Pneumococcal vaccine campaign based in general practice

Paula McDonald, E H I Friedman, A Banks, Ros Anderson, Val Carman

West Pennine
Health Authority,
Westhulme Avenue,
Oldham OL1 2PL
Paula McDonald,
senior registrar in
public health
E H I Friedman,
director of public
health
A Banks,
medical adviser
Ros Anderson,
pharmaceutical
adviser
Val Carman,
nurse adviser

Correspondence to:
Dr P McDonald,
Communicable
Disease Unit, PHL,
Countess of Chester
Health Park,
Chester CH2 1UL.

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Abstract

Objective: To show whether a general practice setting is a practical and effective medium for increasing uptake of pneumococcal vaccine.

Design: Follow up study of responses of general practices (debriefing by questionnaire or small group session) and patients (questionnaire sent to 429 patients vaccinated in a two week period) to vaccination campaign.

Setting and subjects: Patients registered with general practices of one family health services authority.

Interventions: Pneumococcal vaccination campaign including clinical guidelines and support materials.

Main outcome measures: Proportion of general practitioners offering pneumococcal vaccine; proportion of patients at risk who were vaccinated between 1 May and 31 December 1995; number of splenectomised patients identified and vaccinated in same period; views of patients who were vaccinated.

Results: Proportion of general practitioners offering pneumococcal vaccine increased from 17% to 89% during the campaign. Estimated number of patients at risk who were vaccinated increased from 656 (4%) to 5982 (33%) during campaign. Of 61 splenectomised patients identified, 30 had been vaccinated previously and 27 were vaccinated during campaign. Practices in which a general practitioner took or shared the lead had higher vaccination rates and used vaccine up faster. Of the 384 patients whose questionnaires were used in analysis, only 35 had heard of pneumococcal vaccine before the campaign, 198 reported side effects (mostly minor and local, but systemic and severe local reactions were more common than expected), and 337 were pleased they had been vaccinated (only five expressed dissatisfaction).

Conclusion: A practice based campaign is an effective method of increasing uptake of pneumococcal vaccine by high risk groups.

Introduction

Pneumococcal infections are an important cause of avoidable mortality and morbidity, especially in older people and those who are immunocompromised or suffering from chronic disorders.¹ A district health authority with a population of 500 000 can expect an annual incidence of 400 cases of pneumococcal pneumonia in adults, with 40-80 deaths; 43 cases of pneumococcal bacteraemia, with 6-11 deaths; and three to four cases of pneumococcal meningitis, with

one death. The resource implications are substantial: for example, patients admitted to hospital with community acquired pneumonia (of which pneumococcal infections are the commonest cause) have a median length of stay of 11 days, and one in 10 will require intensive care management.²

Streptococcus pneumoniae is sensitive to antibiotics, but substantial mortality occurs despite the use of appropriate antibiotics.³⁻⁴ Multidrug resistant pneumococci are an increasing problem worldwide,⁵ and resistance to penicillin and erythromycin is increasing in Britain.⁶ The most effective method of reducing the morbidity and mortality associated with pneumococcal infections is therefore prevention by vaccination.

Pneumococcal vaccine has been available in Britain since 1979.⁷ The current 23 valent vaccine covers 96% of serious pneumococcal infections in Britain,⁸ is safe,⁹ and is cost effective.¹⁰⁻¹² Its efficacy is 50-80% in older and high risk patients.¹³ It is ineffective in children under 2 years old, and it is less effective in immunocompromised people, though may still be of value.¹⁴⁻¹⁷

The Department of Health made recommendations for use of the vaccine in 1992,¹⁸ but these have not been systematically implemented.^{7 19 20} The comprehensive primary care system in Britain offers the potential to reach almost all high risk patients. The aim of this project was to show whether a campaign based in general practice is a practical and appropriate mechanism for increasing uptake of pneumococcal vaccine among high risk patients.

