Continuing medical education for asthma in primary care settings: a review of randomised controlled trials

Christopher Barton, Nabil Sulaiman, Siaw-Teng Liaw

Abstract

Background: The aim of this paper is to review evidence of the effectiveness of educational interventions for General Practitioners for health outcomes of patients with asthma.

Methods: The 'Research and Development Resource Base in CME' was searched in addition to searches of the Cochrane, Medline, CINAHL and ERIC databases for original articles published between 1966 and October 2002. Inclusion criteria for the studies were that, the study was a randomised controlled trial (RCT), that the intervention included physician education, and that the effect of the intervention on patient health outcomes was reported.

Results: Three studies were identified that met our selection criteria and had an appropriate study design. One of these studies found health benefits for paediatric patients however these benefits were mostly lost when patients were followed up two years later. The other two studies found no health benefits from provider education.
Conclusions: Based on the studies available, no recommendations can be made on the effectiveness of CME for improving health outcomes of patients with asthma. However, absence of evidence does not imply absence of effect, so further controlled trials are needed to evaluate the effectiveness of this intervention in primary care settings. The challenges of conducting trials in primary care settings are discussed.

Key Words: asthma, continuing medical education, general practice

Christopher Barton,
Monash University,
Australia

Nabil Sulaiman
University of Melbourne,
Australia

Siaw-Teng Liaw
University of Melbourne,
Australia

Correspondence to:
Christopher Barton
Department of
Epidemiology and
Preventive Medicine
Monash University
Level 3, 553 St Kilda Rd
Melbourne Victoria
Australia 3004

Tel: +61 3 9903 0555
Fax: +61 3 9903 0556

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Introduction

Asthma is a major public health problem in Australia and has been recognised as one of seven national health priority areas. As many as 2 million Australians are affected by asthma and this number is increasing.[1]

Approximately 90% of the Australian population will see a general practitioner during the year[2] and asthma is the fourth most common reason for seeing a general practitioner.[2] As such, the quality of care provided by General Practitioners (GPs) is vitally important to the health and quality of life of asthma sufferers in Australia. National guidelines for the management of asthma have been available in Australia since 1989.[3] However, asthma management is still too often not in accordance with national guidelines as demonstrated by the low ownership of asthma management plans by patients.[4]

Utilising clinical practice guidelines is one way to improve management of asthma.[5] However simple, dissemination of guidelines is not in itself enough to change physician behaviour and improve health outcomes for asthma.[5] Dissemination of guidelines in association with other interventions such as CME is likely to be more effective at changing clinical practice, and subsequently, decreasing asthma related morbidity and mortality.[5]

While CME is the cornerstone of professional development there is little evidence for its effectiveness in terms of improved patient health outcomes.[6] Reports arising from systematic reviews suggest that the effectiveness of formal CME on patient outcomes is often inconclusive or weak and depends on the intensity of the intervention.[6-9] The most effective methods of CME identified in systematic reviews include learning linked to clinical practice, interactive educational meetings, outreach events, and strategies that involve multiple educational interventions.[8] Others have found that academic detailing and reminders may also be effective interventions.[10] However, the findings from these reviews cover a range of medical conditions and treatment settings, which are not necessarily comparable. Furthermore, interventions shown to be effective in secondary care may have little value in primary care settings.[11] To date, the effectiveness of CME for asthma in the primary care setting has not been reviewed.

There is a need for GPs to manage their patients with asthma with the most up to date information and an understanding of current best practice guidelines. As much of this learning will take place by formal CME strategies, we undertook a systematic review of evidence from randomised controlled trials for the effectiveness of CME for GPs, in terms of health benefits for patients with asthma.

Methods

A systematic review of the literature was undertaken to identify continuing medical education interventions to improve the management of adult or paediatric asthma by GPs. Medline, CINAHL and ERIC databases were searched for articles published between 1966 and October, 2002. Further searches of the Cochrane Database of Systematic Reviews and the 'Research and Development Resource Base in CME'[12] were also performed. The later also includes articles sourced from the EMBASE database and unpublished works.

The search terms included combinations of (1) asthma and education and general practice or family practice or primary care; and (2) asthma and workshop or academic detailing or seminar.

The abstracts of identified papers were reviewed by

one of the authors (CB) to determine if they contained an education based intervention for asthma. These articles were then recovered and the reference lists of these and other review articles were inspected to identify additional studies not identified in our literature search.

The inclusion of different studies was then discussed by two of the authors (CB and NS). Disagreements were resolved through discussion, or by consultation with the third author (SL). Studies were included in the review if they utilised a Randomised Controlled Trial design, the intervention included physician education, and the effect of the intervention on patient health outcomes was reported.

