35%; 95% confidence limits, 30%-41%) reported during telephone in-

terviews that they had already been immunized at another site during the current influenza season. If this self-reported percentage of out-of-practice immunizations held for the entire practice, then we can estimate that before the end of October, between 79 and 106 additional individuals had received influenza immunizations from non-Family Practice Center community resources. Since the window for immunization extended well after October, the total number of Family Practice Center patients who actually received an influenza immunization is likely somewhat higher than this number. Nineteen (9%) of 216 individuals in the nontelephoned group received immunizations after the end of October at the Family Practice Center.

IF WE ASSUME that the percentage of latecomers was comparable among those who received their immunizations within and outside of the practice, we can derive a final full-season estimate for out-of-practice immunizations by increasing the preceding estimate of individuals (79-106) by 9%. The resulting estimate is that during the 1996 influenza season, between 86 and 116 older Family Practice Center patients (18%-24%) received influenza immunization outside of the practice in addition to the 135 influenza immunizations administered to Medicare beneficiaries actually recorded in the practice. Adding together the observed immunizations with this estimate yields a best guess of between 221 (47%) and 251 (53%) total influenza immunizations among older practice patients. Considering that nursing home and institutionalized older patients were excluded from this study, these estimates are quite close to the 53% to 56% rates in Saline County actually reported by HCFA in 1994 and 1995, respectively.

Our estimate that nearly one fourth of Family Practice Center patients received influenza immunizations outside of the practice raises an important concern for our study: Does the observed 57% increase in the practice immunization rate represent an actual increase in the number of persons immunized, or does it merely document that in 1996 some persons (presumably in response to the postcard intervention) chose to receive immunizations at the Family Practice Center that they otherwise would have received elsewhere in the community? Unfortunately, we have no way to answer this question from the study's data or from the work of others, nearly all of whom have looked only at immunizations performed at the study site.

We are unaware of other studies using mailed reminders that have attempted to determine by interview, as did we, whether patients had received immunizations outside of the study site. Buffington et al¹³ did address the issue of immunizations given at multiple sites. In a study comparing postcard reminders with an intervention targeted to individual physicians, these authors were able to track immunizations given in each of 13 associated practices as well as at county health department clinics. While Buffington et al¹³ could not assess immunizations given at pharmacies, senior centers, shopping malls, and health fairs, all sites in which older per-

sons may today receive immunizations, they did at least acknowledge that some patients choose immunization sites other than physicians' offices. Satterthwaite's¹⁴ study of mailed reminders acknowledged a potential source of bias from failing to detect immunizations given at sites other than the one explicitly studied, but neither Satterthwaite¹⁴ nor Buffington et al¹³ considered whether their observed effects might represent a site shift rather than a net increase in the number of persons actually immunized. This question may have been less relevant when immunizations were given only in physicians' offices, but with increasingly widespread immunization availability, the question of site shift has become more important in interpreting the results of studies such as ours. Our awareness of site shift came during the analysis of comments recorded during reminder calls. Prior to the onset of the study, we did not fully recognize the importance of site shift for understanding the community dynamics of influenza immunization campaigns.

Another important consideration in interpreting the results of our study is the degree to which it is possible to confidently attribute the observed immunization rate increase to the postcard intervention. Whereas it is likely that in the 1980s and early 1990s many older people may have remained unaware of the important health benefits of immunization, by 1996, public health campaigns had become far more widespread. Our study took place during the fall of 1996, a season in which public education programs were particularly widely used. For example, during this year, Medicare sent information about the desirability of receiving an influenza immunization to all beneficiaries and included a note about immunization with each of 65 million "Explanation of Medicare Benefits" announcements sent to beneficiaries each month. Immunization-related public service announcements were distributed to multiple media outlets, and posters stressing the desirability of influenza immunization for older persons were placed in banks, churches, and other public places. Even advice columnist Ann Landers was enlisted by HCFA as a trusted source to encourage influenza immunization among her readers. Because of this national effort and a range of physician interventions (such as the one reported here), immunization rates in the Medicare-recipient population rose nationally between 1995 and 1997, reaching levels higher than 60% in all but 5 states. We were unaware of Medicare's informational plans prior to instituting the study, and given the intensity of Medicare informational efforts, it is difficult to know whether our postcard reminders added anything other than local cost to a major federal immunization campaign.

While the potential for site shift and the intervening variable of a large public campaign make the ultimate significance of our intervention difficult to assess, this study is among the first to emphasize the current highly fragmented environment in which influenza immunizations are now given. Maximizing the number of older individuals who receive influenza immunization is a worthy goal for practice quality improvement and potentially offers major benefits to patients and their insurers (including Medicare) if serious illness and hospitalization are avoided. While 60% was set as the *Healthy*

People 2000 influenza immunization rate goal, population benefits continue to accrue until 100% of the population is immunized.⁶ Currently, fewer than half of our Family Practice Center patients receive their influenza immunizations at the practice. Prior to the study, neither faculty nor residents recognized the degree to which enrolled patients went outside the practice for this service. We suspect that nationally, many patients seek immunizations at sources other than their physicians' offices, and that many of these physicians are similarly incompletely aware of their patients' choices in this matter. Recognition of these patterns of care seeking potentially allows practices to design improved community-based approaches for enhancing immunization levels.

Like many other practices, after 1993 the Family Practice Center did not require an individualized physician order or examination for influenza immunization, and this same relaxation of medical supervision requirements allowed nurses and other health care workers to provide immunizations outside clinics, hospitals, and physicians' offices. As noted earlier, in recent years immunization has been increasingly offered in nontraditional sites, such as pharmacies, shopping malls, supermarkets, and churches. The adoption of Medicare coverage in 1993 also facilitated billing and cost recovery by public health clinics. This diffusion of immunization into the community without a corresponding ability to capture data on who does and does not receive immunizations has a number of important implications, some of which are illustrated by this study.

Without asking patients about their immunization status, physicians and clinics cannot know whether high-risk patients are protected from influenza. The short autumn immunization window puts an immense burden on physician's offices, particularly if, as we found, it proves difficult to contact patients and if in contacting them it is discovered that a high proportion have received immunizations at another facility. Under these circumstances, a good deal of effort goes into discovering information that does not change clinic practice and hence may be seen as wasted. If the goal is truly to ensure high immunization rates for high-risk individuals within an immunizing system that is fragmented and decentralized, then a community-wide database linking all immunization providers may be the only effective means to this end. Identified individuals who fail to receive an immunization by any one of many immunization providers by a defined date would receive a personalized intervention by telephone or perhaps a home visit. Based on Hutchinson and Norman's¹⁵ observation that persons who do not receive an immunization in a prior year are at a higher risk for continuing to be nonrecipients, interventions could reasonably be targeted to those who were known to have been unimmunized the previous year.

This study began as a simple practice-based effort to increase immunization adherence among Medicare beneficiaries eligible for influenza vaccination. While apparently successful, the study was most valuable in (1) demonstrating that a significant percentage of older patients of the Family Practice Center are currently

immunized outside the practice, (2) illustrating how an unanticipated federal informational campaign can be an important intervening variable in assessing the effectiveness of an information-based local campaign, and (3) illustrating why successful programs to increase influenza immunization rates for Medicare beneficiaries beyond the current 60% goal may require the establishment and maintenance of community health database networks storing specific information on individuals' immunization status.

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Corresponding author: Rick D. Kellerman, MD, Department of Family and Community Medicine, The University of Kansas School of Medicine—Wichita, 1010 N Kansas, Wichita, KS 67214-3199.

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