Methods

Vaccination campaign

Supply of vaccine—We encouraged Tameside general practices to order vaccine through the family health services authority. Vaccine was provided by the manufacturer at a discount, with a 90 day credit period, and the health service authority allowed practices an additional period of credit to enable them to obtain reimbursement from the Prescription Pricing Authority.

Support materials—We provided the following support materials to practices: clinical guidelines, a patient identification form, a professional briefing leaflet, a patient information leaflet (translated into Urdu, Bengali, and Gujarati), splenectomy leaflets, and a draft invitation letter to send to patients. We also gave a lecture (approved for postgraduate education allowance)

Target groups for vaccination

Asplenia and severe splenic dysfunction
 Congenital asplenia
 Removal of spleen because of disease or trauma
 Homozygous sickle cell disease
Chronic renal disease
 Renal dialysis
 Renal transplant
 Nephrotic syndrome
 Renal failure
Immune deficiency and immunosuppression
 HIV infection at all stages
 Bone marrow transplant
 Heart transplant
 Hodgkin's disease
Chronic heart disease
 Congestive cardiac failure requiring regular medication
 Ischaemic heart disease
Chronic lung disease
 Chronic bronchitis
 Bronchiectasis
 Emphysema
 Chronic obstructive airways disease
Chronic liver disease
 Cirrhosis of liver
Diabetes

on pneumococcal vaccine as part of the general practitioner postgraduate lecture programme and offered a practical briefing session to practices. We developed and piloted all the materials except for the splenectomy leaflets, which we obtained from the Department of Health and the Splenectomy Trust.

Vaccination guidelines—We developed clinical guidelines on interpreting the Department of Health recommendations to ensure that the vaccine was targeted at high risk groups and to turn the guidance into diagnoses that could be extracted from general practice computer systems (see box for details of target groups). The criteria used were:

- Are patients with this disorder at increased risk of developing pneumococcal infections?
- Are patients with this disorder at increased risk of mortality and morbidity if they develop pneumococcal infection?
- Do patients with this disorder respond to pneumococcal vaccine?
- How much other intervention has the patient had?

Follow up

The campaign started in May 1995. We offered practices the option of debriefing sessions in September 1995 or of returning a debriefing questionnaire. We collected vaccination data in September and December 1995.

We also asked general practitioners to identify all patients vaccinated between 19 June and 2 July 1995. We sent these patients follow up questionnaires seven to 14 days after vaccination. One reminder was sent to non-respondents. We entered the data from these questionnaires twice on EpiInfo and compared the data sets with the VALIDATE program of EpiInfo.

Data analysis

We calculated the proportion of general practice patients who were at risk by extrapolating data from 10 practices that carried out computer searches to identify

such patients. Demographic and socioeconomic indicators of these practices' patients were similar to those for the whole population of Tameside, except that the proportion of patients aged over 65 was lower—14% compared with 15.1% for all Tameside.

We estimated the proportion of patients at risk who were vaccinated from the number of vaccinations carried out before and during the campaign adjusted by the percentage of patients answering the patient questionnaire who identified themselves as falling into a target group.

Results

Use of vaccine

Six Tameside practices had already run their own pneumococcal vaccine campaigns, all in 1994 or early 1995. During the district-wide campaign, 5450 vaccines were ordered through the family health services authority and 650 were ordered directly from the manufacturer. This increased the proportion of Tameside general practitioners offering the vaccine from 18 (17%) to 96 (89%) out of 106 and the number of practices offering the vaccine from six to 30 (out of 37). The size of orders ranged from 25 to 600 doses per practice, and the mean number of doses ordered per 100 patients was 3.9 (range 1.04-8.47). By 31 December 1995, 96% of the original order had been given and 10 practices had re-ordered and given further vaccine.

We estimated the number of patients at risk in Tameside to be 18 430, based on the computer search by 10 practices, which identified 8% of the health authority's population as falling into target groups. The estimated number of patients at risk who were vaccinated increased from 4% before the campaign to 33% after the campaign (table 1). A total of 61 splenectomised patients were identified by practices. Thirty of these had been vaccinated previously, and 27 were vaccinated during the campaign. Four remained unvaccinated, including one who refused vaccination.

