

Influenza immunization; vaccine offer, request and uptake in high-risk patients during the 1991/2 season

J. S. NGUYEN-VAN-TAM¹ AND K. G. NICHOLSON²

¹*Department of Public Health Medicine and Epidemiology, University of Nottingham Medical School, Queen's Medical Centre, Nottingham NG7 2UH, UK*

²*Department of Microbiology, University of Leicester Medical School, Medical Sciences Building, Leicester LE1 7RH*

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SUMMARY

Current levels of influenza vaccine uptake in patients considered to be at high risk have been determined by means of a questionnaire survey. During March–April 1992, information was sought from 624 patients in Leicestershire, UK with either chronic cardiovascular or respiratory disease, or diabetes; questions related to current health status and the request, offer and receipt of influenza vaccine in the current and three previous seasons. Ninety-eight percent of all offers of immunization were made in the primary care setting, and vaccine was well tolerated as judged by the fact that 86% of vaccinees between 1988/9–1990/1 returned for immunization in the following year. However in the 1991/2 season the overall level of vaccine uptake was only about 41% which is at variance with the stated policies and practices of general practitioners. Opportunities were missed, in both hospitals and general practices, to publicise and offer immunization to individuals with vaccine indications. Future attempts to improve vaccine uptake should focus on increasing the role of hospital staff in influenza prevention, in addition to promoting better vaccine delivery through primary care.

INTRODUCTION

The use of influenza vaccine has been associated with considerable reductions in the incidence of complications (including bronchopneumonia), hospital admission and death in the elderly, when vaccine and prevalent strains are closely matched [1–4]. In Great Britain the Department of Health, the Welsh Office, and the Scottish Home and Health Department issue annual guidelines for influenza immunization. In recent years it has been recommended that influenza vaccine be considered for patients of all ages with chronic cardiovascular, pulmonary and renal disease, diabetes and other endocrine disorders, and conditions involving immunosuppression [5, 6]; vaccine has also been recommended for elderly people living in residential care and long stay hospitals [5, 6]. In 1986, a study of patients with serious long-term cardiac disease, showed that only 17% had received influenza vaccine [7], suggesting that the level of vaccine uptake in high-risk groups was low. A contemporary survey of general practitioners in the Trent

health region, UK indicated that only 19.5% of the elderly had been immunized against influenza [8]. In the influenza epidemic which followed in 1989/90, there were 29000 excess deaths in Great Britain, almost exclusively in elderly people [9]. In Leicestershire, UK during the epidemic, the influenza immunization rate in those that died from certified influenza was 24% (10 of 42), but 93% (39 of 42) had indications for the vaccine [10]; death rates from certified influenza were related to the number of underlying chronic illnesses suffered by individuals prior to their final illness, ranging from 6.6 deaths/100000 in elderly people living at home and free from chronic illness, to 2703 deaths/100000 among elderly residents of nursing and old people's homes with three or more chronic illnesses [10]. During the same epidemic the immunization rate among asthmatic individuals in Leicestershire was 15% [11]. Although these vaccine studies were confined to the Trent health region, UK they suggest that large deficiencies exist in the delivery of vaccine to high risk groups [7–11]. A survey of general practices conducted in England during 1992 revealed that 89% had an agreed policy for influenza immunization [12]; this represents a significant increase over the 69% reported in 1986 [8]. Ninety-six percent of the 616 responding practices made special efforts to immunize patients with certain medical conditions; however among the conditions for which vaccine was recommended only patients with chronic cardiovascular or respiratory disease, asthma, and diabetes were specifically targeted by more than 50% of practices [12]. Furthermore vaccine delivery appeared very uneven and an estimated 38% of practices had ordered insufficient vaccine even to cover their elderly patients with high-risk conditions [12]. Surprisingly little is known about how medical practitioners' policies and practices have influenced vaccine uptake in high risk groups and it is possible that substantial improvements in vaccine usage may have occurred since the last epidemic. We describe a large questionnaire survey of selected high risk patient groups in Leicestershire to quantify influenza vaccine uptake during the 1991/2 season.

