

Influenza vaccination in the elderly:

1. Determinants of acceptance

John W. Frank,* MD, CCFP, MSc, FRCPC
Margaret Henderson,† Reg N, NP
Lorraine McMurray,† Reg N, NP

In the autumn of 1982 routine annual influenza vaccination was offered, by reminder letters and follow-up telephone calls, to 273 independent elderly individuals registered at a community health clinic in Hamilton, Ont. The demographic and geographic characteristics and the health beliefs of those who either accepted or did not accept the vaccine were compared. Among those who received reminder letters there were no significant differences in the rates of vaccine acceptance according to age, sex, household composition or ease of access to the clinic. The patients who reported having previously experienced side effects from the vaccine and perceived a lack of efficacy of the vaccine were more likely not to accept it this time. Both a lack of effort by health care providers (to promote vaccination) and patient behaviour appeared to contribute to pre-existing low levels of influenza vaccination coverage. Although physicians' efforts to inform patients about the vaccination clinics resulted in a tripling of the overall rate of acceptance of the vaccine, there remained a "hard core" of almost half the patients who were unwilling to receive the vaccine, apparently because they perceived its risks to outweigh its benefits.

En automne 1982 on a communiqué, par courrier puis par téléphone, avec 273 personnes âgées indépendantes qui étaient inscrites à un centre de soins communautaire de Hamilton (Ont.) pour leur proposer un vaccin grippal annuel. On a ensuite établi un profil des personnes ayant accepté et décliné l'offre, selon des critères démographiques et géographiques ainsi que selon leur attitude à l'égard des soins de santé. Au sein de l'échantillon

From *the Department of Preventive Medicine and Biostatistics, University of Toronto, and †the First Place Community Health Centre, Department of Family Medicine, McMaster University, Hamilton, Ont.

Presented in part Dec. 1, 1983 at the Conjoint Meeting on Infectious Diseases, Montreal

Reprint requests to: Dr. John W. Frank, Department of Preventive Medicine and Biostatistics, University of Toronto, Toronto, Ont. M5S 1A8

présenti uniquement par courrier, aucune variation n'est apparue dans les taux d'acceptation selon l'âge, le sexe, la composition du ménage et l'éloignement du domicile par rapport à la clinique. Les refus paraissent liés à la notion d'effets secondaires éprouvés lors d'une vaccination antérieure ou au manque de confiance dans l'efficacité du vaccin. Le manque de zèle des personnes chargées de la vaccination et l'attitude des sujets expliquent au moins en partie le faible taux de vaccination observé antérieurement. La campagne d'information menée par les médecins traitants a permis de tripler le taux d'acceptation du vaccin grippal, mais près de la moitié des personnes pressenties ont persisté dans leur refus, apparemment parce qu'elles jugeaient les inconvénients plus grands que les avantages.

Although routine annual influenza vaccination for the elderly has been recommended in North America for many years,¹ usually less than 20% of this population, at least in the United States, are vaccinated.^{2,3} One exception was the 1976 "swine flu" vaccination campaign, during which about 25% of the entire US population and perhaps 40% of high-risk individuals — the elderly and the chronically ill — were vaccinated.⁴⁻⁷ Only a few studies have examined the use of mailed reminders for routine annual vaccine delivery in primary care.^{8,9}

As well, virtually all the previous studies of the determinants of acceptance of influenza vaccination have been conducted within the American health care system,⁵⁻¹¹ with its multiplicity of public and private health insurance plans, many of which involve payment or copayment by the patients. For example, the cost of influenza vaccine, per se, is not generally covered under Medicare for the elderly. Because economic factors are so important in the United States, research there is unlikely to single out noneconomic factors that limit elderly patients' acceptance of influenza vaccination — for example, their access to and general acceptance of immunization, and the efforts health care providers make to inform the elderly of the need for an injection each year. Such factors are more readily examined in the Canadian setting, where the costs of delivering annual influenza vaccination to the elderly (and, in most provinces, the actual costs of the vaccine) are covered by comprehensive medical care insurance.