Practice debriefing

All practices returned data on vaccine use. Thirteen practices (out of 20 vaccinating in September 1995) attended debriefing sessions or returned debriefing questionnaires. Some reported difficulty in identifying patients at risk because of incomplete computerised records, lack of technical skills by staff extracting the data, or because of software deficiencies. Most practices

Table 1 Estimated proportion of patients at risk of pneumococcal infection in Tameside who were vaccinated

Vaccinations given	No of vaccinations given	Estimated No (%) given to target patients*	Estimated % of target patients vaccinated†
Before campaign‡	820	656(80)	3.6
During campaign§	6101	5326(87)	29
Total	6921	5982	32.6

*Based on percentage of patients answering the patient questionnaire who identified themselves as falling into an at risk group. (We used a lower estimated percentage for practices that vaccinated before the campaign as they developed their own criteria for vaccination, and some included asthmatic patients.)

†Number of patients at risk in Tameside was estimated by extrapolating data from 10 practices that ran computer programs to identify patients at risk.

‡From 1 January 1994 to 30 April 1995.

§From 1 May 1995 to 31 December 1995.

Table 2 Relation between characteristics of person leading pneumococcal vaccination campaign and orders and use of vaccine by 13 general practices that attended debriefing sessions or returned debriefing questionnaires

Person leading campaign	No of practices	Mean (range) initial order of vaccine per 100 patients	Mean percentage of initial order used up after four months of campaign
Doctor	6	5.1 (3.20-8.47)	92%*
Nurse or practice manager	7	3.8 (2.08-5.60)	42%

*One practice had reordered and given further vaccine in addition to this.

Table 3 Side effects reported in patient questionnaire by 133 out of 384 patients who returned questionnaire

Symptom	No (%) of patients reporting symptom
Redness or swelling in arm:	83(22)
Severe	10 (3)
Raised temperature	23 (6)
Headache	16 (4)
Feeling unwell	33 (9)
Other	43(11)

vaccinated opportunistically, with only four of the 13 practices inviting patients to special vaccination clinics. Other methods used to contact patients at risk included giving out leaflets with prescriptions and setting up an alliance with a local pharmacist. Table 2 shows that practices in which a general practitioner took or shared the lead in the campaign ordered more vaccine per 100 patients and had used a significantly higher proportion of their vaccine order after four months ($P=0.002$).

Some practices would have preferred to have vaccinated alongside influenza vaccination in the autumn, but many did not have enough refrigerator space to store both vaccines concurrently. Some groups of patients were felt to be hard to access, including patients infected with HIV and housebound patients. The support materials were well used by the practices.

Patient questionnaire

Ten out of 18 practices vaccinating during the two weeks between 19 June and 2 July 1995 collected data on patients vaccinated. We sent questionnaires to all 429 patients identified, and 388 were returned after one reminder, of which 384 were usable in the analysis. Of these 384 patients, 365 were aged 45 or over and 223 were aged 65 or over. There were more women than men, because of an excess of women aged 75 and over. A total of 335 patients identified themselves as falling into one or more target groups for vaccination, with a quarter falling into more than one category.

Only 35 of the patients reported having heard of the vaccine previously, with over those aged 65 being more likely to report prior knowledge (relative risk 2.5 (95% confidence interval 1.2 to 5.4)). Nearly three quarters took advice from others before deciding to have the immunisation. Practice nurses were the commonest source of advice (consulted by 104 (37%) of the 279 people seeking advice), but 75 (27%) took advice only from family or friends, and 22 (8%) took advice only from practice receptionists. Most (261 out of 266 (98%)) people given a leaflet said they had read it.