METHOD

In March 1992 the names and addresses of 624 patients with either heart disease, lung disease or diabetes were obtained; an age-stratified random sample of 200 insulin-taking diabetic patients was selected from the Leicestershire Diabetic Register; 224 patients were randomly selected from the waiting lists of four cardiothoracic surgeons based at the Regional Cardiothoracic Centre in Leicester; finally 200 patients with chest disease were randomly selected from the pooled records of patients under the care of chest physicians in one of the Leicester teaching hospitals. During April 1992 each subject was sent a questionnaire concerning their current level of health, and the offer of influenza vaccine in the current and previous seasons. One reminder questionnaire was sent to non-responders. Information was sought relating to basic demography, self-perceived level of health in the last 12 months, the existence of long-standing illnesses, current medication, and recent health service contacts. Further questions addressed issues relating specifically to influenza vaccine; details of the offer, request and acceptance of vaccine in the 1991/2 season; the reasons for receipt and non-receipt of vaccine in 1991/2 (open questions), and the uptake of vaccine in the

three previous winter seasons. To discover if subjects had deliberately sought immunization a question asked if they had requested vaccine. Similarly, to determine if health care workers had offered vaccine (either directly during consultation, or through indirect means such as posters or letters), subjects were asked about the offer of vaccine, but were not asked to distinguish between offers initiated by health care workers and those made in response to patients' requests. To cover the likelihood that not all patients who were offered vaccine would accept it, a separate question was posed which asked about receiving (or accepting) vaccine. Finally questions were asked about the frequency of visits to the general practitioner and attendances at hospital. Descriptive analyses were performed using χ^2 and Mann-Whitney tests within SPSS-PC [13].

RESULTS

Basic demography

Of 624 questionnaires sent out, 517 were returned of which 10 were unanswered because of death, admission to hospital, or extended overseas travel. Five hundred and seven questionnaires were available for analysis from 157 patients with chest disease, 197 awaiting cardiac surgery and 153 with diabetes, representing response rates of 79.7%, 89.1% and 78.1% respectively, and 82.6% overall. The demographic characteristics of each group of patients is shown in Table 1; a larger proportion of cardiac patients were males reflecting the well established sex difference in the prevalence of ischaemic heart disease ($\chi^2 = 16.7$, D.F. = 2, $P = 0.002$) [14].

Level and stability of health

Four hundred and ninety-six respondents provided information about self-perceived health status; subjects were asked to describe their current level of health on a scale from 'good' through 'fairly good', 'not good but stable', to 'not good and getting worse'. These data are shown in Table 2. It is noteworthy that not all patients appreciated that they had heart or lung disease, or diabetes, although this was only a small proportion of each group. Overall 480 of 493 patients (97.4%) reported being ill for 12 months or longer, but there were no significant differences between diagnostic groups. Four hundred and seventy-five respondents gave further information about specific illnesses as detailed in Table 2. Four hundred and sixty-nine of 492 respondents (95.3%) were taking at least one prescribed medication with a median number of three per patient. Two hundred and fifty-nine of 413 respondents (62.7%) had been admitted to hospital in the previous 12 months, and over the same time each patient had consulted a general practitioner an average of 6.7 (95% CI. 6.2-7.1) times (462 respondents), and made on average 4.9 (95% CI. 4.8-5.3) visits to a hospital outpatient clinic (443 respondents).

Differences between risk groups in vaccine offer, request and acceptance

Four hundred and seventy-six subjects gave information about the offer of influenza vaccine, 445 about its request, and 482 about its acceptance; these data are shown in Table 3.