This study was designed to assess the factors influencing the decision of elderly persons living independently

in an urban Ontario community to accept routine annual influenza vaccination.*

Methods

Study population

The target population included all of the 273 non-housebound patients aged 65 years and over who were registered at a community clinic centrally located in Hamilton, a large industrial city in southern Ontario. The age distribution of the target population differed from that of the elderly population in Canada in 1981¹² in that there was a somewhat smaller proportion of persons aged 65 to 69 and a larger proportion aged 80 to 89 years in the former. The male:female ratio was 1:2, compared with 1:1.34 for the elderly population in Canada.¹² Of the study population 57.5% lived alone, compared with 21.5% of the elderly in Canada.¹³ These differences reflect the relatively high proportion of older women — mostly widows — who were living alone in subsidized seniors' apartments in the clinic building. One quarter of the entire target group lived in the clinic building, another quarter lived within 10 blocks of the building and the remainder lived farther away but within the city boundaries.

Previous clinic policy

No mailed reminders, telephone calls or other means of increasing annual influenza vaccination coverage had been used in this area previously. About one sixth of the patients indicated that they had received influenza vaccine in the previous year, either because they had specifically requested it or because their physicians had recommended it during an autumn office visit for other reasons.

Study design

In September 1982, just before the usual time for annual influenza vaccination, each patient was sent a reminder letter from his or her physician. This strategy was based on a preliminary assessment that suggested that it was much less costly than the alternative option — a telephone "blitz". The reminder letter informed patients that influenza vaccine would be available from nurse-practitioners at drop-in clinics or 4 half-days over a 2-week period. Drop-in clinics, rather than individualized appointments with physicians, were used to minimize delivery costs. At each of the vaccination sessions the nurse-practitioners interviewed the patients and completed a questionnaire on the patients' demographic characteristics, ease of access to the clinic, previous influenza and vaccination history, and attitudes towards "the flu" and the vaccine.

Of the 273 patients 91 (33%) attended one of the four clinics and were vaccinated. Another 26 patients (9%) were seen at the clinic by a physician, primarily for an

unrelated medical problem, and received the vaccine at that visit. Since almost all of the 26 patients specifically requested the vaccine after reading the reminder letter, they were included in the group of patients who responded to the letter (91). Overall, then, 43% of the 273 patients received the vaccine after they had received a reminder letter, compared with only 17% in the previous year, when a letter was not sent.

Of the 156 patients who did not respond to the reminder letter 118 (75%) were systematically selected to receive a follow-up telephone call over the subsequent 2-week period. The nurse-practitioners making these calls were instructed not to pressure the patients to accept the vaccination. They merely told the patients that there would be a second series of vaccination clinics and answered queries about the vaccine. During the telephone calls they collected the same information that had been collected during the interviews at the vaccination clinics. Of the 105 patients (89%) who were reached by telephone 24 attended one of the second series of clinics; 23 of them accepted the vaccine. The overall effect of follow-up with a telephone call (had it been offered to all those who had not responded to the letters instead of only 75%) would have been to increase the vaccination coverage from 43% to only about 55%. Thus, the considerable expense entailed by the telephone follow-up did not appear to be justified.

Chi-square analyses were done to compare the rates of response according to demographic characteristics, ease of access to the clinic, influenza and vaccination history, and attitudes towards the vaccine. The 23 patients who did not respond to the letter but did receive vaccine at a clinic after the follow-up telephone call were considered "nonresponders" since it was evident that without the telephone follow-up, which was expensive and time-consuming, they would not have received the vaccine.

Results

There were no statistically significant differences in the response rates by age, sex, household composition or distance of residence from the clinic. However, there were statistically significant differences in response according to vaccination history and attitudes towards the vaccine (Table I). The rates were higher among the patients who had been vaccinated in 1981 and among those who had ever been vaccinated. Although one sixth of all the patients interviewed believed they had had "the flu" the previous winter, there was no association between this history and the response rate.

Of the 109 patients who had ever received the vaccine, the response rate was higher among those who could not recall having had a "reaction". Of the 23 patients who reported a previous reaction, more than two thirds described symptoms more serious than a "sore arm" or other local reactions — usually "flu-like" constitutional symptoms.