Over a third of patients reported side effects (133 out of 384 (35%)) (table 3). Most were minor and local, but 10 patients reported extensive swelling or "very sore" arms. The risk of reporting at least one side effect was greater in patients aged under 65 (relative risk 1.4 (1.1 to 1.9)), those who worried that they would get side effects (1.5 (1.1 to 1.9)), and those who disliked injections (1.4 (1.03 to 1.9)).

Most (337) patients were pleased that they had been vaccinated. Five patients regretted being vaccinated, and 42 were unsure.

Discussion

Despite considerable evidence for its potential benefits,¹⁻²¹ pneumococcal vaccine has not yet been used systematically in Britain. Individual practices have run vaccination campaigns, but we think that ours is the first coordinated campaign in Britain.

Our campaign substantially increased the uptake of pneumococcal vaccine in people at risk: there was a ninefold increase in the estimated number of people at risk who were vaccinated in Tameside. In contrast, national uptake rose by only 15% in 1995 (personal communication, product manager, Pasteur Merieux MSD). The eventual uptake by 33% of patients at risk is low compared with childhood vaccinations, but compares well with international figures for pneumococcal vaccination,⁷ and many practices are continuing to offer the vaccine.

Practicalities of campaign strategy

The research literature on strategies to increase the use of pneumococcal vaccine concentrates mainly on hospital based initiatives carried out in the United States' fragmented healthcare system.²²⁻²⁷ Hospital based immunisation schemes can target high risk patients,²⁸ but comprehensive programmes are difficult to administer and can lead to inadvertent reimmunisation.²⁹ This is unlikely to happen in general practice, where records follow patients.

Central purchasing of vaccine

There is at present little incentive for general practices in this country to offer pneumococcal vaccine. No item of service fee is available, and the vaccine costs about £10 per dose, so purchasing a large number can lead to cash flow problems for the practice. Central purchasing by the family health services authority allowed practices to maximise the (small) profit from dispensing the vaccine and make substantial orders without experiencing cash flow problems.

Targeting patients at risk

The clinical guidelines were based on the best evidence available to us, but more detailed research is needed on which groups are at risk, and we had to make some pragmatic decisions as to which groups should be included in the guidelines. A review of the guidelines by an expert panel has since concluded that patients with coronary heart disease should not be a priority group.³⁰ We excluded patients with asthma and cystic fibrosis on the basis of expert advice that they are not at substantially increased risk of pneumococcal infections.

We excluded patients with haematological malignancies other than Hodgkin's disease because of their poor response to vaccination.¹ However, in view of the extremely high mortality recently demonstrated in British patients with chronic lymphoproliferative malignancies,³¹ this should be reviewed as some patients with chronic lymphoproliferative and acute leukaemia may reach protective antibody levels after vaccination.¹ Some groups thought to be at risk are not included in the Department of Health's guidelines—such as people aged over 65, alcoholics, and people who have had pneumonia or who are institutionalised.^{1 32-36}

Views of practices

Practices reported a number of practical issues in organising the campaign, such as limited refrigerator space and difficulty in identifying patients at risk. The use of a facilitator or peer education—by “twinning” practices starting campaigns with experienced “mentor” practices — could minimise such problems. It is known that practices' computer records may be incomplete.³⁷ A recent study found complete recording of important chronic disorders such as diabetes,³⁸ but incomplete recording of other diagnoses may have led to an underestimation of patients at risk. The lower proportion of patients aged over 65 in the practices carrying out computer searches may also have reduced the estimate.

Certain groups of patients were difficult for practices to access. Some patients infected with HIV were reached through the HIV team and the local infectious diseases unit. One option to increase uptake among housebound patients would be to train district nurses to vaccinate them. The number of asplenic patients identified by practices was substantially lower than the 293 identified in a two year project in a district of similar size to Tameside.³⁹ More publicity and case finding are needed for this group, and for patients with other low incidence, high risk conditions such as sickle cell disease, who may be missed by opportunistic vaccination.