Information was then extracted from the articles by one of the authors (CB) and included study design, setting, and main outcomes. The primary outcomes of interest were patient use of health services for asthma attacks, symptoms, and quality of life. Studies meeting the inclusion criteria were independently assessed for methodological quality by two of the authors (CB and NS) using the scoring scheme of Jadad *et al.*[13] Any discrepancies were resolved through discussion between the two authors.

Due to the small number of studies and the different outcomes reported, meta-analysis was not deemed appropriate. The relevant findings were synthesised and are reported descriptively.

Results:

A QUOROM flow diagram of the process for selecting studies for inclusion in the review can be found in Figure 1. It can be seen that of the 156 abstracts identified by our initial search, only 11 articles met the screening criteria and were recovered for further assessment. Of these, only three studies (four published papers) met all the inclusion criteria and were included in the review (Table 1). The remaining seven were excluded as they did not determine patient health outcomes. Details of these excluded studies are reported in Table 2. The three studies to be included were assessed for methodological quality using the scoring scheme of Jadad *et al*,[13] which assesses appropriateness of randomisation and blinding. All of the studies were given a score of 3 out of a maximum possible score of 5, indicating good study quality. None of these studies described how the subjects were randomised and were not double blinded, although it was reported by Clarke *et al* that patients were blind to the intervention received by their health care provider, and physicians did not know what questions were asked of patients.

The four studies[14-17] included analyses of health benefits to patients with asthma following CME delivered to GPs in the United States,[14,15] Netherlands,[16] and England.[17] They reported varying levels of success in terms of benefits to patients. Clarke *et al*[14] assessed changes in use of health care services for asthma following an interactive seminar for GPs. The intervention group had fewer hospital admissions, Emergency Department visits, scheduled visits for asthma, and number of days with symptoms in spring and summer, but only for patients who began using inhaled corticosteroids during the trial. When patients were followed up two years later[15] patients treated by physicians in the intervention group only differed from patients in the control group by number of admissions to hospital. Participants who had more than three ED visits at baseline and whose GP received the intervention had a reduced number of ED visits at follow up.

Neither Smeele *et al*,[16] nor White *et al*[17] found significant benefits to patients in the intervention groups compared to patients in the control group for asthma morbidity or quality of life, one year and two years after the intervention respectively. Both these studies reported adequate sample sizes to detect clinically significant differences between groups for the reported outcomes.

Seven studies were excluded from this review as they did not report patient health outcomes. These studies nonetheless have demonstrated a number of important

Figure 1: QUOROM Flow Diagram for selection of studies to be included in the review and reason for exclusion.

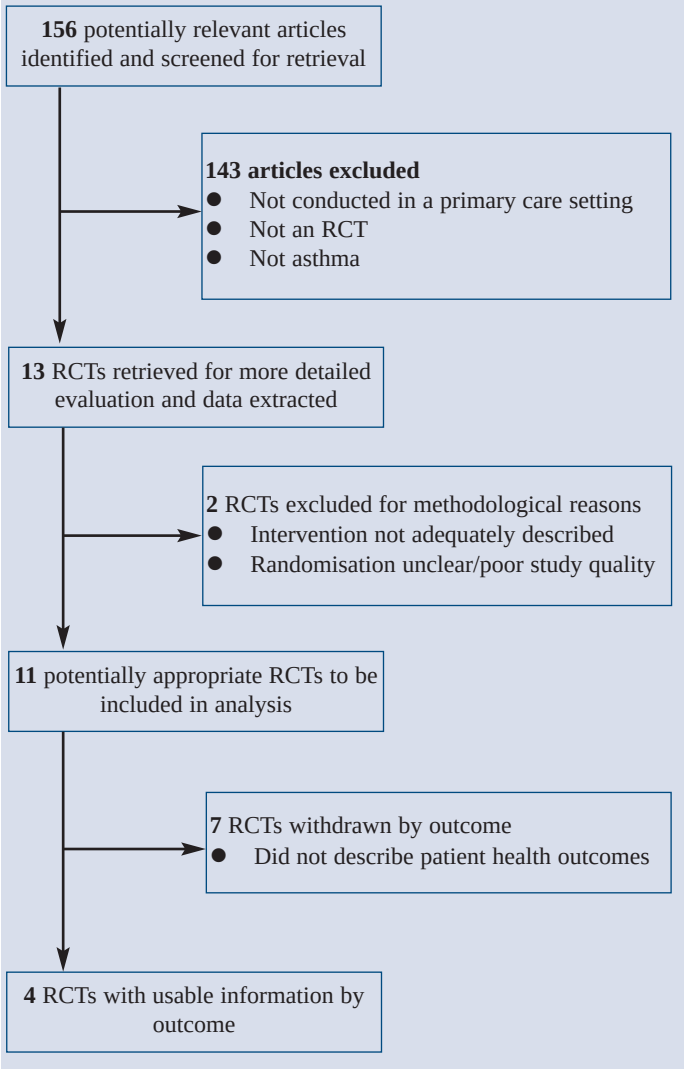

Table 1: Summary of studies included in the review, including description of sample, description of intervention, and the primary patient health outcomes.

Author (year)	Sample and Setting	Intervention	Primary Patient Outcomes
Clarke *et al* (1998) #14	Practitioners were drawn from the environs of Ann Arbor, MI, and New York, NY. ~ 74 practitioners ~ 637 children	Interactive seminar for GPs based on the theory of self-regulation, guiding physicians to develop	Scheduled visits (0.005), follow up visits (0.005), ED visits (NS), hospital visits (NS), days with symptoms Spring (0.01), Summer (0.005)
Clarke *et al* (2000) #15	As above	As above	Scheduled visits (NS), follow-up visits (NS), ED visits (NS), hospital admissions (0.03)
Smeele *et al* (1999) #16	GPs in south eastern Netherlands, with a balanced distrbution of urbanisation and type of practice ~ 34 GPs ~ 433 adult patients	4x2 hour intensive interactive group education and peer review involving: aims of national guidelines, diagnosis, treatment, regular review, patient education.	No significant patient differences for symptoms, current smoker and quality of life (total score).
White *et al* (1989) #17	GPs identified from a list of the Croydon family practitioner committee (UK) ~ 27 GPs ~ 454 children and adult patients	7 small group seminars and group discussion about variability in the management of asthma by GPs	No significant patient differences for respiratory symptoms, days off work or school, one or more home visits by GP, two or more severe attacks, or longest attack at least one day

Table 2: Summary of findings from trials that were excluded as they did not determine patient health outcomes

Reference	Reason for exclusion	Sample	What outcomes did these studies measure?
Evans *et al* (1997) #21	No patient health outcomes	37 paediatricians and 50,560 children	Continuity of care (0.002), increase prescribing corticosteroids (0.001), beta-agonist (0.05), spacer (0.001)
Feder *et al* (1995) #22	No patient health outcomes	39 GPs but no patients	Cost savings in medicine use observed
(a) Lundborg *et al* (2000) #23	No patient health outcomes	204 GPs but no patients	Improvements in GP prescribing
(b) Lundborg *et al* (2000) #24	No patient health outcomes	As above	GP perception of an education intervention
Mesters and Meertens (1999) #25	No patient health outcomes	105 family physicians completed all 3 surveys	Uptake of an asthma education program by GPs
Veninga et *al* (2000) #26	No patient health outcomes	181 GPs	GP knowledge (NS) but attitudes (0.05)l
Veninga *et al* (1999) #27	No patient health outcomes	665 GPs across four countries	Prescribing behaviour Netherlands (0.05), Norway (0.05) Slovakia (0.05), others (NS). Doctor attitude Netherlands (0.05), Norway (0.05), Slovakia (0.05)

intermediate outcomes following provider education. These benefits included significant cost savings,[19] improved continuity of care and prescribing behaviour[20-22] and doctor knowledge.[23,24] While some of these improvements might be expected to "flow on" to improve patient health outcomes, without documented evidence of benefits it cannot be certain that improved clinical management translated into improved patient health outcomes in these studies.

Discussion:

Because this review was undertaken to identify the health benefits to patients with asthma of CME delivered to General Practitioners, it was important to limit the review to RCTs. Three studies meeting our selection criteria were identified. These studies found little evidence of benefits to patients in terms of improved control of asthma, asthma symptoms, and quality of life. One study[14] demonstrated that education for general practice paediatricians reduced the number

of days with symptoms and use of acute emergency care for asthma, but only in a sub-group of patients who began using corticosteroids during the study. When patients were followed up two years later, most of these benefits were no longer found.[15]
The finding that there are only limited and short-term benefits for patients following provider education are similar to those reported previously from larger reviews of studies conducted in other health care settings and of patients with other medical conditions.[6-9] There are a number of reasons that can potentially explain the lack of any strong effect. The studies we identified in this review serve to highlight some of the challenges of conducting trials in primary care/community health settings. Wilson *et al*[11] has recently outlined some of the challenges faced by researchers doing research in primary care/community health settings and a number of these probably worked to dilute the effects of the CME interventions of the three studies we identified. Specifically, benefits to patients may have been diluted due to the inclusion of only one GP in intervention practices, which potentially results in a lack of continuity of care. This is a considerable problem for any intervention that is initiated in a primary care setting as the target population may never actually receive the intervention. Similarly, the patient may not return for review within the time frame of the study, and again miss out on receiving the intervention, or alternatively, health benefits may not be observed within the timeframe of the study but manifest themselves later (for example from smoking cessation). One further factor that may serve to dilute the results of primary care based interventions is the selection of patients with co-morbidities (or alternatively, those without). During the life of an intervention the patient may return for follow up at the clinic, but for treatment unrelated to the content of the intervention.

