

# Primary care

## Specialist nurse intervention to reduce unscheduled asthma care in a deprived multiethnic area: the east London randomised controlled trial for high risk asthma (ELECTRA)

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### Abstract

**Objective** To determine whether asthma specialist nurses, using a liaison model of care, reduce unscheduled care in a deprived multiethnic area.

**Design** Cluster randomised controlled trial.

**Setting** 44 general practices in two boroughs in east London.

**Participants** 324 people aged 4-60 years admitted to or attending hospital or the general practitioner out of hours service with acute asthma; 164 (50%) were South Asian patients, 108 (34%) were white patients, and 52 (16%) were from other, largely African and Afro-Caribbean, ethnicities.

**Intervention** Patient review in a nurse led clinic and liaison with general practitioners and practice nurses comprising educational outreach, promotion of guidelines for high risk asthma, and ongoing clinical support. Control practices received a visit promoting standard asthma guidelines; control patients were checked for inhaler technique.

**Main outcome measures** Percentage of participants receiving unscheduled care for acute asthma over one year and time to first unscheduled attendance.

**Results** Primary outcome data were available for 319 of 324 (98%) participants. Intervention delayed time to first attendance with acute asthma (hazard ratio 0.73, 95% confidence interval 0.54 to 1.00; median 194 days for intervention and 126 days for control) and reduced the percentage of participants attending with acute asthma (58% (101/174) *v* 68% (99/145); odds ratio 0.62, 0.38 to 1.01). In analyses of prespecified subgroups the difference in effect on ethnic groups was not significant, but results were consistent with greater benefit for white patients than for South Asian patients or those from other ethnic groups.

**Conclusion** Asthma specialist nurses using a liaison model of care reduced unscheduled care for asthma in a deprived multiethnic health district. Ethnic groups may not benefit equally from specialist nurse intervention.

### Introduction


The numbers and roles of specialist nurses are increasing, but uncertainty remains about their effects on the costs and use of health care.<sup>1</sup> Two types of intervention involving asthma specialist nurses have been evaluated: educating patients after hospital attendance with acute asthma and outreach to educate and support general practitioners and practice nurses.


Improving asthma outcomes for ethnic minority groups remains a global challenge. Morbidity due to asthma is higher for minority or disadvantaged groups.<sup>2-3</sup> In the United Kingdom, hospital admission rates for South Asian patients have been double those of white patients and high for black patients.<sup>4-5</sup> South Asian patients may benefit less from asthma education than white patients and have poorer access to care during attacks.<sup>6-7</sup> Whether asthma specialist nurses can reduce morbidity in multiethnic inner city populations is unknown.

Two important questions remain for specialist nurses, particularly those dealing with asthma. Can they reduce health service use, and can they improve outcomes equally across ethnic groups? We tested the effectiveness of asthma specialist nurses using a liaison model of care across a single health district comprising one of the most ethnically diverse and deprived areas in the United Kingdom.

### Methods

We invited to participate in our study all 42 general practices in the London borough of Tower Hamlets and additionally two practices in the neighbouring borough of Newham which served large Bangladeshi populations using the Royal London Hospital, where the specialist nurses were based. All 44 practices

 The protocol for study groups is on [bmj.com](http://bmj.com)

 This is the abridged version of an article that was posted on [bmj.com](http://bmj.com) on 12 January 2004: <http://bmj.com/cgi/doi/10.1136/bmj.37950.784444.EE>

consented to take part. We randomised practices to intervention and control groups using a minimisation programme, stratifying by partnership size, training practice status, hospital admission rate for asthma, employment of practice nurse, and whether the practice nurse was trained in asthma care (see [bmj.com](http://bmj.com)).

Patients were eligible for inclusion if they had asthma diagnosed by a doctor, were aged 4-60 years, and had been admitted to or attended the accident and emergency department at the Royal London Hospital or the general practitioner out of hours service with acute asthma.

### Practices and participants

The two specialist nurses were accredited by the National Respiratory Training Centre. They intervened at the levels of the general practice and the patient (see [bmj.com](http://bmj.com)).