When asked whether they believed the vaccine "works" — that is, protects against "the flu" — about half of the responders and two thirds of the nonresponders, 131 patients in all, answered "I don't know". When these patients were grouped with those who felt

*In the next issue of *CMAJ* we assess the cost-effectiveness of using reminder notices and follow-up telephone calls to increase immunization coverage and discuss the economic implications for primary care providers.

that the vaccine does not work, there was a strong association between belief in vaccine efficacy and response. The association persisted when the 131 patients were excluded from the analysis. The patients were also asked whether they had heard negative or positive comments about the vaccine from friends or relatives. About three quarters had heard nothing. Among the 61 patients who had heard comments, the response rate was lower in those who heard predominantly negative comments, such as "It doesn't work" or "It causes reactions".

Discussion

Vaccine efficacy and potential vaccination efficiency

When influenza vaccine is given to the elderly during an epidemic it has been reported to reduce the incidence of disease by 72% (95% confidence interval, 31% to 100%) and the mortality rate by 87% (95% confidence interval, 52% to 100%).¹⁴ However, the ranges of vaccine efficacy found in various studies are wide because of inexact antigenic matching between the vaccine and the

strain of influenza virus prevailing in any given year.¹⁵ Recent observational studies of influenza A outbreaks in nursing homes suggest that, for the vaccine currently distributed in Canada and the United States, the antigenic match is good enough to provide a 40% to 50% reduction in the incidence of disease.^{16,17} In addition, the vaccine appears to have been associated with very few serious side effects since 1976.¹⁸

What would be the efficiency¹⁹ of vaccination against influenza if it were delivered to the entire elderly population? The total burden of morbidity and "premature" mortality attributable to influenza in the elderly is very large. The results of a recent cost-effectiveness study suggested that full vaccination coverage of the elderly in the United States would have produced a gain of 2 million years of healthy life, at quite a reasonable cost, between 1971 and 1978.²⁰ Such calculations lend strong support to long-standing official recommendations for annual influenza vaccination in the elderly.¹

Effectiveness: determinants of coverage

Among the vaccines that are routinely given as part of preventive primary care, influenza vaccine is unique.