Table 1. *Demographic features of patient groups*

Patient group:	Number, (%) and [95% confidence intervals]			
	Cardiac waiting list	Chest clinic	Diabetic register	Total sample
Response rate:	197 of 221 (89.1%)	157 of 197 (79.7)	153 of 196 (78.1)	507 of 614 (82.6)
Sex				
Male	134* (68.7)	78 (50.0)	74 (50.3)	286 (57.4)
Female	61* (31.3)	78 (50.0)	73 (49.7)	212 (42.6)
Missing	2 —	1 —	6 —	9 —
Mean age:	61.8 [60.4–63.2]	57.4 [55.0–59.8]	61.6 [59.4–63.8]	60.4 [59.3–61.5]

* $P = 0.002$ Table 2. *Level and stability of health in patient groups*

Patient group:	Number (%)			
	Cardiac waiting list	Chest clinic	Diabetic register	Total sample
Self-perceived health status				
Good	12 (6.2)	9 (5.8)	36 (24.5)	57 (11.5)
Fairly good	45 (23.2)	37 (23.9)	62 (42.2)	144 (29.0)
Not good (stable)	62 (32.0)	81 (52.3)	31 (21.1)	174 (35.1)
Not good (worsening)	75 (38.7)	28 (18.1)	18 (12.2)	121 (24.4)
Missing info	3 —	2 —	6 —	11 —
Self-perceived long standing illness (> 12 months)				
Yes	184 (96.3)	151 (97.4)	145 (98.6)	480 (97.4)
No	7 (3.7)	4 (2.6)	2 (1.4)	13 (2.6)
Missing info	6 —	2 —	6 —	14 —
Self-reported chronic illness				
Heart disease	176 (96.2)	15 (9.9)	30 (21.3)	221 (46.5)
Lung disease	19 (10.4)	137 (90.7)	13 (9.2)	169 (35.6)
Diabetes	9 (4.9)	6 (4.0)	140 (99.3)	155 (32.6)
Renal disease	3 (1.6)	8 (5.3)	6 (4.3)	17 (3.6)
Other	41 (22.4)	39 (25.8)	43 (30.5)	123 (25.9)
Missing	1 —	0 —	4 —	5 —

The offer of vaccine

Of 425 patients who gave information about the offer of vaccine and hospital out-patient visits, 410 (96.5%) had visited a hospital out-patient clinic in the last 12 months. Of these, 345 gave information about advice received from hospital doctors; despite many opportunities to provide relevant information (mean no. of visits = 5.2 per annum), hospital doctors gave advice about influenza immunization to only 25 patients (7.2%). Thus of 209 offers of influenza vaccine, 205 (98.1%) were made by a general practitioner or a practice nurse whilst only 1 offer (0.5%) was made in hospital; three offers (1.4%) were made by other (non-stated) means. Of the offers made through primary health care, 21 (10.2%) were made during the course of a home visit, 159 (77.6%) during consultations at the surgery, and 25 (12.2%) via letters or telephone calls. For 172 vaccine offers, information

Table 3. *Vaccine offered, requested and received*

Patient group:	Number (%)			
	Cardiac waiting list	Chest clinic	Diabetic register	Total sample
Vaccine offered				
Yes	67 (36.0)	69 (45.1)	73 (53.3)	209 (43.9)
No	119 (64.0)	84 (54.9)	64 (46.7)	267 (56.1)
Missing information	11 —	4 —	16 —	31 —
Vaccine requested				
Yes	35 (19.7)	50 (35.5)	41 (32.5)	126 (28.3)
No	143 (80.3)	91 (64.5)	85 (67.5)	319 (71.7)
Missing information	19 —	16 —	27 —	62 —
Vaccine received				
Yes	67 (35.6)	65 (42.8)	67 (47.2)	199 (41.3)
No	121 (64.4)	87 (57.2)	75 (52.8)	283 (58.7)
Missing information	9 —	5 —	11 —	25 —

was also available about vaccine requests; in 83 instances (48.3%) no request had been made by the patient, instead the offer being initiated by a health care professional.

There were no significant differences in the self-perceived standard of health between the groups offered or not offered vaccine, ($\chi^2 = 3.7$, D.F. = 3, $P = 0.30$); however, those offered vaccine saw their general practitioner more frequently (mean 7.1 *v.* 6.1 visits per annum, Mann-Whitney: $z = -3.1$, $P = 0.002$), took more prescribed drugs (mean 3.9 *v.* 3.4 medications, Mann-Whitney: $z = -2.4$, $P = 0.019$), and were older (mean 64.1 *v.* 57.5 years, Mann-Whitney: $z = -5.2$, $P < 0.0001$). Of the 267 patients *not* offered vaccine, only 11 (4.1%) had not visited a general practitioner during the previous 12 months.

Requests for vaccine

One hundred and twenty-six patients (28.3%) requested vaccine; all gave one or more reasons for doing so. Eight (6.3%) had asked out of curiosity, 45 (36.0%) because they thought immunization was important, and 15 (11.9%) in response to a poster; 71 (56.3%) were asking for a repeat annual immunization, and 5 (4.0%) asked for other reasons. Only 8 of 436 patients (1.8%) requested vaccine but did not receive it.

Vaccine acceptance

Overall 199 of 482 patients (41.3%) received vaccine during the 1991/2 season. There were no significant differences in the proportion of patients in each diagnostic group who accepted vaccine, ($\chi^2 = 4.65$, D.F. = 2, $P = 0.098$), and no significant differences in the self-perceived standard of health between the groups receiving and not receiving vaccine, ($\chi^2 = 6.4$, D.F. = 3, $P = 0.09$); however, the group who received vaccine were older (mean 63.5 *v.* 58.2 years, Mann-Whitney: $z = -4.1$, $P < 0.0001$) and had seen their general practitioner more frequently (7.6 *v.* 5.9 visits per annum, Mann-Whitney: $z = -3.4$, $P = 0.0007$). Two hundred and four of the 209 patients offered vaccine provided information about acceptance; 168 (82.3%) were immunized. One hundred and sixty-four respondents gave information about vaccine acceptance in previous years and of these only 25

(15.2%) were first time vaccinees. As judged by the acceptance of vaccine in sequential years, vaccine was well tolerated; for the people immunized in the 1988/9, 1989/90 and 1990/1 seasons 311 of 362 (85.9%) received vaccine in the following year.

Reasons for non-receipt of vaccine

Of the 283 patients who did not receive vaccine 264 gave one or more reasons for missing immunization; 124 (43.8%) were ignorant about their risk status through failing to receive appropriate advice from their general practitioner. An additional 33 (11.7%) considered that vaccine had failed to protect them previously, 18 (6.4%) simply did not want vaccine, 54 (19.1%) were either unaware of the vaccine or had not considered it, and 13 (4.6%) were concerned about side effects; a further 7 (2.5%) believed that vaccine would compromise their underlying chronic illness or that an intercurrent cold was a contra-indication, 11 (3.9%) had problems of access to vaccine or the practice premises, 1 (0.4%) was doubtful of vaccine efficacy, 3 (1.1%) were concerned about possible drug interactions and another 1 (0.4%) forgot to seek immunization. Twenty-four respondents (9.1%) gave a variety of other reasons, such as preoccupation with current illness, needle phobia, the misconception that vaccine was required only once, and a belief that previous 'influenza' made immunization too late to be of benefit.

Reasons for vaccine acceptance

Of the 199 patients who received vaccine, 194 gave one or more reasons; 82 (42.3%) were responding to the advice of their general practitioner, 74 (24.2%) believed that vaccine would reduce the frequency and severity of respiratory illnesses and 36 (18.6%) felt that vaccine could reduce the complications and severity of their other illnesses. A further 9 (4.6%) had accepted because they considered the vaccine was generally worthwhile and 10 (5.2%) because they felt that they were at increased risk from influenza; 11 respondents (5.7%) gave other reasons for acceptance such as media publicity, general practitioners' publicity, 'force of habit' and the offer of vaccine made in the workplace.

DISCUSSION

Whilst the groups studied do not represent the full range of patients with medical conditions for which vaccine is recommended [6], the increased risk of complications from influenza (including death) in patients with chronic cardiovascular and respiratory disease, and diabetes has been well documented [10, 15-17]. Moreover, of the chronic medical conditions for which vaccine is indicated, those studied are numerically important because of their high prevalence in the community [14], and the nature and severity of illness in our chosen subjects had brought them into regular contact with general practitioners (mean of 6.7 consultations in past 12 months) and hospital services (mean of 4.9 out patient visits in past 12 months). It is noteworthy that 97.4% of respondents had been ill for at least 12 months. Our sampling technique undoubtedly selected individuals whose health was especially poor, but who can also be considered to be ones for whom vaccine would definitely be advised. Most individuals in these groups who did not receive vaccine can therefore be legitimately regarded as

examples of 'missed immunization'. By examining the immunization experience of high-profile, readily identifiable groups such as these, whose 'need' for vaccine is perhaps most obvious, implications can be drawn for other numerically smaller or less identifiable groups of patients for whom vaccine is also recommended.