General practices randomised to the intervention group received two one hour visits by the specialist nurses at the start of the study to discuss guidelines for managing patients with acute asthma. We used a behaviour change model, incorporating discussion of relevant research evidence.<sup>8</sup>

Participants registered with the intervention practices were reviewed for asthma control and drugs by the specialist nurses at the nurse run clinic immediately after recruitment. They discussed a self management plan. Patients with sufficient understanding were provided with a peak flow meter and a written plan, which contained standard thresholds for peak flow and symptoms (see [bmj.com](http://bmj.com)). Most of the South Asian patients were Bangladeshi speaking Sylheti—a dialect with no written form; they received a plan written in English, explained through a bilingual advocate. Nurses reinforced advice with a face to face or telephone consultation.

Practices randomised to the control group received a single visit from the nurses to discuss standard guidelines for asthma. Participants registered with control practices were checked for inhaler technique in the nurse run clinic immediately after recruitment. Drugs were unaltered. Participants otherwise continued with usual care.

### Outcome measures and data collection

Primary outcomes were the percentage of participants attending for unscheduled asthma care and the time to first attendance for unscheduled asthma care in the year after intervention. Secondary outcomes were attendance for unscheduled care and review, self management behaviour, and quality of life.<sup>9-12</sup>

Researchers blinded to the randomisation status of the general practice extracted data from written and computerised general practice records. Two researchers blinded to randomisation status interviewed participants in person at baseline and by telephone at two, six, nine, and 12 months after recruitment. Participants self identified their ethnicity.

### Statistical analyses

Before breaking the coded allocation of practices, we carried out main and prespecified subgroup analyses. Analyses for primary outcomes were by ethnicity (South Asian (Bangladeshi, Indian, Pakistani), white, other), after exclusion of patients with both asthma and

chronic obstructive pulmonary disease noted in the medical records, those recruited retrospectively and prospectively, and children and adults. For secondary outcomes we carried out the main and subgroup analyses by ethnicity.

For unscheduled care, review, and quality of life, we fitted generalised estimating equations to individual level data, taking account of the clustering by practice. For time to unscheduled care and time to review we fitted proportional hazards models. Analyses were by intention to treat.

## Results

Practices contributed a mean of eight (range 2-28) participants. The characteristics of participants were similar between groups (table 1). Overall, 50% (164/324) of the participants were South Asian, 34% (108) were white, and 16% (52) were from 12 other ethnic groups, predominantly black African, Afro-Caribbean, and black British. Fourteen different first languages were spoken; 45% (146) of participants spoke English. Eighty nine per cent (269) lived in rented accommodation and 55% (177) were unemployed. Overall, 63% (204) of participants were recruited prospectively after attendance with acute asthma. The remainder met eligibility criteria over the previous year.

### Primary outcome: unscheduled asthma care

Primary outcome data were gathered for 98% (319/324) of participants. The specialist nurse intervention delayed first attendance for unscheduled asthma care in the year after intervention (adjusted hazard ratio for reattendance 0.73, 95% confidence interval 0.54 to 1.00; figure) and reduced the percentage of participants attending for unscheduled care over the following year (table 2). Mean rates of hospital admission, attendance at accident and emergency, and attendance at general practice for exacerbations were all non-significantly lower in the intervention group than in the control group. The

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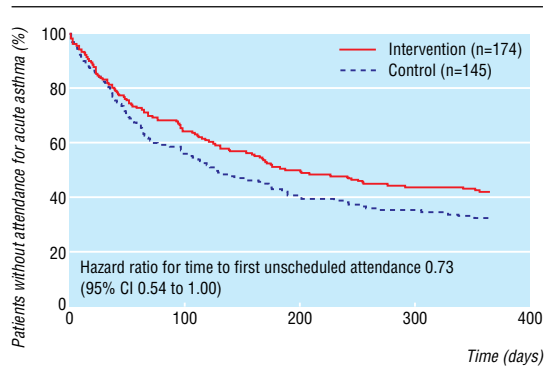
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**Table 1** Characteristics of participants allocated to nurse led intervention for acute asthma or standard guidelines for asthma. Values are numbers (percentages) unless stated otherwise

