# Culture-specific programs for children and adults from minority groups who have asthma (Review)

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## TABLE OF CONTENTS

[Intervention Review]

# Culture-specific programs for children and adults from minority groups who have asthma

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## ABSTRACT

### Background

People with asthma who come from minority groups have poorer asthma outcomes and more asthma related visits to Emergency Departments (ED). Various programmes are used to educate and empower people with asthma and these have previously been shown to improve certain asthma outcomes. Models of care for chronic diseases in minority groups usually include a focus of the cultural context of the individual and not just the symptoms of the disease. Therefore, questions about whether culturally specific asthma education programmes for people from minority groups are effective at improving asthma outcomes, are feasible and are cost-effective need to be answered.

### Objectives

To determine whether culture-specific asthma programmes, in comparison to generic asthma education programmes or usual care, improve asthma related outcomes in children and adults with asthma who belong to minority groups.

### Search methods

We searched the Cochrane Register of Controlled Trials (CENTRAL), the Cochrane Airways Group Specialised Register, MEDLINE, EMBASE, review articles and reference lists of relevant articles. The latest search was performed in May 2008.

### Selection criteria

All randomised controlled trials (RCTs) comparing the use of culture-specific asthma education programmes with generic asthma education programmes, or usual care, in adults or children from minority groups who suffer from asthma.

### Data collection and analysis

Two review authors independently selected, extracted and assessed the data for inclusion. We contacted authors for further information if required.

**Main results**

Four studies were eligible for inclusion in the review. A total of 617 patients, aged from 5 to 59 years were included in the meta-analysis of data. Use of a culture-specific programme was superior to generic programmes or usual care, in improving asthma quality of life scores in adults, pooled WMD 0.25 (95% CI 0.09 to 0.41), asthma knowledge scores in children, WMD 3.30 (95% CI 1.07 to 5.53), and in a single study, reducing asthma exacerbation in children (risk ratio for hospitalisations 0.32, 95%CI 0.15, 0.70).

**Authors' conclusions**

Current limited data show that culture-specific programmes for adults and children from minority groups with asthma, are more effective than generic programmes in improving most (quality of life, asthma knowledge, asthma exacerbations, asthma control) but not all asthma outcomes. This evidence is limited by the small number of included studies and the lack of reported outcomes. Further trials are required to answer this question conclusively.

## PLAIN LANGUAGE SUMMARY

**Culture-specific programs for children and adults from minority groups who have asthma**

In this review, we examined if culture-specific asthma education programmes improves asthma related outcomes in children and adults from minority groups with asthma. Four studies with 617 patients, aged from 5 to 59 years were included in the review. We found that culture specific programmes were better in improving quality of life in adults and asthma knowledge in children but did not significantly improve asthma exacerbations. However there is insufficient data to be confident about the impact on exacerbations or whether culture specific programmes are beneficial in all settings. Nevertheless, it could be argued that asthma education programmes should be as culturally specific as possible, given the increased severity of asthma in minority groups and the complexity of health outcomes and culture. More studies are clearly required to address this question and to further inform relevant clinical practice and health policy.

## BACKGROUND

Asthma education is regarded as an important management step in national asthma guidelines (Coughlan 2000; BTS 2005). Asthma education, defined as provision of information on asthma, encompasses various formats which include face-to-face encounters, group sessions, outreach visits and home visits, provision of asthma action plans, education on recognition of loss of asthma control and self management skills (BTS 2005). The effects on asthma related outcomes of many of these various forms of education are addressed in other Cochrane reviews (Gibson 2002a; Gibson 2002b; Powell 2002; Wolf 2002; Toelle 2004; Tapp 2007) from the Cochrane Airways Group.

Racial and socio-economic factors influence both asthma severity and rates of recurrent acute presentations to emergency health facilities (Coultas 1994; de Oliveira 1999; Sin 2002). The reasons for this are unclear; contributing factors are arguably likely to include broad service delivery issues rather than a reflection of intrinsic asthma severity (Enarson 1999; Chang 2002). Other cultural influences on the management of asthma include symptom perception and understanding of disease and self management (Enarson 1999). An appropriate model of care is important in successful delivery of service so as to improve care for people with asthma (Partridge 2000; Chang 2002). The model of care should be arguably culture appropriate (Enarson 1999). As outlined by Swartz and Dick, the World Health Organisation model of healthcare for chronic diseases in low-income settings should be founded on the premise that "health care should facilitate an ongoing relationship between provider and patient and help patients to make full use of their own and their community's resources for health" (Swartz 2002). Not surprisingly, in the health literature for Indigenous groups, the model of care for chronic diseases in Indigenous people include the involvement of Indigenous healthcare workers (IHWs) (Hamdorf 1996; Chino 2006). Amongst other factors, involvement of IHWs would theoretically facilitate this provider-patient relationship and could possibly reduce the prejudices and inequities that exist in some areas of health care systems (Eades 2000). The involvement of IHW specifically as an inclusion factor has recently been addressed in another Cochrane review (Chang 2007).

However, for a variety of reasons, including availability, not all culturally specific asthma programmes involve intervention by IHWs

(Anderson 2004). Also, many minority groups are non-indigenous to their country of residence (for example Latino groups in the USA) and people from these groups have also been shown to have poorer asthma outcomes (Anderson 2004; La Roche 2006). It is therefore not surprising that recent publications such as the Australian National Strategic Improvement Framework for Asthma makes special reference to disadvantaged/minority groups (NHPAC 2006). However, culture specific programmes are invariably more expensive than generic programmes as they involve specifically designed programmes. It is therefore important that the efficacy of culture specific education programmes for asthma is systematically examined.