In addition to the dilution of outcome effects discussed above one of the primary challenges of conducting good clinical trials in primary care settings is the process of randomising providers and/or patients to intervention and control groups. Both Clarke *et al*[14,15] and White *et al*[17] only recruited a single physician from each clinic, and then randomisation was performed at the clinic level. Selecting only one GP in each clinic leads to the problem of ensuring continuity of care during the time frame of the study. The alternative is to recruit all GPs in a clinic, which in reality, is easier said than done. For practical purposes (eg. expense, lack of a patient or GP list), it is acceptable practice to recruit an 'index GP' but use a practice intervention and analyse data at a practice level. If the data is to be analysed at a GP or patient level, then adjustments for clustering need to be made. While Smeele *et al*[16] and Clarke *et al*[14,15] made adjustments for clustering effects, White *et al*[17] did not include this in their analyses. Adjustment for the effects of clustering should be made in the analysis of results however this can be compensated for in the design of a trial when sample size is calculated, such that sample size is increased and issues like variability in size of practice and patient population are factored into the sample size calculations.

While there have been numerous controlled trials investigating the effect of a wide range of education based interventions on the management of asthma in primary care settings, very few determine whether these interventions actually benefit patients. A number of the studies that we initially identified were excluded from this review because they did not determine patient health outcomes. While there are additional costs involved, and an additional level of technical and logistical complexity involved in studying patient populations, the ultimate goal of health care must be to realise benefits to patients in terms of improved health and improved quality of life. It is therefore imperative that the benefits of any intervention be measured in terms of benefits to patient health.

Educational interventions are often evaluated using a range of methodologies including controlled trials (without randomisation), which may be as appropriate a study design as a RCT in some situations.[19] Similarly, a mixture of qualitative and quantitative methods can provide a richer understanding of the process of learning and translation of the learning into behaviour.[20] An epistemological debate over the use of RCTs for evaluation in preference to study designs that do not employ randomisation is outside the scope of this review. We restricted our review to RCTs and did not include other study types (eg. un-randomised controlled trials, before and after studies) because we were interested only in the studies that used randomisation to determine if CME improved patient outcomes. We acknowledge that in many instances RCTs are not able to be conducted or are inappropriate, however, we do not feel this is the case in the current circumstance, where the outcomes of interest (health care utilisation, asthma symptoms, and quality of life) are easily determined and inclusion of a control group is ethical. While this constrained approach limited the number of trials (and interventions) available for inclusion in this review, limiting studies to those using the highest level of evidence based on the levels of evidence suggested by the Cochrane group, we believe that the findings are strengthened overall.

Implications for future research and clinical practice:

At present there is minimal evidence from RCTs for the effectiveness of continuing medical education for improving health outcomes of patients with asthma treated in the community. However, "absence of proof is not the same as proof of absence". Evaluation should be a corner stone of any trial, and any new intervention should be evaluated before being disseminated into normal practice. Good evaluation requires appropriate study design, suitable sample size, use of reliable and valid instruments, and appropriate statistical analysis. However, this can only occur if more funding is made available for research in primary care settings.

The clinical implications of the findings reported here are limited due to the small number of randomised controlled trials that have been published. Further

controlled trials are needed to evaluate the effectiveness of this intervention in primary care settings. More intensive interventions that include a range of strategies including audit are likely to be the most effective, however, in proposing such an intervention investigators need to consider the practical implications (ie. cost and time) of intensive interventions. A successful trial is no success if it can't subsequently be applied in a 'real world' setting.■