Characteristic	Intervention group (n=175)	Control group (n=149)
Male	85 (49)	76 (51)
Mean age in years (SD)	22.9 (17.4)	22.2 (18.1)
Age <16 years	91 (52)	81 (54)
Ethnicity:		
South Asian	95 (54)	69 (46)
White	56 (32)	52 (35)
Other	24 (14)	28 (19)
Fluent in English	141 (81)	133 (89)
English as first language	73 (42)	73 (49)
Housing*:		
Rented	152 (88)	126 (89)
Owned	20 (12)	16 (11)
Employment status of participants (or parent):		
Unemployed	97 (55)	80 (54)
Employed	67 (38)	56 (38)
Unknown	11 (7)	13 (8)
Current smokers (adults aged >16 only)	26 (31)	24 (35)
Chronic obstructive pulmonary disease in medical record	13 (7)	9 (6)
Receiving inhaled corticosteroids	127 (73)	107 (72)

\*Data for 172 intervention and 142 control participants.



Time to first unscheduled attendance with acute asthma after intervention for all participants (number of participants without reattendance at 365 days was 73 for intervention and 47 for control)

overall rates of yearly attendance for unscheduled care for each participant were 1.98 for the intervention group and 2.36 for the control group (adjusted incidence rate ratio 0.91, 0.66 to 1.26).

**Secondary outcomes**

*Review of asthma care*

Overall, 54% (78/145) of participants in the control group were reviewed in secondary or primary care in the year after intervention compared with 65% (113/174) in the intervention group (adjusted odds ratio 1.66, 0.96 to 1.98; table 2); 36% (52/145) of participants in the control group were reviewed in primary care only compared with 47% (82/174) in the intervention group (1.40, 0.72 to 2.73). Participants in the intervention group received 1.84 reviews yearly compared with 1.56 of participants in the control group (incidence rate ratio 1.15, 0.85 to 1.57).

*Self management behaviour, quality of life, and symptoms*

Self management behaviour and scores for quality of life and asthma symptoms showed no differences at two or 12 months' follow up (see bmj.com). Oral rescue corticosteroids were used by similar numbers of participants in each group (4% intervention, 7% control; odds ratio 0.7, 0.28 to 1.68).

**Subgroup analyses**

Exploratory hypothesis generating analysis comparing the effect of specialist nurse intervention on time to attendance between white patients, South Asian patients, and other ethnic groups was not statistically significant (white to South Asian hazard ratio 0.76, 0.44 to 1.29; white to other ethnicities 0.64, 0.39 to 1.06). It was, however, compatible with a larger effect for white participants (intervention group compared with control group hazard ratio 0.57, 0.38 to 0.85; South Asians 0.72, 0.48 to 1.09; other ethnicities 1.29, 0.51 to

3.22). The effect of the intervention was not significantly different for other subgroup analyses.

**Discussion**

Asthma specialist nurses using a liaison model reduced unscheduled care for acute asthma in a deprived multi-ethnic area. The intervention delayed attendance with acute asthma and reduced the percentage of participants attending with acute asthma over the following year. Rates of hospital admission, attendance at an emergency department, and visits to primary care for acute asthma were all non-significantly lower for participants receiving specialist nurse care, suggesting an impact on healthcare utilisation across both primary and secondary care. These improvements occurred despite comparison with a control group of practices receiving educational outreach for asthma, which itself improves care.<sup>13</sup>

Strengths of our study include completeness of follow up for primary outcome data and a pragmatic design with inclusion of all general practices in one health district, with a representative sample of the local multiethnic population. Use of a control group receiving outreach visits promoting standard asthma guidelines as a comparator for specialist nurse intervention had three benefits: it allowed a comparison against best usual practice, it reduced the impact of any Hawthorne effect (all practices received some education), and it promoted recruitment of a broader range of practices, increasing external validity. Although a secondary aim was to detect differences in effect between ethnic groups, this prespecified subgroup analysis had limited power.