Outcomes of asthma education programmes can be variably defined. Arguably the most important asthma education outcome is provision of self management so as to prevent death and morbidity from acute exacerbations. Other outcomes include reduction of day to day morbidity from asthma symptoms (for example, asthma control scores and quality of life measures) and objective measurements of asthma severity (for example, lung function data) (BTS 2005).

This systematic review examines if culture-specific asthma programmes improve asthma related outcomes in children and adults from minority groups who have asthma. The data will be useful to guide clinical practice and health policy.

## OBJECTIVES

To determine whether culture-specific asthma programmes in comparison to generic asthma education programmes, improve asthma related outcomes in children and adults who suffer from asthma and who belong to minority groups.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

All randomised controlled trials with parallel group design, comparing utility of specifically developed culture orientated asthma programmes in comparison to generic asthma education programmes or usual care for children and adults of minority groups who have asthma.

#### Types of participants

Children and adults from minority groups who suffer from asthma. Exclusion criteria: eosinophilic bronchitis, asthma related to an underlying lung disease such as bronchiectasis and chronic obstructive airway disease, or diagnostic categories such as 'cough variant asthma' and 'wheezy bronchitis' where controversy exists.

#### Types of interventions

All randomised controlled studies involving comparisons of specifically developed culture orientated asthma programmes with their local generic asthma education programmes or usual care. We considered trials that involved the use of other education and other interventions for inclusion if all participants had equal access to such interventions. An education programme is defined as a programme which transfers information about asthma in any form.

#### Types of outcome measures

Attempts were made to obtain data on at least one of the following outcome measures.

##### Primary outcomes

a) Proportion or number of participants who had asthma exacerbations during follow up.

##### Secondary outcomes

b) Proportions or number of participants not substantially improved at follow up.
c) Mean difference in other asthma related outcome measures.
d) Proportions experiencing adverse effects (from medications etc.).
e) Adherence outcomes.
f) Asthma knowledge factors.
g) Economic data.
It was planned that the proportions of participants who failed to improve on treatment and the mean clinical improvement would be determined using the following hierarchy of assessment measures (i.e. where two or more assessment measures were reported in the same study, the outcome measure that is listed first in the hierarchy would be used):

1. Death, hospitalisation, acute presentations to an emergency facility for asthma;
2. Rescue courses of oral corticosteroids;
3. Symptoms (Quality of life, Likert scale, asthma diary, visual analogue scale, asthma control scores) - assessed by the patient (adult or child);
4. Symptoms (Quality of life, Likert scale, asthma diary, visual analogue scale, asthma control scores) - assessed by the parents/carers;
5. Symptoms (Likert scale, visual analogue scale, asthma control scores) - assessed by clinicians;
6. Indices of spirometry, peak flow, airway hyper responsiveness, exhaled nitric oxide, sputum eosinophils;

7. Beta$_2$-agonist used;
8. Lost school or work days.

## Search methods for identification of studies

We used the following topic search strategy to identify relevant randomised controlled trials listed from electronic databases: "asthma", all as (textword) or (MeSH ) AND "indigenous" OR "aboriginal" OR "minority groups" AND "education" OR "self management" OR "self-management", AND "child" OR "children", OR "adult" OR "adults" all as (textword) or (MeSH )
*See* Appendix 1 for the full search strategies.
Trials were identified from the following sources.
1. The Cochrane Airways Group Specialised Trials Register (1950 to May 2008).
2. The Cochrane Central Register of Controlled Trials (CENTRAL), *The Cochrane Library*
3. MEDLINE (1950 to May 2008). Topic search strategy combined with the RCT search filter as outlined in the Airways Group module.
4. EMBASE (1980 to May 2008).Topic search strategy combined with the RCT search filter as outlined in the Airways Group module.
5. The list of references in relevant publications.
6. Written communication with the authors of trials included in the review.

## Data collection and analysis

### Study selection

From the title, abstract, or descriptors, two review authors (EJB, ABC) independently reviewed the results of literature searches to identify potentially relevant trials for full review. Searches of bibliographies and texts were conducted to identify additional studies. From the full text using specific criteria, the two review authors (EJB, ABC) independently selected trials for inclusion. It was planned that any disagreement would be resolved by consensus.
Trials that satisfied the inclusion criteria were reviewed and the following information recorded: study setting, year of study, source of funding, patient recruitment details (including number of eligible participants), inclusion and exclusion criteria, other symptoms, randomisation and allocation concealment method, numbers of participants randomised, blinding (masking) of participants, care providers and outcome assessors, type of education intervention, duration of intervention and follow up, co-interventions, numbers of patients not followed up, reasons for withdrawals from study, and whether intention-to-treat analysis is possible. Data was extracted on the outcomes described previously, and data from included studies was double entered into RevMan for meta-analysis. Further information was requested from the authors where required.
After the initial review of abstracts, the inclusion criteria were expanded to include trials that compared culture-specific programmes with 'usual care' in addition to 'generic education programmes'. It was assumed that, in accordance with pre-existing guidelines such as the 1997 National Asthma Education and Prevention Program Expert Panel Review guidelines, 'usual care' for asthma patients would include, at each clinical encounter, patient-centred asthma management education. This may include the provision of a written daily treatment plan and a written 'action plan' for management of acute episodes (Edmond 1998).
Studies included in the review underwent quality assessment. Four components of quality were assessed:

1. Allocation concealment. Trials scored as: Grade A: Adequate concealment, Grade B: Unclear, Grade C: Clearly inadequate concealment. (Grade A = high quality).
2. Blinding. Trials scored as: Grade A: Participant and care provider and outcome assessor blinded, Grade B: Outcome assessor blinded, Grade C: Unclear, Grade D: No blinding of outcome assessor (Grade A, B = high quality).
3. Reporting of participants by allocated group. Trials scored as: Grade A: The progress of all randomised participants in each group described, Grade B: Unclear or no mention of withdrawals or dropouts, Grade C: The progress of all randomised participants in each group clearly not described. (Grade A = high quality).
4. Follow up. Trials scored as: Grade A: Outcomes measured in > 90% (where withdrawals due to complications and side-effects are categorised as treatment failures), Grade B: Outcomes measured in 80 to 90%, Grade C: Unclear, Grade D: Outcomes measured in < 80%. (Grade A = high quality).