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References

1. National Asthma Council (NAC) Asthma Management Handbook. 2002
2. Pegram R., Calcino G, MacIsaac P. *et al.* General Practice in Australia: 2000. Canberra. Cmmonwealth of Australia. 2000.
3. Woolcock A. Rubinfeld AR. Seale JP. et al. Thoracic society of Australia and New Zealand. Asthma management plan, 1989. Med J Aust. 151(11-12): 650, 1989.
4. Matheson M. Wicking J. Raven J. et al. Asthma management: how effective is it in the community? *Internal Medicine Journal*. 2002;**32(9-10)**:451-6,
5 Weingarten S. Translating practice guidelines into patient care: Guidelines at the bedside. *Chest* 2000; **118(2)Suppl**: 4S-7S.
6 Davis D.A., Thomson M.A., Oxman A.D., and Haynes R.B. Evidence for the effectiveness of CME. *Medical Education* 1992; **268(9)**: 1111-7.
7 Davis D, O'brien MAT, Freemantle N *et al*. Impact of formal continuing medical education: Do conferences, workshops, rounds, and other traditional continuing education activities change physician behaviour or health care outcomes. *JAMA* 1999 **282(9)**: 867-874.
8 Cantillon P. and Jones R. Does continuing medical education in general practice make a difference? *BMJ*. 1999;**318(7193)**:1276-9.
9 Oxman AD. Thomson MA. Davis DA. Haynes RB. No magic bullets: a systematic review of 102 trials of interventions to improve professional practice. *CMAJ*. 1995;**153(10)**:1423-31.
10 Schattner P, Markey P, and Matthews M. Changing GPs' clinical behaviour. What can divisions do? *Aust Fam Physician*. 2001; **30(3)**:300-304.
11 Wilson S, Delaney BC, Roalfe A, *et al*. Randomised controlled trials in primary care: case study. *BMJ* 2000; **321**: 24-27.
12. The Research and Development Resource Base in Continuing Medical Education. http://www.cme.utoronto.ca/RIS
13 Jadad AR, Moore RA, Carroll D. *et al*. Assessing the quality of reports of randomised clinical trials: is blinding necessary. *Controlled Clinical Trials* 1996 **17**: 1-12.
14 Clarke N., Gong M., Schork A. *et al.* Impact of education for physicians on patient outcomes. *Pediatrics* 1998; **101(5)**: 831-836.
15 Clarke N., Gong M., Schork A. *et al.* Long-term effects of asthma education for physicians on patient satisfaction and use of health services. *Eur Respir J* 2000; **16**:15-21.
16 Smeele, I.J.M., Grol, R., van Schayck C.P., *et al.* Can small group education and peer review improve care for patients with asthma/chronic obstructive pulmonary disease? *Quality in Health Care* 1999; **8**:92-98.
17 White PT, Pharoah CA, Anderson HR, and Freeling P. Randomized Controlled trial of small group education on the outcome of chronic asthma in general practice. *Journal of the Royal College of General Practitioners*. 1989; **39**: 182-186.
18 Dunn OJ Multiple comparisons among means. *J Amer Statistical Assoc*. 1961; **56**, 52-64.
19 Norman G. RCT = results confounded and trivial: the perils of grand educational experiments. *Medical Education* 2003; **37**: 582-584.
20 NHS Centre for Reviews and Disseminatin, University of York. *Effective Health Care* 1999; **5(1)**: 1-16. Trials excluded as they did not measure Patient Health Outcomes:
21 Evans D, Mellins R, Loback K, *et al.* Improving care for minority children with asthma. Professional education in public health clinics. *Pediatrics* 1997; **99(2)**:157-164.
22 Feder G, Griffiths C, Highton C, *et al.* Do clinical guidelines introduced with practice based education improve care of asthmatic and diabetic patients? A randomised controlled trial in general practices in east London. *BMJ* 1995;**311(7018)**:1473-8.
23 (a) Lundborg CS, Wahlstrom R, Oke T, *et al.* Influencing prescribing for urinary tract infection and asthma in primary care in Sweden: A randomised controlled trial of an interactive educational intervention. *J Clin Epidemiol.* 2000;**52(8)**: 801-812.
24 (b) Lundborg CS, Wahlstrom R, Diwan VK, *et al.* Design and implementation of an educational intervention in primary care in Sweden. *Int J Tech Assess Health Care.* 2000; **15(3)**: 458-472.
25 Mesters I, and Meertens RM. Monitoring the dissemination of an educational protocol on pediatric asthma in family practice: A test of associations between dissemination variables. *Health Educat and Behav.* 1999;**26(1)**: 103-120.
26 Veninga CCM, Denig P, Zwaagstra R, and Haaijer-Ruskamp F.M. Improving drug treatment in general practice. *J Clin Epidemiol*. 2000 **53**:762-772.
27 Veninga CCM, Lagerlov P, Wahlstrom R., et al. Evaluating an educational intervention to improve the treatment of asthma in four European countries. *Am J Respir Crit Care Med.* 1999 **160**; 1254-1262.