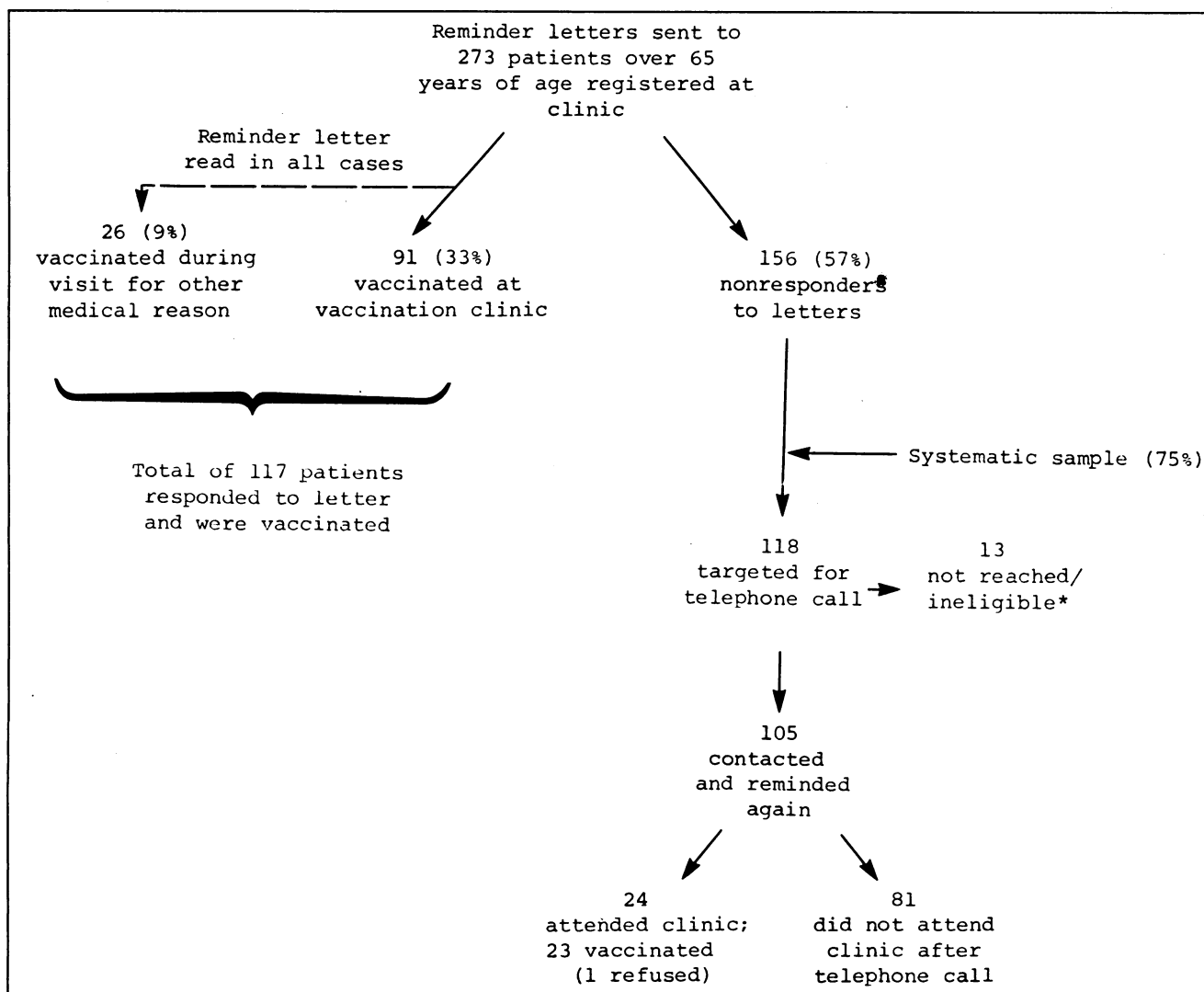


Fig. 1—Design of influenza vaccination program. Of the 13 patients who were ineligible for the remainder of the program (*) 3 were no longer patients of the clinic when they were telephoned.

It is the only biologic agent that must be administered yearly in a particular season (autumn). This requirement puts special demands on primary care providers to inform the target population and deliver the vaccine every year.

Two studies have examined the factors affecting patient acceptance of swine influenza vaccine.^{10,11} The results appear to support the Health Belief Model of patient behaviour.^{21,22} The persons who accepted the vaccine tended to perceive the threat of influenza as more serious, or themselves as more susceptible, and the vaccine as safer and more efficacious than those who did not accept it.

In our study the factors that best explain the unwillingness of some well elderly to be vaccinated also appear to fit the Health Belief Model. In particular, refusal of the vaccine by many patients was associated with a lack of a perceived threat from influenza coupled with a significant perceived risk of vaccine reactions. These findings confirm those of Larson and colleagues,⁹ who used the Health Belief Model to explain annual influenza vaccination coverage by primary care physicians in the United States in 1975 — prior to the swine influenza “scare” and the subsequent publicity surrounding severe side effects (particularly Guillain-Barré syndrome) of the vaccine.

Our results strongly suggest that there were two key constraints on influenza vaccination coverage, and therefore on the effectiveness of vaccination programs,

in an urban population of independent elderly who were fully covered by health insurance. First was the failure to inform the target population annually of its need for the injection — arguably a form of “provider noncompliance”. The use of a reminder letter resulted in more than a tripling of coverage. Second was the lack of acceptance of the vaccine — rather than a lack of access to the vaccination clinics — among half of the target population. Even a combination of a reminder letter and a subsequent telephone call to “no-shows” failed to influence almost half of the target group, who appeared unwilling to receive the vaccine.