Our liaison model was more effective than the community based approach evaluated in the Greenwich asthma study, with its similar setting in inner London.<sup>14</sup> In that study, specialist nurses educated practice nurses but not patients, and outcomes were assessed in the wider population of patients with milder asthma rather than a high risk group. Our liaison model of specialist nursing is probably as effective as the secondary care model, but provides additional support for patients in the community through patient education and clinical recommendations for general practitioners and practice nurses, and direct clinical support for patients.<sup>9 15-18</sup> This may be important in inner city areas, where general practices vary in their capacity to manage chronic illness.<sup>19</sup> A liaison model of specialist nursing has previously been evaluated (using a randomised design) only for patients discharged after a coronary event.<sup>20</sup> This study showed no benefits from the intervention perhaps because liaison lacked direct clinical involvement in care and was limited to supporting practice nurses.

**Table 2** Percentages (numbers) of participants attending for unscheduled asthma care and for review of asthma in year after intervention

Outcome	Intervention group (n=174)	Control group (n=145)	Intracluster correlation	Adjusted odds ratio (95% CI)
Unscheduled care	58 (101)	68 (99)	-0.0056	0.62 (0.38 to 1.01)*; 0.61 (0.38 to 0.99)†
Reviewed	65 (113)	54 (78)	0.0905	1.66 (0.96 to 1.98)
Reviewed in primary care	47 (82)	36 (52)	0.2077	1.40 (0.72 to 2.73)

\*Without clustering.  
†With clustering (see bmj.com).

### What is already known on this topic

Clinical specialist nurse outreach to primary care has not been shown to improve patient outcomes

Education of hospital attenders with acute asthma by asthma specialist nurses has inconsistent effects on unscheduled care

People with asthma from ethnic minority groups experience high levels of morbidity

### What this study adds

When asthma specialist nurses educated patients and liaised with primary care clinicians, unscheduled care in a deprived multiethnic area was reduced

Ethnic groups may not benefit equally from specialist nurse intervention

### Ethnicity

Our study was not powered to detect differences in effect of the intervention between ethnic groups, but our exploratory findings are compatible with potentially important differences in outcome between ethnic groups. This is consistent with other work suggesting that minority ethnic groups derive less benefit than majority groups from asthma education.<sup>7</sup> No randomised studies of interventions specifically addressing ethnic minority groups have reduced unscheduled asthma care.<sup>7 21</sup> These observations are important because interventions that have a differential benefit between majority and minority ethnic groups potentially widen inequalities in health.

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*bmjlearning.com*

### Childhood asthma

Over the past 25 years the prevalence of childhood asthma has risen from 4% to 10%. The main symptoms are chronic or recurrent cough and wheeze. You can confirm the diagnosis by checking peak expiratory flow in children old enough to do this. To find out more, take our learning module on the diagnosis and treatment of childhood asthma on *bmjlearning.com*. After reading the module, you can test your knowledge with our "Best of many questions" quiz.

Kieran Walsh, BMJ Learning ([bmjlearning@bmjgroup.com](mailto:bmjlearning@bmjgroup.com))

### Corrections and clarifications

*Experts predict big rise in dengue fever in South East Asia*

An out of date URL slipped into the last sentence of this news article by Jane Parry (News Extra, *bmj.com*, 13 December 2003—[www.tropnet.net](http://www.tropnet.net) is the correct URL for TropNetEurop (the European Network on Imported Infectious Disease Surveillance)).

*Indirect comparison meta-analysis of aspirin therapy after coronary surgery*

A few errors crept into both versions of this paper by Eric Lim and colleagues (*BMJ* 2003;327:1309-11). In the full version of the article (on *bmj.com*) the printed equations in the statistical methods section should be on separate lines as follows:

$$\log RR_{ML} = \log RR_{MP} - \log RR_{LP}$$

$$\text{var}(\log RR_{ML}) = \text{var}(\log RR_{MP}) + \text{var}(\log RR_{LP})$$

In the abridged version, the table still contains the errors that were corrected at proof stage in the full version (where it is table 2): the numbers of patients with events and the event rates for Lorenz (both regimens) and Sanz (aspirin regimen) and the relative risk (95% confidence interval) for Hockings should therefore read as in the full version (on *bmj.com*). Finally, an extraneous "2" slipped into Eric Lim's email address; [eric.lim@cvsnet.org](mailto:eric.lim@cvsnet.org) is his correct address.