While only the allocation concealment quality assessment is displayed in the meta-analysis figures, all assessments are included in the 'Characteristics of included studies' table. Inter-reviewer reliability for the identification of high quality studies for each component were measured by the Kappa statistic.

### Statistics

For the dichotomous outcome variables of each individual study, relative and absolute risk reductions were calculated using a modified intention-to-treat analysis. This analysis assumes that participants not available for outcome assessment have not improved (and probably represents a conservative estimate of effect). Initial qualitative comparison studies of all the individually analysed studies examined whether pooling of results (meta-analysis) was reasonable. This took into account differences in study populations, inclusion/exclusion criteria, interventions, outcome assessment, and estimated effect size.
The results from studies that met the inclusion criteria and which reported any of the outcomes of interest (as defined above) were included in the subsequent meta-analyses. The summary weighted risk ratio and 95% confidence interval (fixed-effect model) was

calculated (Cochrane statistical package, RevMan version 4.3) for Rate Ratios of common events whereby one participant may have more than one event, generic inverse ratio (GIV) was utilised. The Rate Ratios were taken from the published papers and the standard errors were calculated from confidence intervals or P values in the published papers. It was proposed that numbers needed to treat to benefit (NNTB) would be calculated from the pooled OR and its 95% CI applied to a specified baseline risk using an online calculator (Cates 2003). The outcome indices would be assumed to be normally distributed continuous variables so the mean difference in outcomes could be estimated (mean difference (MD)). If studies reported outcomes using different measurement scales, the standardised mean difference was to be estimated. It was proposed that any heterogeneity between the study results would be described and tested to see if it reached statistical significance using a chi-squared test. The 95% confidence interval, estimated using a random-effects model, would be included whenever there are concerns about statistical heterogeneity.

***Sub-group analysis***

An a priori sub-group analysis was planned for:

1. Adults versus children;
2. Different types of education;
3. Different settings (rural versus non-rural).

Sensitivity analyses were planned to assess the impact of the potentially important factors on the overall outcomes:

1. Study quality (adequate allocation concealment and blinding);
2. Study size;
3. Variation in the inclusion criteria;
4. Differences in outcome measures;
5. Analysis using random-defects model; and
6. Analysis by "treatment received".

# RESULTS

## Description of studies

See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of ongoing studies.

The airways group register search in 2007 and 2008 identified 228 potentially relevant titles (203 in the initial 2007 search and 25 in the 2008 update search). After assessment of the abstracts, 29 papers were obtained for consideration for inclusion in the review. Of these, three studies remained ongoing at the time of the review (Buist S; Butz A; Drotar D), and a further four studies fulfilled the inclusion criteria for this final review (Moudgil 2000; Blixen 2001; La Roche 2006 from the initial 2007 search and Canino 2008 from the 2008 update). The main reason that studies were excluded from the review related to non-culture specific interventions in minority groups (11 studies), or non randomised controlled studies (10 studies) (*see* 'Characteristics of excluded studies' table).

Four studies, in which a total of 617 people with asthma from an ethnic minority group participated, were included in the review (*see* 'Characteristics of included studies' table). One was a multicentre study (Moudgil 2000) and three were single-centre studies (Blixen 2001; La Roche 2006). One study (Blixen 2001) examined adult patients and two studies (La Roche 2006, Canino 2008) examined paediatric patients only. The third study (Moudgil 2000) included both adult and paediatric patients however specific results for adults and children were not presented in the published paper. We contacted the author to seek this information but have not received a reply.

**Participants**

Canino 2008 enrolled 221 poor (defined by utilisation of the Peurto Rico Health Insurance Administration Agency Plan which required that the family be close to the poverty level) Peurto Rican families with a child aged from 5-12 years who had utilised health services for asthma within the last 12 months. La Roche 2006 enrolled 24 families, from African-American or Hispanic descent, with a child aged from 7 to 13 years with physician diagnosed asthma. Moudgil 2000 enrolled 689 total participants, however only 344 participants were part of an ethnic minority. We included this study in the review but only examined data relevant to the 344 Indian Sub-Continent (ISC) participants (the other 345 participants were of White European descent and published outcomes were stratified by ethnic descent as well as intervention group allocation). The participants in this study were people with asthma, aged from 11 to 59 years and registered patients of participating General Practices (GP), however data specific for children could not be obtained. Blixen 2001 enrolled 28 African-American participants, aged from 18 to 50 years who had been hospitalised for at least one night with a primary diagnosis of asthma.