Views of patients

Less than 10% of the patients were aware of the pneumococcal vaccine, compared with 32% of patients in the United States.⁴⁰ Many practices felt that this adversely affected attendance for vaccination, with some patients believing that they were being given an experimental vaccine. The campaign had been featured in the local newspaper, but much more effective publicity could be arranged if there was a national campaign, as in the United States.⁴¹

Patients took advice on vaccination from a variety of sources, with about one in 12 of those seeking advice consulting only the general practice receptionists. This highlights the importance of training the whole practice team during campaigns.

More severe local and systematic side effects were reported than expected,^{1 9 19} but patient satisfaction was also high. Patients' willingness to accept side effects of vaccines that are not life threatening has been reported elsewhere.⁴²

Key messages

- Pneumococcal infections are an important cause of preventable morbidity and mortality
- We set up a pneumococcal vaccination campaign based in the 37 general practices of Tameside family health services authority
- The proportion of patients thought to be at risk who were vaccinated increased ninefold after the campaign started
- Patients' prior awareness of the vaccine was low, and publicity was needed
- Side effects from the vaccine were commonly reported, but most were minor and were well tolerated
- This is an appropriate and effective method of increasing vaccine coverage among people at risk of pneumococcal infection

Conclusion

A pneumococcal vaccination campaign based in general practice is feasible and offers the potential to substantially increase the proportion of patients at risk of pneumococcal infections who are vaccinated.

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ORIGINAL CONTRIBUTIONS BY MEDICAL STUDENTS

Increased fees may discourage research

Medical students can and do make valuable contributions to medicine when they are given the opportunity to become involved in research. Now the Medical Research Council has decided to withdraw funding for medical students opting to do an intercalated degree.

Sir James Paget (1814-99) discovered the round worm *Trichinella spiralis* in 1834, one year after entering St Bartholomew's Hospital Medical School. He became the first English pathologist and subsequently president of the Royal College of Surgeons in 1858. Paget contributed to many areas of medicine and has two classic descriptions of disease named after him.

William Stokes (1804-78), who became regius professor of medicine at the University of Dublin, published *An Introduction to the Use of the Stethoscope* in 1825 while he was still a student in Edinburgh. This, with a second book, formed the basis of the important treatise on the diagnosis and treatment of diseases of the chest.

Frederick Akbar Mahomed (1849-84) became fascinated by the measurement of blood pressure while a medical student at Guy's Hospital, London. He had studied Marey's sphygmograph which recorded the radial arterial waveform, and arranged for a watchmaker to produce an external spring mechanism. This modification allowed the first sphygmograph studies to be carried out while Mahomed was a resident medical officer at the London Fever Hospital. It was these readings which allowed him to accurately describe the natural history of hypertension.

In the field of genetics Walter S Sutton (1877-1916) detailed in 1903 the chromosome theory of heredity while still a medical student. M Lesch under the tutorship of W L Nyhan described in 1964 the clinical features of mental

retardation, ataxia, and self destructive behaviour which are the hallmark of the X linked recessive deficiency of hypoxanthine guanine phosphoribosyltransferase.

There have been many other contributions made during student days—for example, Lord Adrian's description of neuromuscular electrophysiology, which later helped earn him the Nobel prize; Banting and Best's discovery of insulin; and Sandstrom's histological description and naming of the parathyroid glands.

Increased student numbers combined with government cuts in capital funding have now outstripped resources. The response of the Committee of Vice Chancellors and Principals has been to suggest levying an entrance fee for university undergraduates. Medical students already face longer terms than other undergraduates without increased loans. Not surprisingly many medical students accumulate significant financial debts before completing their studies. The opportunity of undertaking an intercalated BSc course must therefore seem increasingly like a luxury rather than a valuable opportunity for students to develop and display a skill for research.

A K Saggarr-Malik is the Williams fellow of the University of London

M A Patton is reader in medical genetics at St George's Hospital Medical School

We welcome filler articles of up to 600 words on topics such as *A memorable patient*, *A paper that changed my practice*, *My most unfortunate mistake*, or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk.