

How complete is influenza immunization coverage? A study in 75 nursing and residential homes for elderly people

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SUMMARY

Background. Elderly people in residential accommodation are particularly susceptible to outbreaks of influenza. Up to 70% of residents can become ill and many will develop complications or die. Immunization can prevent such outbreaks and is cost-effective.

Aim. A study was undertaken to measure influenza immunization coverage in residential accommodation for elderly people and to identify factors that might influence uptake.

Method. In March 1992, a questionnaire survey was conducted of all 113 registered nursing and residential homes for elderly people, in South Glamorgan. It asked about the demographic characteristics of people resident on 1 October 1991, their influenza immunization history and the homes' arrangements for administering immunizations.

Results. Questionnaires were returned by respondents from 75 homes (66%). Mean influenza vaccine uptake was 67%. Uptake was higher in nursing homes (mean of 82% in eight nursing homes) than in homes registered as both nursing and residential homes (mean of 76% in six homes) or in residential homes (mean of 65% in 61 homes). Nearly all of those immunized (94%) had been immunized by the end of November 1991. Residents who were reported to have underlying disease that increased their risk of complications if they contracted influenza were no more likely to have been immunized than those without risk factors. Immunization coverage varied considerably both between homes and between general practices. Most general practices in South Glamorgan had several elderly people in residential accommodation on their list, but only nine out of 64 practices had immunized all the elderly residents on their list and 12 practices had immunized fewer than half. Routine recording of immunization status in nursing and residential homes was variable, often as a consequence of poor communication between the primary health care team and staff at the home. Even where recorded, retrieval of the data was sometimes a problem.

Conclusion. Influenza immunization coverage could be improved if general practices held a case register of all at-risk patients including elderly residents, and if nursing and residential homes were encouraged to keep better immunization records. These measures would facilitate year-on-year monitoring of influenza immunization coverage and the targeting of homes with low immunization coverage.

Keywords: influenza; immunization rates; immunization status; residential care for the elderly; over 75s.

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Introduction

THE last major influenza epidemic in 1989-90 resulted in approximately 26 000 deaths in England and Wales.¹ Up to 90% of these deaths were among people aged 65 years or over, and elderly people living in residential accommodation appeared to be particularly susceptible.^{2,3} Outbreaks of influenza in institutional settings can cause illness in up to 70% of residents with 22% of those affected developing complications severe enough to result in hospitalization or death.⁴

Influenza vaccination confers about 70% protection against infection in normal healthy adults.⁵ Although the degree of protection is less among elderly people, considerable reductions in the incidence of bronchopneumonia, hospitalization and death can be achieved in this population when vaccine and epidemic strains are closely related.⁶⁻⁸ Immunization has been shown to be the most cost-effective option for prevention of influenza among elderly people.⁹⁻¹¹ Following the 1989-90 influenza epidemic, the guidance on influenza immunization issued each autumn by the chief medical officers was reviewed and strengthened. Immunization is now strongly recommended for all residents of nursing homes, residential homes and other long-stay facilities where rapid spread is likely to follow the introduction of infection.¹²

Despite the benefits of influenza immunization, several studies have shown coverage of elderly people to be low. Fewer than one fifth of the total elderly population of Trent were immunized in 1985-86 and fewer than half of the residents of homes for elderly people in Leicester were immunized in 1988-89.^{13,14}

A study was undertaken to measure influenza immunization coverage in nursing and residential homes for elderly people in South Glamorgan during the 1991-92 influenza season and to identify any factors that might influence uptake.

Method

In 1992 South Glamorgan, a county with a population of just over 400 000, had 17 nursing homes, 89 residential homes for elderly people and seven dually registered homes (both nursing and residential). In March 1992, following a pilot study of 10 homes, a postal questionnaire and covering letter signed by E W was sent together with a reply-paid envelope to the matron or officer-in-charge of all 113 homes. Non-respondents were sent a reminder letter and contacted by telephone on two occasions, and a further questionnaire was sent if requested.

Information was sought on all persons who were permanently resident at the home on 1 October 1991. The questionnaire was divided into two parts. The first requested general information on the home including the number of residents present on the census date, the number of general practices looking after residents and arrangements for administering immunizations. The second part sought anonymous information on each resident including sex, date of birth, whether immunized (and if so, date of immunization), name of general practitioner, date of admission, and date of discharge or death (where applicable). Patients with underlying disease have an increased risk of developing complications if they contract influenza. Therefore, information was also sought on whether a patient had chronic lung disease (including asthma), chronic heart disease, chronic kidney disease, diabetes,

leukaemia or lymphoma, and whether the patient was on radiotherapy, chemotherapy or long-term steroid treatment.

Analysis was carried out using the *EPI INFO* software package. Categorical data were analysed using the chi square test with Yates correction, and continuous variables were analysed using regression and correlation, or Kruskal-Wallis one-way analysis of variance for non-parametric data. Several factors were examined by multiple linear regression for evidence of a relationship with immunization uptake.

Results

Demographic characteristics

Questionnaires were returned by respondents from 75 of the 113 homes (66.4%) of which eight were from the 17 nursing homes contacted (47.1%), 61 from the 89 residential homes contacted (68.5%) and six from the seven dually registered homes (85.7%). Smaller homes (those with fewer than 20 residents) were more likely to reply (73.6% of 53 homes) than larger homes (60.0% of 60 homes). Information was received on 1557 residents (Table 1). Overall, the male: female ratio of residents was 1: 4.1 and their mean age was 83 years. Median duration of residence, as at 1 October 1991, was 20.4 months. A medical risk factor was reported to be present in 376 residents (24.1%), and more than one risk factor was reported to be present in 3.7% of residents. Seven respondents reported that they did not have access to medical information on their residents. A higher proportion of residents in nursing homes had medical risk factors compared with those in residential or dually registered homes.

Influenza immunization in the homes

Mean influenza immunization uptake by homes was higher in nursing homes (81.5%) than in dually registered homes (75.5%) or residential homes (64.7%) (χ^2 for trend = 58.1, $P < 0.001$; Table 1). Twelve homes had a 100% immunization uptake rate, but in 19 homes fewer than half of the residents had been immunized (Table 2). No consistent relationship was found between the size of the home (number of residents) and percentage immunization uptake.

Altogether, 69.0% of the 1557 elderly people resident on the census date were immunized against influenza. The majority of those immunized (93.8% of 1075) had been immunized by 30 November 1991. The likelihood of a resident being immunized was examined in respect of age, sex, length of residence, and the presence of medical risk factors; no statistically significant associations were found. Early respondents to the questionnaire (those not requiring a reminder) reported immunization uptake rates no higher than late respondents to the questionnaire.

Some respondents reported that they did not routinely record

residents' influenza immunization details, often because of poor communication between staff at the home and the primary health care team. Retrieval of data was also reported to be a problem for some respondents.

Influenza immunization by general practices

Homes had contact with general practitioners from a mean of five different practices but there was no evidence to suggest that homes which had contact with a large number of practices had lower influenza immunization uptake rates than homes in contact with fewer practices. In most cases (86.5%), immunization took place at the home; uptake was not influenced by whether immunization took place in the home, the surgery or elsewhere.

Sixty four of the 72 practices in South Glamorgan (88.9%) had nursing home/residential home residents on their list (median 17 residents, range 1–112). Only nine practices had immunized all their elderly residents and 12 practices had immunized fewer than half (Table 2). There was no association between influenza immunization uptake and the number of partners per practice, the number of residents on the list or the number of homes covered.

Discussion

Encouragingly, this study found a mean influenza vaccine uptake of 67% among the 75 residential and nursing homes, considerably higher than the 45% uptake rate reported by the only other published United Kingdom study carried out in a similar setting.¹⁴ This rate must be interpreted with caution since response rates from nursing homes and from some of the larger residential homes were disappointing. However, early respondents reported uptake rates no higher than late respondents and non-response appears to have been mainly due to the size of the home rather than a desire to conceal poor uptake. Better coverage during the 1990–91 influenza season compared with the 1988–89 season¹⁴ may have been a consequence of heightened awareness following the major influenza epidemic the previous winter. Nearly all those immunized had received their immunization in good time

Table 2. Influenza immunization coverage in nursing and residential homes and in general practices.

	% of residents immunized						
	<50	50–59	60–69	70–79	80–89	90–99	100
No. of homes with uptake rate	19	4	3	12	15	10	12
No. of general practices with uptake rate	12	7	14	9	10	3	9

Table 1. Demographic characteristics of residents in nursing, residential and dually registered homes, and influenza immunization uptake.

Characteristics of residents	Nursing home (n = 8)	Residential home (n = 61)	Dually-registered home (n = 6)	All homes (n = 75)
Total no.	253	1086	218	1557
Mean no. in home (range)	31.6 (5–52)	17.8 (6–42)	36.3 (20–57)	20.8 (5–57)
Male: female ratio	1: 3.2	1: 4.1	1: 5.2	1: 4.1
Mean age (years)(range)	82 (49–102)	84 (35–108)	82 (30–97)	83 (30–108)
Median length of stay (months)	13.2	22.6	21.1	20.4
% with medical risk factor	40.3	19.2	30.3	24.1
% immunized	86.2	63.4	77.5	69.0
Mean % immunization uptake, by home (range)	81.5 (28.6–100)	64.7 (0–100)	75.5 (40.4–100)	67.3 (0–100)

n = number of homes.

by the end of November. As protective antibody levels may take up to 14 days to develop and influenza activity is generally negligible before the end of November, the ideal time for immunization is October and early November. Immunity can be expected to last through the winter.

The study found considerable variation in the extent of immunization coverage between homes. Nursing homes had the highest uptake, probably, because residents with medical risk factors are more likely to be immunized.¹⁴ That no association with medical risk factors was demonstrable in the present study was probably because of reporting bias, since a number of respondents commented that they were not privy to medical information on their residents. As influenza immunization is recommended for all people in nursing and residential homes regardless of their age and health status,¹² the presence of risk factors should not influence the decision to immunize.

The reasons most commonly cited for not immunizing people in homes for the elderly are scepticism about vaccine efficacy, concern over vaccine safety and the view that immunization is unnecessary in this population.² Influenza vaccine gives about 70% protection in healthy adults but two studies in residential elderly populations, one in the UK and one in the United States of America, have reported protective efficacy of only 25% and 45%, respectively.^{15,16} However, as many acute respiratory viral infections may be misdiagnosed as influenza, there is potential for vaccine efficacy to be underestimated.^{7,14} Although clinical infection may not be prevented, the number of cases of serious illness and death may be reduced by approximately 70%.⁵ Immunization is also important for herd immunity, and uptake rates of between 70% and 80% have been shown to reduce substantially the risk of outbreaks in a closed setting.¹⁵ Side effects from influenza immunization are generally minor. A randomized controlled trial of reactions to influenza vaccine among elderly people showed only pain and swelling at the immunization site to be more common in immunized patients than in non-immunized patients, with no evidence of an excess of systemic side effects such as fever, headache and malaise.¹⁷

Influenza is sometimes viewed as the 'old man's friend' and immunization of institutionalized elderly people is considered by some to be officious and unnecessary.¹⁸ However, in the majority of cases, influenza complications are not fatal. A case-control study of patients aged 65 years and over who survived influenza-related pneumonia found that most were alive five years later although were more likely to have suffered subsequent ill health than their age- and sex-matched controls.¹⁹ Immunization thus offers improved quality of life by preventing influenza-associated morbidity.

In the UK, most influenza immunization is administered by general practitioners who are therefore in the best position to improve coverage.¹³ Immunization uptake rates varied considerably between general practices in the present study. Greater use of case registers of high-risk patients (including elderly people in residential care) could improve uptake, and this approach is encouraged in the 1994 communication on influenza immunization from the chief medical officers.¹² Primary health care staff also need to ensure that immunization is safely administered, and that staff in the homes are told when residents have been immunized. Since all homes are subject to regular inspection for registration purposes under the registered homes act 1984, there is also a mechanism for ensuring that better records of influenza immunization are kept.

The National Health Service directorate for Wales set ambitious targets for influenza immunization which included the design and implementation of a system to monitor influenza immunization coverage among all at-risk groups by 1994, to achieve a 90% uptake among at-risk groups by 1997, and to

reduce deaths from influenza and pneumonia by 25% among those aged between 65 and 75 years by 2002.²⁰ The present study shows considerable scope for improvement, much of which could be achieved by better general practice management, improved recording and communication of information, targeting of homes with low immunization coverage, and regular audit.

References

1. Curwen M, Dunning K, Ashley J. Hidden influenza deaths [letter]. *BMJ* 1990; **300**: 896.
2. Nicholson KG. Influenza vaccination and the elderly [editorial]. *BMJ* 1990; **301**: 617-618.
3. Nguyen-Van-Tam JS, Nicholson KG. Influenza deaths in Leicestershire during the 1989-90 epidemic: implications for prevention. *Epidemiol Infect* 1992; **108**: 537-545.
4. Arden NH, Patriarca PA, Kendal AP. Experiences in the use and efficacy of inactivated influenza vaccine in nursing homes. In: Kendal AP, Patriarca PA (eds). *Options for the control of influenza*. New York, NY: Alan R Liss, 1986.
5. Kilbourne ED. Inactivated influenza vaccines. In: Plotkin SA, Mortimer EA (eds). *Vaccines*. Philadelphia, PA: WB Saunders, 1988.
6. Barker WH, Mullooly JP. Influenza vaccination of elderly persons: reduction in pneumonia and influenza hospitalization and deaths. *JAMA* 1980; **244**: 2547-2549.
7. Patriarca PA, Weber JA, Parker RA, et al. Efficacy of influenza vaccine in nursing homes. *JAMA* 1985; **253**: 1136-1139.
8. Gross PA, Quinnan GV, Rodsein M, et al. Association of influenza immunization with reduction in mortality in an elderly population. *Arch Intern Med* 1988; **148**: 562-565.
9. Patriarca PA, Arden NH, Koplan JP, Goodman RA. Prevention and control of type A influenza infections in nursing homes. *Ann Intern Med* 1987; **107**: 732-740.
10. Helliwell BE, Drummond MF. The costs and benefits of preventing influenza in Ontario's elderly. *Can J Public Health* 1988; **79**: 175-179.
11. Nichol KL, Margolis KL, Wuorenma J, von Sternberg T. The efficacy and cost effectiveness of vaccination against influenza among elderly persons living in the community. *N Engl J Med* 1994; **331**: 778-784.
12. Chief Medical Officer. *Influenza vaccine. CMO(94)11*. London: Department of Health, 1994.
13. Nicholson KG, Wiselka MJ, May A. Influenza vaccination of the elderly: perceptions and policies of general practitioners and outcome of the 1985-1986 immunization programme in Trent, UK. *Vaccine* 1987; **5**: 302-306.
14. Nicholson KG, Barker DJ, Farquhar A, et al. Acute upper respiratory tract viral illness and influenza immunization in homes for the elderly. *Epidemiol Infect* 1990; **105**: 609-618.
15. Patriarca PA, Weber JA, Parker RA, et al. Risk factors for outbreaks of influenza in nursing homes. *Am J Epidemiol* 1986; **124**(1): 114-119.
16. Nicholson KG, Barker DJ, Chakraverty P, et al. Immunogenicity of inactivated influenza vaccine in residential homes for elderly people. *Age Ageing* 1992; **21**: 182-188.
17. Govaert ThME, Dinant GJ, Aretz K, et al. Adverse reactions to influenza vaccine in elderly people: randomised double blind placebo controlled trial. *BMJ* 1993; **307**: 988-990.
18. Fedson DS, Waida A, Nicol JP, Roos LL. The old man's friend [letter]. *Lancet* 1993; **342**: 561.
19. Fedson DS, Waida A, Nicol JP, Roos LL. Disparity between influenza vaccination and risks on influenza-associated hospital discharge and death in Manitoba in 1982-1983. *Ann Intern Med* 1992; **116**: 550-555.
20. Welsh Health Planning Forum. *Protocol for investment in health gain: respiratory diseases*. Cardiff: Welsh Office NHS directorate, 1992.

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