**Interventions**

Canino 2008: Children and families enrolled in the intervention group received 8 asthma education modules, delivered over the course of 2 home visits with telephone contact for follow up and reinforcement of recommended plans and assignments. The modules aimed to help the patient/family with the following goals:

1. Understanding the chronic nature of asthma
2. Identifying and overcoming barriers to care and to appropriate medication use
3. Better understanding and use of the types of medications
4. Appropriately use the health care system and keep follow-up appointments
5. Enhance the use of action plans
6. Improve identification of asthma triggers and environmental avoidance techniques
7. Encourage identification of onset of symptoms and early management
8. Assume an active role in the communication with the provider

9. Identify the stressors that may affect the psychological well being of the parent and learn when and where to look for psychological and family therapy help, and
10. Provide a culturally competent environment in which the family feels understood and free to share cultural beliefs and practices.

Participants in the control group received 5 flyers of educational materials that contained information about the following topics: a description of control and rescue medications, when to use them and their benefits, information about what asthma is, common allergens and triggers and how to prevent episodes, how to take care of asthma equipment, and common foods that may be allergenic.

La Roche 2006: Families in the intervention group received three (on separate days) one hour education sessions each covering one module of the education programme. The content of the education programme was delivered in a manner that was consistent with the allocentric self-orientation and the socio-economic context of ethnic minorities. The emphasis of the intervention programme was on relational and collaborative asthma management among children, parents, families, physicians and mental health specialists. The content of each module consisted of:

1. Identifying and monitoring asthma symptoms and learning to effectively use medical resources;
2. Identifying and preventing asthma triggers; and
3. Preventing and coping with an asthma episode.

Participants in the control group received the same educational modules but were taught by a structured approach without attempting to locate asthma symptoms within the socio-economic and cultural context.

Moudgil 2000: Participants in the intervention group received an individual asthma education session of 40 minutes duration with an asthma educator fluent in each participants own dialect (English, Punjabi, Urdu or Hindi). Emphasis during the sessions was on:

1. Advising GP regarding any necessary changes of treatment;
2. Optimising treatment including drug delivery technique and compliance;
3. Improving knowledge about disease severity and medication.

All participants were given peak flow meters, individually tailored asthma management plans and educational literature (in the appropriate dialect) describing aspects of asthma and asthma management. Educational intervention was reinforced at four and eight months, although it is not stated how this was done.

Control group participants attended their GP at the start and end of the study for outcome assessment and were asked to continue their usual asthma follow up in the meantime.

Blixen 2001: Intervention group participants received three one-hour individual asthma self-management educational sessions while hospitalised with a primary diagnosis of asthma. The aim of the sessions was to teach patients the rationale and skills required to manage asthma as a chronic inflammatory process rather than an episodic crisis-driven process. The sessions incorporated the use of an asthma self-management workbook modified to be specific to African-Americans. This included a discussion on handling the stressors common to many African-Americans. The goals of the educational intervention were:

1. to optimise anti-inflammatory therapy by improving inhalation technique with metered dose inhalers (MDI's); and
2. to have patients learn to monitor changes in airway obstruction through use of peak flow meters.

To achieve these goals a video on MDI technique and peak flow monitoring was shown during the educational sessions. The video featured a well-known African-American asthma specialist. Participants then rehearsed the demonstration until appropriate technique was shown.

The comparison group were given usual care.

**Outcomes**

Canino 2008 measured symptom-free days and nights in the previous month and previous 2 weeks (as reported by caregivers). Asthma control was assessed with the Childhood Asthma Control Test; Emergency Department (ED) visits and hospitalizations in the last 30 days were measured; medication use in the previous 12 months was assessed by retrospective daily self reporting, and parents were asked to bring medications used by their child to the interviewer. The parents quality of life was assessed with the Juniper's Pediatric Asthma Care Quailty of Life Questionnaire. Asthma knowledge was assessed with the Caregiver's Asthma Knowledge Scale, and family empowerment was measured with the Family Empowerment Scale (which assesses whether the caregiver feels empowered to procure the services the child needs) and Self Efficacy was measured to determine how confident the caregiver feels about preventing their child's asthma and about managing their child's asthma.

La Roche 2006 assessed the number of Asthma-Related Emergency Department visits in the year following the intervention. The Individualism-Collectivism scale, which is used to measure self-orientation, and the Asthma Behavioural Assessment Questionnaire which contains an Asthma Knowledge test and an Asthma Skills report, were also reported on.

Moudgil 2000 assessed clinical outcomes (hospital admissions, emergency department (ED) presentations, home visits after hours by general practitioner (GP), consultations with GP in regular hours, prescription of oral steroids and prescription of antibiotics) and Asthma Quality of Life (AQOL) (using a validated, 32 question Asthma specific Quality of Life questionnaire (Juniper 1992; Juniper 1993)).

Blixen 2001 assessed symptom frequency (self report of frequency of wheeze, shortness of breath and cough), asthma self-management behaviours, overall health status, Asthma Quality of Life (using the validated, 32 question Asthma specific Quality of Life questionnaire (Juniper 1992; Juniper 1993)), depression and Health Care Resource Use (in-patient hospital admissions for asthma, associated length of stay, number of physician visits, ED visits for

asthma and telephone contact to nursing or medical personnel in the three months prior to the intervention).

**Follow up**

Canino 2008 performed follow-up of baseline assessments 4 months post randomisation.

La Roche 2006 performed follow-up assessment of ED visits and the Asthma Behavioural Assessment Questionnaire 12 months post intervention

Moudgil 2000 performed follow-up assessment of clinical outcomes and AQOL 12 months post intervention.

Blixen 2001 performed follow-up assessment of participants by telephone interview at three and six months post intervention.

## Risk of bias in included studies

Allocation Concealment: One study scored 'A' and three studies scored 'B'.

Blinding: One study scored 'B', one scored 'C' and one scored both 'B' and 'D' (blinding of outcome assessors for one outcome but not others).

Reporting of participants by allocated groups: One study scored 'C', one scored 'B' and one scored 'A'.

Follow up: One study scored 'D', one scored 'B' and one scored 'A' for follow up.

The agreement between the two review authors (EJB, ABC) was excellent (weighted kappa 0.8).

## Effects of interventions

The four studies included a total of 617 randomised participants (from minority groups), of which 245 were children (La Roche 2006, Canino 2008). Five hundred and fifty participants (243 children (La Roche 2006)) completed the studies. Although the study by Moudgil et al. included participants from the age of 11, the data is presented combined with adult data and outcomes are not shown separately for the paediatric population (Moudgil 2000). Each of the studies lost participants to follow up. The study by La Roche et al. had two participants lost to follow up at final assessment (La Roche 2006), and the study by Blixen et al. had 15 participants lost to follow up at final assessment (Blixen 2001). The study by Moudgil et al measured clinical outcomes for 294 (of 344) participants, and Asthma Quality of Life outcomes for 280 (of 344) participants (Moudgil 2000). Canino 2008 stated that 3 participants were lost to follow up. The only data that could be combined for the adult studies was the Asthma Quality of Life scores, and the only data that could be combined for the paediatric studies was

### Adult studies (Comparison 01)

### Primary Outcome

#### a) Asthma exacerbations during follow up

a.i) Asthma Exacerbations during study period (Adult Studies) (Outcome 01.01)

Both trials reported exacerbations but numerical data were only provided by one paper (Moudgil 2000). Blixen 2001 stated that there was no statistically significant differences between groups in asthma-related health care resource (defined by authors as hospitalisations, ED visits and physician visits) but no figures were given therefore meta-analysis of data from these two studies was not possible. As seen in the forest plots, there was no significant difference between the groups for number of participants who were hospitalised for asthma (Odds Ratio 0.3; 95% CI 0.31 to 2.22), number of participants who required additional steroids (Odds Ratio of 0.97; 95% CI 0.55 to 1.73) or number of participants who had an emergency visit for asthma during the study period (OR 2.92; 95% CI 0.58 to 14.7) (Moudgil 2000).

### Secondary Outcomes

#### b) Proportion of patients not substantially improved at follow up

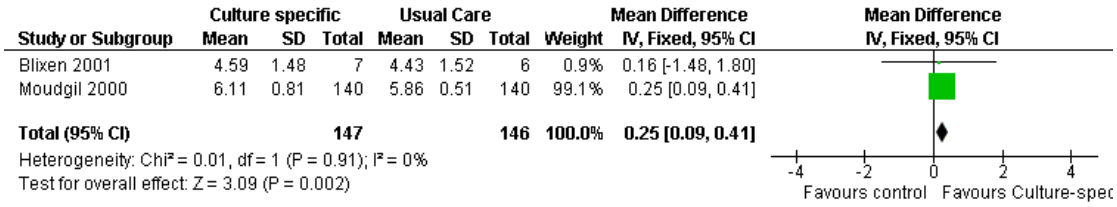
None of the included studies reported on patients not improved at follow up.

#### c) Mean difference in other asthma related outcome measures

Asthma Quality of Life scores (Outcome 01.02)

A significantly higher total (i.e. improved) Asthma Quality of Life scores was seen in the group receiving culturally specific education programmes when compared to controls; WMD 0.25 (95% CI 0.09 to 0.41), Analysis 1.2, Figure 1 There was no significant heterogeneity between the studies ($I^2$ = 0%, P = 0.91). For this outcome, the number of participants in each group in the Moudgil study was assumed rather than given. The authors report that 280 ISC participants completed the end of study AQOL but specific numbers per group were not given, therefore it was assumed that N = 140 was for each group. We could not obtain any further data from the primary author contacted.

**Figure 1. Forest plot of comparison: 1 Adult studies, outcome: 1.2 Asthma Quality of Life scores.**




### Other secondary outcomes

None of the studies reported on other secondary outcomes.

#### Paediatric studies (Comparison 02)

### Primary Outcome

#### a) Asthma exacerbations during follow up

Outcome 2.01 Asthma 'under control' post intervention - Canino 2008 reported numbers of children in each group with their asthma under control (as defined by author) following the intervention period. This was the only study that presented this data. This outcome significantly favoured the culture-specific group with Odds Ratio of 3.34 (95%CI 1.45, 7.73). Analysis 2.1

Outcome 2.02 Mean number of ED visits in year post intervention (mean difference) - There was no significant difference between groups. La Roche 2006 reported a mean number of 0.70 (SD 0.90) ED presentations in the year post intervention for the group receiving culturally specific education, versus a mean of 1.20 (SD 1.70) presentations for the usual care group, mean difference -0.50 (95% CI -1.64 to 0.64), Analysis 2.2. Data could not be presented in any other format. It should be noted that the sample size was small and the data are skewed.

Outcome 2.03 ED visits (rate ratio) - Canino 2008 also presented data on ED presentations post intervention (in the following 6 month period) however the data could not be combined with that from the La Roche 2006 study. Data from the Canino paper showed a Rate Ratio of 0.63 (95%CI 0.42 to 0.95), significantly favouring the group receiving the culture-specific intervention.

Outcome 2.04 Hospitalisations - Canino 2008 reported on Hospitalisations for asthma in the 6 month period following the intervention. This outcome significantly favoured the group receiving the culture-specific program. RR 0.32 (95% CI 0.15 to 0.70).