Although similar proportions of patients in each diagnostic group received vaccine, there was a suggestion towards a higher level of uptake among diabetics (53.3%), an intermediate level in chest clinic patients (45.1%) and a lower level in cardiac patients (36.0%). Overall 41.3% of respondents had received vaccine during the 1991/2 season; this level seems at variance with the stated policies and practices of general practitioners as established by a contemporary nationwide questionnaire survey [12]. The survey revealed that 'special efforts' to immunize cardiac, respiratory and diabetic patients were made by 72.3%, 72.5% and 70.0% of practices respectively [12]. Renal patients, the immunocompromised and other patients were less well targeted by most practices [12]; low immunization rates in cardiac, respiratory and diabetic patients, by inference, suggest that patients with other conditions for which vaccine is indicated such as those with chronic renal failure and the immunocompromised, are even less well covered. On the typical general practitioner's list such patients are usually numerically less, and perhaps less attractive as targets for vaccine promotion than larger groups such as those with cardiac or respiratory disease, and diabetes.

The onus for offering vaccine to high risk groups appears to lie with general practitioners and other members of the primary care team who made 98.1% of all offers of vaccine, and initiated at least half without patient request. Nonetheless the majority of vaccinees were presumably offered vaccine opportunistically since 77.6% of offers occurred in the surgery during consultation with a general practitioner or nurse; only 12.2% were offered vaccine in writing or by a phone call from the practice. Of the 56.1% of patients *not* offered vaccine only 4% had not consulted a general practitioner in the previous 12 months; for the remaining 96% the mean number of consultations for each patient was 6.1, suggesting that a number of opportunities to encourage vaccine uptake were missed. Advice from a general practitioner was a reason why 42.3% of vaccinees accepted immunization, and failure to receive such advice was a reason given by 43.8% of non-vaccinees. Recommendation, advice and the offer of immunization from a general practitioner or practice nurse therefore appeared to be of paramount importance in prompting immunization whilst a lack of relevant advice and ignorance about risk status featured prominently among reasons for non-immunization. Our data suggest that for every 10 offers of immunization made by members of the primary health care team about 8 will be accepted. A contemporary survey of general practices has revealed that 94% employ a practice nurse and 79% a practice manager, whilst 80% possess at least one computerized practice register [12]; these resources, human and technical, could be readily deployed to assist general practitioners in increasing the identification of high-risk patients who do not present opportunistically, and the number of offers made in writing or by telephone. Improved sources of information are required since 43.8% of non-vaccinees giving reasons were ignorant of their risk status, 19.1% were not aware or vaccine, and 20.3% held reservations about safety or efficacy. Posters displayed in the surgery are the most frequently employed means of vaccine promotion [12];

however only 15 requests for immunization resulted from seeing a poster suggesting that their impact is low, and further emphasising the need for additional information.

In the 1991/2 season, hospital services played a minimal role in promoting vaccine. Although 96.5% of respondents had visited a hospital during the preceding 12 months, only 7.2% had received advice about influenza vaccine, and of the 209 offers of vaccine made, only one was made by hospital staff. These data indicate that hospital staff hardly ever consider influenza or its prevention in patients with cardiovascular or respiratory disease or diabetes and miss many opportunities for health promotion. Since a large proportion of high-risk patients made frequent visits to out-patient clinics (mean of 4.9 visits per annum) and 62.7% of patients had been admitted to hospital in the preceding 12 months, there is considerable scope to expand vaccine promotion in the hospital setting; this need not necessarily be centred on doctors but could also involve the nursing staff of appropriate clinics and wards.

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