There is further indirect evidence in our study that a lack of acceptability of the vaccine is more important than a lack of access to vaccination clinics in determining coverage among the elderly. Even when the 17 housebound elderly patients registered with the clinic were offered delivery of the vaccine “to their door” or a routine home visit by a physician or a nurse-practitioner the rate of acceptance was only 59%. This coverage was not significantly different from the total coverage achieved with both reminder letters and follow-up telephone calls (55%), despite the obvious difference in the ease of access to the vaccination clinic for the two groups.

The attitudes of the housebound patients towards the vaccine — primarily a fear of side effects — seemed to be the major reason for nonacceptance. Ironically, it also appeared that many of these chronically ill patients,

Table I—Associations between elderly patients' experience with and attitudes towards influenza vaccination and their response to a reminder letter

Experience/attitudes	Total no. of patients* (n = 222)	No. (and %) of patients		p value†
		Responders (n = 117)	Nonresponders (n = 105)	
Had “flu” the previous winter‡				
Yes	37	21 (56.8)	16 (43.2)	0.557
No	173	89 (51.4)	84 (48.6)	
Received influenza vaccination in 1981				
Yes	37	29 (85.3)	8 (14.7)	< 0.001
No	185	88 (47.5)	97 (52.3)	
Had “ever” had a reaction from vaccine§				
Yes	23	11 (47.8)	12 (52.2)	0.001
No or didn't know	86	70 (81.4)	16 (18.6)	
Believes in efficacy of vaccine				
Yes	68	54 (79.4)	14 (20.6)	< 0.0001¶
No	18	1 (5.6)	17 (94.4)	
Didn't know	131	60 (45.8)	71 (54.2)	
Had heard comments about vaccine from friends or relatives 				
Yes, positive	28	22 (78.5)	6 (21.5)	0.028
Yes, negative	33	17 (51.5)	16 (48.5)	

*No response or an inappropriate response led to exclusions of patients from analysis; therefore, the numbers do not add up to the overall total.

†In chi-square analysis with 1 degree of freedom.

‡Does not include the 12 patients who didn't know their influenza history.

§Includes only the 109 patients who recalled having been vaccinated previously.

||Includes only the 61 patients who recalled hearing comments about the vaccine.

¶See text for details.

who are known to be at the highest risk of influenza morbidity and mortality, perceived themselves as both "unlikely to get the flu" (because of their lack of social exposure) and "too frail to take the vaccine".

The overall influenza vaccination coverage achieved for the independent elderly in this study — approximately 55% — concurs with that in numerous American studies that used various promotional maneuvers.^{5,8,9,23} In other words, it appears that, even with maximum provider effort, the annual vaccination coverage rarely exceeds 50% to 60% among the well elderly in North America. Such a "ceiling" or "saturation effect" would obviously tend to limit the cost-effectiveness of any maneuver designed to improve coverage. Apparently there is a "hard core" of older people who do not accept vaccination because of negative beliefs about the vaccine's risks and benefits.

Conclusions

We were unable to identify any specific health education messages that might persuade elderly persons to accept influenza vaccination. The simple communication of facts about immunization would, a priori, seem unlikely to influence older persons with strong views about their health. What must be tackled are the underlying reasons for their health beliefs. Why, for example, do the elderly appear to feel that the discomforts caused by vaccination are more important than the possible future benefits of averted illness? Behaviourally oriented research is needed to develop new approaches to health care education and promotion among the elderly.

On a more positive note, the vaccination of approximately half the elderly against influenza is certainly a worthwhile achievement. Furthermore, the simple expedient of keeping a patient age-sex register and a list of patients with chronic disease in a general practice could greatly improve influenza vaccination coverage in the target populations each autumn. Simply by scheduling "regular" office visits for elderly and chronically ill patients each autumn and by ensuring that vaccinations were given at those visits to those who accepted them, primary care providers could, in our view, efficiently improve overall influenza vaccination coverage among those at greatest risk.

Postscript

In the fall of 1983 a repeat effort was made to inform all the elderly patients registered at the community clinic in Hamilton (85% of whom had been registered at the clinic in 1982) of their need for influenza vaccination. Only a reminder letter was used. The overall vaccination coverage this time was 46%, similar to the 43% achieved in the previous year. This finding confirms the hypothesis we have advanced in this article — namely, that patients who still do not accept vaccination after receiving a reminder letter represent a hard core of nonbelievers who are not readily influenced by simple informational maneuvers. Although no control group was available to show the "carry-over effect", if any, of the letters that were sent in the previous year, the

failure of a second consecutive autumn mailing to further increase overall coverage is discouraging. It may be that the expense of sending reminder letters each year is necessary simply to maintain coverage in the 40% range, at least in practices without a well established "habit" of annual influenza vaccination.

We gratefully acknowledge the guidance and support of Dr. Tony Dixon and the staff of the First Place Community Health Centre and the Department of Family Medicine, McMaster University. As well, we thank the staff of the Computer Processing Unit, McMaster University Medical Centre, for their help in analysing the data.

References

1. Recommendations of the Public Health Service Immunization Practices Advisory Committee: influenza vaccines 1983-84. *MMWR* 1983; 32: 333-337
2. Kovet J: Vaccine utilization: trends in the implementation of public policy in the U.S.A. In Selby P (ed): *Influenza: Virus, Vaccines, Strategy*, Acad Pr, New York, 1976: 297-308
3. *United States Immunization Survey 1976*, DHEW publ no (CDC) 78-8221, Centers for Disease Control, US Public Health Service, Atlanta, Ga, 1978
4. Influenza — worldwide. *Morb Mortal Wkly Rep* 1976; 25: 399-400
5. Anderson C, Martin H: Effectiveness of patient recall system on immunization rates for influenza. *J Fam Pract* 1979; 9: 727-730
6. Monto AS, Ross HW: Swine influenza vaccine program in the community: acceptability, reactions and responses. *Am J Public Health* 1979; 69: 233-237
7. Schoenbaum SC: Influenza vaccine — unacceptable or unaccepted? [E]. *Ibid*: 219-221
8. Henk M, Froom J: Outreach by primary care physicians. *JAMA* 1975; 233: 256-259
9. Larson EB, Olsen E, Cole N et al: The relationship of health beliefs and postcard reminder to influenza vaccination. *J Fam Pract* 1979; 8: 1207-1211
10. Cummings KM, Jette AM, Broch BM et al: Psychosocial determinants of immunization behavior in a swine-influenza campaign. *Med Care* 1979; 17: 639-649
11. Rundall TG, Wheeler JRC: Factors associated with utilization of the swine flu vaccination program among senior citizens in Tompkins County. *Ibid*: 191-200
12. *Causes of Death — Provinces by Sex and Age, 1981*, cat no 84-203, Statistics Canada, Ottawa, 1982
13. Abelson J, Paddon P, Strohmenger C: *Perspectives on Health*, cat no 82-540E, Statistics Canada, Ottawa, 1982
14. Barker WH, Moolooly JP: Influenza vaccination of elderly persons. Reduction in pneumonia and influenza hospitalizations and deaths. *JAMA* 1980; 244: 2547-2549
15. Ruben FL: Prevention of influenza in the elderly. *J Am Geriatr Soc* 1982; 30: 577-580
16. A preliminary report. Influenza outbreaks in two institutions for the elderly — Ontario. *Can Dis Wkly Rep* 1983; 9: 37-39
17. Impact of influenza in a nursing home population. *MMWR* 1983; 32: 32-34
18. Advisory Committee on Immunization Practices Recommendations: influenza vaccine 1982-83. *MMWR* 1982; 31: 352
19. Cochrane AL: *Effectiveness and Efficiency: Random Reflections on Health Services*, Oxford U Pr, London, 1972
20. *Cost-effectiveness of Influenza Vaccine*, Office of Technology Assessment, Washington, 1981
21. Becker MH: The Health Belief Model and personal health behavior. *Health Educ Monogr* 1974; 2: 326-333
22. Becker MH, Haefner DP, Kasl SV et al: Selected psychosocial models and correlates of individual health-related behavior. *Med Care* 1977; 15 (suppl): 27-46
23. Fedson DS, Kessler HA: A hospital-based influenza immunization program, 1977-78. *Am J Public Health* 1983; 73: 442-445