### Secondary Outcomes

The limited secondary outcomes reported were:

#### f) Asthma knowledge factors

Outcome 2.05 - Change in Carer's Asthma Quality of Life - The study from Canino measured the change from baseline in the Caregiver's asthma related Quality of Life. This outcome trended towards the culturally specific group however the differences were not significant, as can be seen on the forest plots. Risk Difference 3.15 (95% CI -0.13 to 6.43).

Outcome 2.06 - Change in Carer's Asthma Knowledge - The Canino study also presented the change from baseline for the caregivers asthma knowledge. This outcome significantly favoured the group receiving the culture-specific program. Risk Difference 1.10 (95% CI 0.51 to 1.69).

Outcome 2.07 - Children's Asthma Knowledge scores

A significant difference was shown in the children's mean asthma knowledge scores between the culturally specific and usual care groups. The data favoured the culture specific programme mean difference 3.30 (95% CI 1.07 to 5.53). There is baseline imbalance in the scores, and when measured as a change from baseline (Analysis 2.8) the difference is no longer significant, mean difference 1.81 (95% CI -0.42 to 4.04).

Outcome 2.09 - Parent's Asthma Knowledge scores

No significant difference was demonstrated in the parent's mean Asthma Knowledge scores, although the trend favoured the treatment (culturally specific group); mean difference 1.90 (95% CI -0.04 to 3.84). Again there is baseline imbalance in the scores, and when measured as a change from baseline (Analysis 2.9) the difference is significant, mean difference 3.00 (95% CI 1.06 to 3.94).

*g) Economic data*

The La Roche study estimated that the economic savings made by using the culturally specific education programme, based on the reduction of ED presentations, was $4675. The estimated total cost of the culturally specific programme for asthma education was $2295 (La Roche 2006).

**Sensitivity analysis**

We performed a sensitivity analysis removing the Blixen study, as it was not specified that the 'usual care' that the control group participants received included a generic asthma education program (although this was assumed). Removing the study did not alter the direction of effect for the outcome of Asthma Quality of Life score, and the WMD remained 0.25 (95% CI 0.09 to 0.41).
No sensitivity analysis could be appropriately performed on other outcomes.

## DISCUSSION

This systematic review is limited by few studies. However the data suggests that the use of culturally specific asthma education programmes for adults and children from minority groups are effective at improving the self-reported asthma related quality of life (in adults), overall asthma knowledge scores for children (in the paediatric studies), caregiver's asthma knowledge (in paediatric studies) and reducing ED visits and hospitalisations for asthma (again in the paediatric studies). When updating the review in mid 2008, one newly included study showed that the use of culturally specific programs for asthma significantly improved the number of participants experiencing ED presentations or hospitalisations for asthma in the study follow up period. Unfortunatley we were unable to combine these results with those of previously included studies in order to gain stronger evidence.

The results of another Cochrane review found that asthma education interventions in the ED, while effective at reducing hospital admission, did not significantly reduce subsequent ED visits (Tapp 2007). The review by Tapp et al. however also found no significant difference in quality of life scores between treatment and control groups (Tapp 2007), whereas the review presented here has shown a significant improvement in asthma quality of life scores for participants in the group receiving culturally specific education compared to controls.

The original results (prior to 2008 update) for a lack of improvements in exacerbations may be possibly related to inadequate sample size as none of the studies originally included were designed to address non-inferiority. Therefore, while both this review and the review from Tapp et al found no improvement in ED presentations, the type of educational intervention used can affect the self-reported asthma related Quality of Life of participants. In this instance, we could theorise that the use of a culturally specific programme enables the participants to more fully engage in the education being provided and in turn have a positive effect on their Quality of Life scores. These results however should be interpreted with caution due to the small number of included studies that measured Asthma Quality of Life (two studies) and the relatively small sample size in those studies (Moudgil 2000; Blixen 2001). On updating the review in 2008 we were able to include results from Canino et al (Canino 2008) which also included an Asthma Quality of Life outcome.

For the purpose of this review, it was assumed that 'usual care' for asthma presentations would include the provision of generic asthma education, in accordance with recommendations such as the 1997 National Asthma Education and Prevention Program Guidelines (Edmond 1998). Therefore, while the studies by Blixen and Moudgil do not specify the nature of the education that control group participants received, it has been assumed that through the provision of 'usual care', participants would have received some form of education during the clinical encounter.

Ideally, this review would have included randomised controlled studies in both adults and children with larger sample sizes and present more data regarding asthma exacerbation outcomes (e.g. hospitalisations, ED visits, use of rescue oral corticosteroids). This review is limited by the small number of studies and the small sample sizes of two of the studies, also by the high rate of attrition of participants (clinical outcomes were measured for 329 participants from an original total sample size of 396). It should be noted that two of the studies (Blixen 2001; La Roche 2006) were pilot studies and it would be hoped that these would follow on to further studies with larger sample sizes, and improved statistical power. There was a significant differences in five outcomes, however in most outcomes, the direction of results favoured the culture specific programmes.

It has been recognized by Swartz and Dick that in models of care for chronic diseases, the focus must be on the person in his or her own context (Swartz 2002). Certainly this ideal has been met with the intervention in the study by La Roche et al., with one focus of the intervention being to locate the signs and symptoms of asthma within the cultural context of the participant and family (La Roche 2006). La Roche et al. also trialled their culturally specific intervention against a generic education programme, whereas the control groups in the other two included studies (Moudgil 2000; Blixen 2001) received 'usual care' and participants were asked to continue with their usual follow-up routine. The interventions used by Blixen 2001 and Moudgil 2000 could be argued to be culturally modified, rather than culturally specific, with both studies using interventions that have been used in Caucasian populations, and modified through the use of language, images and other additions. However, the decision was made to include these two studies as it was felt that the modifications and delivery of the intervention were specific to the ethnic groups that the participants belonged to.

