

Research papers

Pneumococcal vaccination: uptake and coverage in primary care

Matthew Thalanany FRCP MFPHM

Director of Public Health, Billericay, Brentwood and Wickford Primary Care Trust, Essex, UK

Tarik Derrough (PharmD)

Medical Affairs Executive, Sanofi Pasteur MSD, Lyon, France

ABSTRACT

Objectives To assess pneumococcal vaccination coverage achieved in primary care in the Billericay, Brentwood and Wickford area, in order to inform decisions on options to improve pneumococcal vaccination coverage in the future.

Study design An audit was set up to evaluate pneumococcal vaccination coverage in patients aged 80 years and over, and those falling in one of the clinical at-risk groups (as defined in August 2003 within the Department of Health recommendations). A total of 15 practices at the Billericay, Brentwood and Wickford Primary Care Trust (BBW PCT) were evaluated.

Methods The audit was conducted between May and August 2004. Pneumococcal vaccination uptake was assessed by both age-group and clinical risk factor recommendations. Several other factors were also assessed to determine their influence on the level of uptake in a given patient population.

Results The overall mean vaccine coverage in patients aged 80 years and over, and patients with

a clinical risk factor was found to be 59% and 36%, respectively. In those aged 80 years and over, factors that significantly influenced vaccine uptake were the presence of a concomitant chronic illness, gender and practice size. Clinical risk patients' vaccination uptake was also significantly influenced by practice size as well as by the proportion of practice-registered patients aged 65 years and over.

Conclusions The good vaccination coverage achieved in BBW PCT is not typical within the UK. The Department of Health has specifically identified a low level of pneumococcal vaccination uptake in high-risk groups as an important issue, and has asked that measures be put in place by all healthcare professionals and by every PCT to maximise uptake. This audit clearly identifies that smaller practices are likely to need support to achieve adequate rates.

Keywords: PCT, pneumococcal, streptococcus pneumoniae, vaccination coverage

Introduction

The bacterium *Streptococcus pneumoniae* causes a range of diseases, the most serious of which are pneumonia, bacteraemia, otitis media and meningitis.¹ It is one of the leading causes of acute bacterial meningitis with bacteraemia, a condition which is often more severe in preschool children, older people, alcohol-dependent patients and patients without a spleen.² Up to 60% of healthy people in the community carry *S. pneumoniae* in their nose and throat without suffering any ill effects, but illness develops when the organism spreads from the nasopharynx into other tissues.

Respiratory disease is still the single most common reason for acute hospital admissions in the UK with an estimated 50 000 cases of pneumonia each year.³ Pneumococcal pneumonia is the most common of all community-acquired pneumonia, and is estimated to affect 1 in 1000 adults each year and to have a mortality rate of 10–20%.¹ Around two-fifths of hospital inpatient bed days used in the treatment of respiratory disease are due to pneumoniae.³

S. pneumoniae is also one of the most frequently reported causes of bacteraemia and meningitis. During 2000, 4744 laboratory isolates from blood, cerebrospinal

fluid (CSF) or other normally sterile sites were reported to the Health Protection Agency (formerly Public Health Laboratory Service) from laboratories in England and Wales.

The impact of pneumococcal infection on the health service is considerable. It is estimated that in an average district with a population of 500 000, the following may be expected:⁴

- 400 cases of pneumococcal pneumonia in adults, with 40–80 deaths expected
- 43 cases of pneumococcal bacteraemia, with 6–11 deaths
- 3–4 of pneumococcal meningitis, with one death.

Pneumococcal vaccination has been recommended since 1996 and had to be considered from 1992 for all those in whom invasive pneumococcal infection was likely to be more common. In August 2003, the Department of Health recommended pneumococcal vaccination for all patients aged 65 years or over who have not previously been immunised, as well as for patients of any age deemed to be in a clinical risk group.⁵ The age recommendation for this policy has been gradually phased in, starting in August 2003 with all persons aged 80 years and over, followed by all those aged 75 years and over from 1 April 2004, and finally by all those aged 65 years and over from 1 April 2005. Research has shown that despite a vaccination recommendation being in place, many patients who have a high risk of developing invasive pneumococcal disease are not being immunised.^{6,7} A recent publication from the Health Protection Agency (HPA) estimated that vaccination coverage in those aged 80 years and above would be only 26% in England as a result of this programme.⁸

The data presented are taken from an audit implemented by the Billericay, Brentwood and Wickford PCT (BBW PCT). This audit was carried out to evaluate the level of pneumococcal vaccination coverage and to help identify what the PCT and surgeries could do to improve this level of coverage. The PCT viewed this exercise as part of its clinical governance responsibilities and its strategy for providing high-quality care and protecting the health of its population.

Methods

In May 2004, the Public Health Directorate at BBW PCT invited all primary care practices ($n = 22$) to participate in an audit aimed at evaluating pneumococcal vaccination coverage in those aged 80 years and

over and those falling into one of the clinical risk groups (as defined in August 2003 within the Department of Health (DH) recommendations). It should be noted that since this audit was carried out, the phased approach to the implementation of the pneumococcal vaccination recommendation for persons aged 65 years and over has progressed to its final phase. Further to this, the DH has also added additional clinical risk groups to the previous list who would benefit from pneumococcal vaccination. Box 1 shows the current DH recommendations for pneumococcal vaccination and identifies which new categories have been added in the latest update.⁹

The audit was conducted between May and August 2004 and consisted of a comprehensive review of both electronic and paper documentation. This was carried out in two phases. In the first phase both electronic and paper documentation were audited. These were reviewed to detect any difference. In the second phase only electronic data were audited. Appropriate electronic search criteria (Read codes) were used to identify patients. Pneumococcal vaccination coverage was assessed for patients who fell into one (or both) of the groups recommended for vaccination; the group defined by age and the group defined by clinical risk conditions. As the aim of this audit was to calculate the pneumococcal vaccination coverage among patients with *any* clinical risk condition, it was crucial to ensure that patients presenting with more than one clinical risk condition were accounted for only once. For example, a patient with diabetes and chronic heart disease would only be counted once, hence the apparent low prevalence of a clinical risk condition. In addition, several other factors were assessed to determine their possible influence on the level of vaccine coverage in a given patient population, namely:

- the presence of a concomitant chronic illness
- the gender of the patient
- the total number of patients registered with the practice (used as a proxy measure for the number of practice staff)
- the proportion of patients aged 65 years and over registered in the practice
- the proportion of patients aged 80 years and over registered in the practice.

All data entry and statistical analyses were conducted using SPSS version 12 (SPSS Inc., Surrey, UK). Any association between pneumococcal vaccination coverage and factors that could potentially impact on this coverage (and for which information was available from the audit) was evaluated using Pearson chi squared test and multiple logistic regression (SPSS version 12).

Box 1 Department of Health pneumococcal immunisation programme recommendations with effect from April 2005

Age-based recommendations for vaccination:

- all those ≥ 65 years old
- all those >2 months old in the following clinical risk groups:
 - children >2 months to <5 years of age should receive 7-valent pneumococcal conjugate vaccine, followed by a single dose of 23-valent pneumococcal polysaccharide vaccine after the age of 2 years
 - children ≥ 5 years of age and adults should receive a single dose of polysaccharide vaccine

Clinical risk factor recommendations for vaccination:

- asplenia or dysfunction of the spleen
- chronic respiratory disease including asthma
- chronic heart disease
- chronic renal disease
- chronic liver disease
- diabetes
- immunosuppression
- HIV infection at all stages
- individuals with cochlear implants
- individuals with CSF shunts*
- children under 5 years of age who have previously had invasive pneumococcal disease*

*New categories added as part of a DH update on the pneumococcal immunisation programme issued in August 2004 and therefore not assessed within the scope of this audit⁹

Results

There was a high level of participation in this audit, with a total of 15 practices taking part. Eleven practices were audited in the first phase. Paper records and electronic records were both audited. Evaluations of data from both sources showed no difference between the two methods of data capture. Hence in the second phase (four practices), only the electronic notes were reviewed. The PCT audit team felt assured that additional information was unlikely to be retrieved from including a review of the patients' paper notes as well.

Practice and patient demographics

The practice demographics in terms of the average list size per general practitioner (GP), as well as the number of GPs per practice for the audit were compared with those for the UK,¹⁰ and were found to be comparatively consistent (see Table 1). Similarly, the patient age demographics for the audit population with regard to the key patient age groups impacted by the vaccination recommendations were also found to be similar to those seen across the UK.

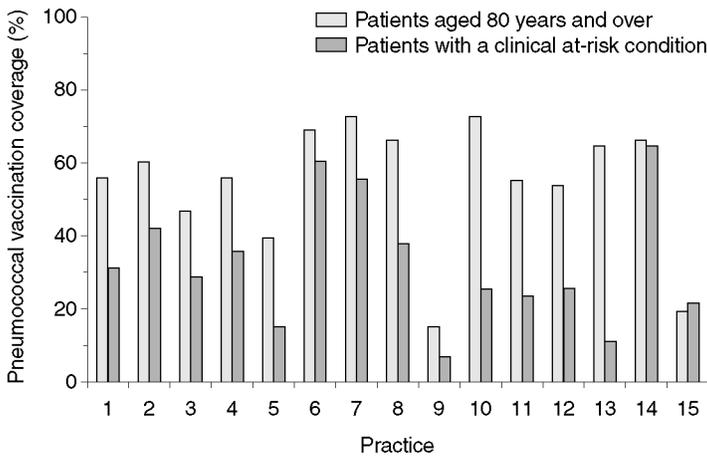
Pneumococcal vaccination coverage in patients aged 80 years and over

The vaccination coverage among patients aged 80 years and over varied greatly from practice to practice: from a high of 75% to a low of 17% (Figure 1). The overall mean coverage for this group of patients was 59%. Factors that appeared to influence vaccine coverage in this patient group were the presence of clinical risk conditions, the gender of the patients, and the size of the practice with which the patients were registered. Patients with a clinical risk condition were significantly more likely to have received pneumococcal vaccine (67%) compared to those without (56%), as were males (65%) compared to females (56%; $P < 0.0001$). Interestingly, patients in large practices (i.e. practices with 4000 or more patients) were more likely to be vaccinated (62%) than patients in smaller practices (52%; $P < 0.0001$).

In contrast, vaccination coverage for this group was not influenced by the proportion of patients aged 80 years and over registered with the practice. In England and Wales persons aged 80 years and over represent 4.3% of the total population.¹¹ Practices in which patients aged 80 years and over represented less than 4.3% of the patient population recorded vaccination coverage of 60% compared to 58% for practices with a higher proportion of elderly patients ($P = 0.30$). Coverage seemed however to be influenced by the

Table 1 Practice and patient age demographics: BBW PCT audit versus UK population data

Practice demographics	BBW PCT audit population	UK population
Average list size per GP	2083	1777
Practices with the following number of GPs (%)		
1	29	27
2	8	19
3	18	14
4	15	13
5	13	11
>5	18	17
Patient age demographics		
Mean % patients ≥ 65 years of age	17.6	16.0
Mean % patients ≥ 80 years of age	4.6	4.3

**Figure 1** Individual practice pneumococcal vaccination coverage of patients ≥ 80 years of age and of those deemed at risk

proportion of patients aged 65 years and over registered with practices, with patients in practices with a higher proportion of patients in this age group being more likely to be vaccinated: 60% versus 56% ($P = 0.035$).

Logistic regression analysis of the potential effect of inclusion in a clinical risk group, gender, practice size and practice population demographics on pneumococcal vaccination coverage limited the statistically significant predictors of pneumococcal vaccination coverage to inclusion in a clinical risk group (adjusted odds ratio 1.54 $P < 0.0001$), the practice size (adjusted odds ratio 1.45 $P < 0.0001$), and gender (adjusted odds ratio 1.39 $P < 0.0001$).

In terms of the patient population aged between 65 and 80 years, there was a total of 9308 individuals

(who in future will all be recommended to receive vaccination), of whom 2036 (22%) had a risk factor present; however only 840 (41%) had actually received the vaccine.

Pneumococcal vaccination coverage for patients in clinical risk groups

A total of 5048 patients (7% of the total practice population) had a history of at least one clinical risk condition, thereby indicating a need for pneumococcal vaccination. The proportion of these individuals who had actually been vaccinated varied widely, ranging from a high of 64% in one practice, to a low of 6% in another, and an overall mean of 36%. In each practice the vaccination coverage for patients in these

clinical risk groups was consistently lower than for patients aged 80 years and over.

Again, larger practices, i.e. practices with 4000 or more registered patients, were more likely to vaccinate persons in the clinical risk groups than smaller practices: 41% versus 25% ($P < 0.0001$). Coverage was, however, not influenced by the proportion of the practice population aged 80 years and over: 35% in practices with a higher than average elderly population versus 37% ($P = 0.26$). Surprisingly, the proportion of patients aged 65 years and over registered with practices seemed to be associated with vaccination coverage in these groups of patients: 38% for practices with a higher proportion of patients 65 years and over versus 33% ($P < 0.0001$). Overall, uptake in those with a clinical risk condition varied considerably depending on the condition present (see Figure 2 and Table 2). Vaccination coverage was higher among patients with chronic heart disease, chronic lung disease or diabetes. Interestingly, 2316 registered patients were vaccinated (4% of all vaccinated patients), even though they were outside the present recommendations (i.e. less than 75 years old and with no clinical at-risk condition).

Each practice involved in the audit was asked to complete a questionnaire identifying issues surrounding vaccination uptake within their locality. Nine out of the 15 practices completed the questionnaire. Of the multi-partner practices, a lack of patient understanding and patient refusal were identified as being of greatest importance, whereas in smaller GP practices a lack of resources was identified as the key issue relating to vaccination uptake.

Discussion

Although no pneumococcal vaccination coverage target has been set by the DH, the BBW PCT has achieved a level of coverage among patients aged 80 years and over, and among patients in clinical risk groups which, based on published and anecdotal evidence, seems to be significantly above what is being experienced by PCTs, on average, at the moment. In a previously reported study of patients admitted as medical emergencies, out of 68% of patients found to have been eligible for pneumococcal vaccination, only 15% had actually received it.¹²

The DH has specifically identified low levels of pneumococcal vaccination uptake as being an important issue, and has asked that measures be put in place by all healthcare professionals and for each PCT to maximise uptake, as part of their Directed Enhanced Service programme.¹³

This audit suggests that a key influencing factor for pneumococcal vaccination coverage both for patients aged 80 years and over and for those with a clinical risk condition factor was the size of the practice; practices with less than 4000 registered patients achieved a significantly lower rate. Based upon an average UK patient list per GP of just under 1800 patients, this would mean that at least one-third of UK practices would fall into this category. Significant associations between size of practice and quality of care have been seen in other studies,¹⁴ although the relationship is not simple. For example, in these studies, smaller practices scored better than larger ones regarding access to care, while larger practices scored better than smaller ones regarding diabetes care. This emphasises the fact that

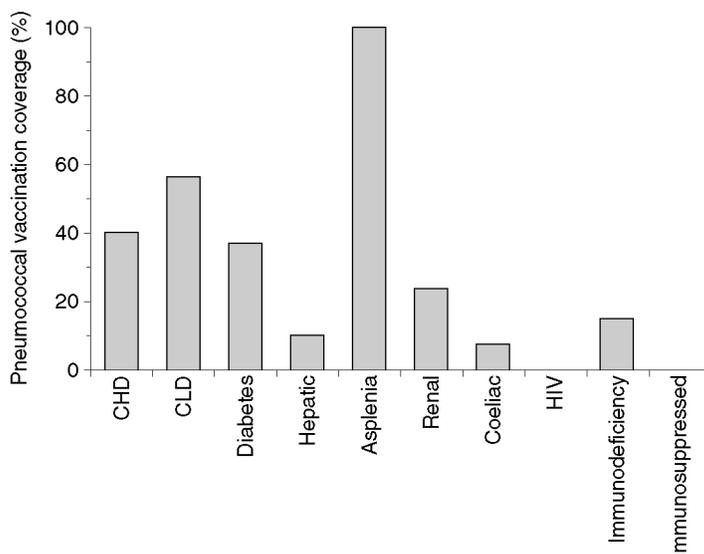


Figure 2 Pneumococcal vaccination coverage by risk factor. CHD, coronary heart disease; CLD, chronic lung disease

Table 2 Pneumococcal vaccination coverage by risk factor

Clinical risk factor	Pneumococcal vaccination coverage	
	Number of patients vaccinated (total number of patients)	Patients vaccinated (%)
Chronic heart disease	1986 (4844)	41.0
Chronic lung disease	414 (741)	55.9
Diabetes	752 (1944)	38.7
Hepatic	40 (370)	10.9
Asplenia	3 (3)	100.0
Renal	171 (713)	24.0
Coeliac disease	3 (37)	8.1
HIV	0 (5)	0.0
Immunodeficiency	2 (13)	15.4
Immunosuppressed state	0 (1)	0.0

no single type of practice can be seen to monopolise high-quality care, with different practices having different strengths. In the case of pneumococcal vaccination, one reason for the lower coverage may be that smaller practices (with 1–2 GPs) generally have fewer additional staff and clinics (e.g. nurse-led clinics) to provide support with this kind of vaccination programme. It may, therefore, be necessary to review ways to provide additional support to smaller practices enabling them to achieve good coverage.

From April 2005, the DH recommendation for pneumococcal vaccination reached its final phase and included all patients 65 years and over, which, based on current UK data, represents 16% of the population. This extension of the benefits of pneumococcal vaccination to a wider group of patients will have considerable workload implications for practices, as they will have to identify, offer and vaccinate considerably larger numbers of patients. The previous strategy of offering pneumococcal vaccine at the same time as the influenza vaccine is therefore likely to be unsuccessful and to provide even lower coverage rates.

Conclusion

In order to maximise the benefits to be gained from the pneumococcal vaccination programme, vaccine coverage among patients for whom the vaccine is recommended needs to be improved. PCTs, in their public health role, will need to ensure that practices are aware of the clinical benefits for patients and in their

clinical governance role, their responsibility to provide high-quality preventive care. In an attempt to improve vaccination coverage, PCTs may be in a position to provide funding to support practice-based pneumococcal vaccination programmes. In addition PCTs could support practices by providing extra administration time to identify patients in need of vaccination, and by providing extra nursing hours to assist with the undertaking of a pneumococcal campaign. This will allow practices to introduce a strategic approach to identifying, informing and vaccinating patients where such an approach is not yet in place.

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CONFLICTS OF INTEREST

None.

ADDRESS FOR CORRESPONDENCE

Dr M Thalanany, Director of Public Health, Billericay, Brentwood and Wickford PCT, High Wood Hospital, Geary Drive, Brentwood, Essex CM15 9DY, UK. Tel: +44 (0)1277 302452; fax: +44 (0)1277 302313.

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