This systematic review is limited to four studies with 617 participants from minority groups completing the interventions. Also in spite of the number of participants, limited data availability prevented combining all outcomes other then QOL in adults (Figure 1) for meta-analysis.

While the studies shared some common themes, there are also

significant differences, notably, the type of interventions used, the ethnic groups being investigated and the outcomes that were measured. Furthermore, Blixen 2001 did not report patients' follow-up data for the clinical outcomes (hospitalisations, ED visits etc). It should also be noted that while all the studies trialed interventions in minority groups, none of the populations involved were indigenous to the study setting. No studies were identified that examined the use of a culturally specific asthma education programme for minority groups that are indigenous to their country of residence. Also La Roche and colleagues' study was small leading to baseline imbalances in the asthma knowledge scores.

## AUTHORS' CONCLUSIONS

### Implications for practice

The limited available evidence presented here suggests that culture-specific education programmes for adults and children from minority groups are effective in improving asthma related outcomes of quality of life (in adults and children), asthma knowledge (for children) and rate of asthma exacerbations (for children) and asthma control (children). Thus it is arguably justified that asthma education programmes for children and adults from minority groups with asthma should be culture specific, given the findings of this review and the ongoing complexity of health outcomes and culture.

### Implications for research

High quality parallel RCT's are needed to further assess the role of culturally specific education programmes for people with asthma from minority groups. Trials should include both adults and children/families, and should compare the culturally specific programmes to generic education programmes (as opposed to culture specific vs routine care). Collection of clinical outcomes of asthma exacerbations and severity, as well as other asthma related outcomes including quality of life, knowledge, self-management behaviours, adherence outcomes and economic impact should be included in future trials to gain a better perspective on the efficacy of culture-specific programmes for people with asthma from minority groups. Trials involving minority groups indigenous to their country of residence should also be conducted. The type and extend of 'culture specific' approaches should also be explicit.

## ACKNOWLEDGEMENTS

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* *Indicates the major publication for the study*

## CHARACTERISTICS OF STUDIES

### Characteristics of included studies *[ordered by study ID]*

**Blixen 2001**

| | |
|---|---|
| Methods | An open, prospective, randomised study evaluating the use of an asthma education program specifically targeted for African-Americans with no education (as a control group) . Potential participants were identified and approached whilst admitted to hospital. Patients were given information about the study and were invited to participate. Verbal consent was obtained from patients who wished to participate and time for a face-to-face baseline interview was arranged (whilst still admitted). Following baseline interview, participants randomly assigned to intervention or control group. Telephone interviews were conducted at 3- and 6- months which consisted of the same questions asked at baseline plus asked for information about any asthma events since the last interview<br>No information is given regarding method of randomisation or allocation concealment. Randomisation status of participants was concealed from the telephone interviewer at 3 and 6 months post discharge<br>Dropouts: only 13 of the 28 participants (46% of the sample) were able to be contacted for the complete 6-month post discharge follow-up data<br>Quality score:<br>Allocation concealment - B<br>Blinding - B<br>Reporting of Participants by allocated group - C<br>Follow up - D |
| Participants | 28 African-Americans with Asthma were included. At baseline, intervention group n = 14, control n = 14; 3-month follow up: intervention group n = 10, control group n = 11; 6-month follow up: intervention group n = 7, control group n = 6<br>Inclusion criteria: African-American adult, aged 18-50 years, hospitalised overnight at one hospital, with a primary diagnosis of asthma during July - November 1997<br>No information is given regarding exclusion criteria. |
| Interventions | Intervention group received three one-hour individual education sessions on asthma self management prior to discharge from hospital. During these educational sessions, participants received a number of resources, as outlined:<br>1. Workbook 'Learn Asthma Control in Seven Days', modified to be culturally appropriate to African-Americans.<br>Modifications to the workbook (to make it culturally specific for African-Americans) were made by a noted African-American researcher, Dr. Marvella Ford, and included:<br>- illustrations of African-Americans performing asthma management techniques;<br>- references to famous African-Americans who have asthma and who could serve as role models;<br>- the addition of a discussion on handling the stresses common to many African-Americans (such as looking for work);<br>- substitution of lay language for medical terms wherever possible;<br>- addition of ideas for communicating with health care providers, such as taking a tape recorder to doctors visits and recording what the doctor says;<br>- the addition of toll-free telephone numbers for asthma organizations and local telephone numbers for the American Lung Association<br>2. Participants were shown a video on metered dose inhaler technique and peak flow monitoring. The video, "Managing Your Asthma: Understanding Proper inhaler and Peak Flow Technique" was produced by Glaxo-Wellcome and featured an African-American asthma specialist showing African-American patients |

**Blixen 2001** (*Continued*)

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| | how to use Metered Dose Inhalers and Peak flow meters. Participants then rehearsed the demonstration until the technique was mastered. Participants were given the video, a peak flowmeter and a spacer for an MDI to take home<br>Written materials to reinforce the concepts and self-management techniques introduced in the educational sessions were mailed to the intervention group participants at 3 and 6 months<br>Participants in the control group did not receive any additional treatment and were asked to continue with their usual care and follow up, which therefore represents the 'generic' asthma programme |
| Outcomes | 1. Symptom frequency (frequency of wheeze, shortness of breath and coughing in 2 weeks prior to hospitalisation) as self-reported by participants, coded into categories of 1) mild intermittent (symptoms twice a week or less), 2) mild persistent (symptoms more than twice a week but less than once a day), 3) moderate persistent (daily symptoms) and 4) severe persistent (continual symptoms)<br>2. Asthma self management behaviours - participants asked to record which medications they use, the frequency of following physician instructions regarding these medications, use of a rescue plan for asthma, the use of a peak flow meter and whether they have a physician they see regularly for asthma<br>3. Overall health status - participants asked to rate their health as excellent, very good, good, fair, or poor, using one question from Medical Outcomes Study 36-Item Short-Form-Health Survey<br>4. Quality of Life - Asthma Quality of Life (AQOL) evaluates 4 domains of asthma-related quality of life: activity limitation, symptoms, emotional functioning and environmental stimuli<br>5. Depression - participants asked to complete the Center for Epidemiological Studies Depression Scale<br>6. Health Care Resource Use - Survey addressing asthma-related inpatient hospital admissions and length of stay, number of office or clinic based physician visits, emergency department presentations for asthma and telephone contacts to nursing or medical personnel in 3 months prior to each interview |
| Notes | We have attempted to contact the authors regarding this information but no reply has been received |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | Unclear | B - Unclear |

**Canino 2008**

| | |
|---|---|
| Methods | Randomised single blinded trial comparing intervention ("Take Control, Empower Yourself and Achieve Management of Asthma" (CALMA) program) with control (usual care group). Potential participants were identified and screened for eligibility before invitation to participate<br>All study participants completed a one hour in-home baseline interview and similar post-interview 4 months after randomisation<br>Randomisation by computer algorithm based on mixed block design |
| Participants | 221 children randomised from 256 eligible children after screening 332 children. 1 participant from control group and 2 participants from CALMA (intervention) group were lost to follow up. All analyses were based on intention-to-treat<br>Eligibility criteria:<br>1) families with a child between ages of 5 and 12 years<br>2) poor asthma control, as defined by any of the following in the past 4 weeks:<br>a) use of any asthma medication more than once a week, b) experiencing asthma symptoms such as |

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|---|---|
| | wheezing, tightness of chest, problems coughing, or waking up at night because of asthma either daily or continuously, c) using the emergency department 2 or more times during the last 4 weeks, and d) using oral steroids or having been hospitalised in the last year<br>Exclusion criteria:<br>1) currently participating in another asthma study<br>2) being the sibling of a selected child<br>3) no appropriate address for follow up |
| Interventions | CALMA is the abbreviation of the Spanish for "Take Control, Empower Yourself and Achieve Asthma Managment". The intervention was developed for reducing asthma morbidity in poor Puerto Rican children (aged 5-12 years) with asthma. The intervention consists of 8 asthma education modules modified to be specific to this group. The modules were delivered over 2 home visits with phone contacts for ongoing follow up and reinforcement. The modules were intended to :<br>1) help the participants/family a)understand the chronic nature of asthma, b)identify and overcome barriers to care and to appropriate medication use, c) better understand and use the types of medications, d) appropriately use the health care system and keep follow up appointments, e)enhance the use of action plans, f)improve identification of asthma triggers and environmental avoidance techniques, g) encourage identification of onset of symptoms and early management, h) assume an active role in communication with the provider, i)identify stressors that may affect the psychological well being of the parent and learn when and where to look for psychological and family therapy help, and j) provide a culturally competent environment in which the family feels understood and free to share cultural beliefs and practices<br>The modules were culturally adapted with inclusions such as common practices and myths that Puerto Rican parents have about asthma, proper use of home remedies, culturally congruent pictures, and common asthma triggers in the island, such as Sahara dust an eruptions from Caribbean volcanoes. Educational material was developed relating to coping with marital and family stress resulting from the consequences of the child's asthma, increasing parental empowerment to deal with the Puerto Rican health system and educating parents how to teach their child and others how to manage asthma<br>The control group received 5 flyers of educational materials that contained information about:<br>1) a description of control and rescue medications, when to use them and their benefit<br>2) information about what asthma is<br>3) common allergens and triggers and how to prevent episodes<br>4) how to take care of asthma equipment<br>5) common foods that may be allergenic. |
| Outcomes | 1 Numer of symptom free days in the past month and past 2 weeks at follow up<br>2 Childhood Asthma Control Test<br>3 Medication use in last 12 months as per retrospective daily self-report<br>4 Pediatric Asthma QOL (caregivers QOL measured with Junipers Pediatric Asthma Quality of Life scale)<br>5 Caregivers Asthma Knowledge Scale<br>6 Family Empowerment Scale |
| Notes | |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|

**Canino 2008** (*Continued*)

| | | |
|---|---|---|
| Allocation concealment? | Unclear | B - Randomisation by computerized algorithm based on mixed block randomisation scheme however allocation concealment not specifically mentioned in paper |

**La Roche 2006**

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|---|---|
| Methods | Randomised single blind, parallel comparison of 2 types of interventions: Multifamily asthma group treatment (MFAGT) vs. Standard Psycho-educational Asthma Intervention (SPAI) in children with asthma. These two interventions were also compared to controls (no additional education program provided) that were randomly selected from a pool of patients with asthma<br>Potential participants invited to participate in MFAGT or SPAI. Patients competed 2 assessments (see outcome measures); one at enrolment and the 2nd at one year following enrolment<br>Randomisation by computer, allocation method not described. Compliance monitored by pill counts after treatment period<br>All completed trial but 2 did not complete 2nd evaluation. These 2 families were omitted from analysis in the published paper<br>Quality Score:<br>Allocation concealment - A<br>Blinding - B (for outcome of ED visits) and D (for other outcomes) (information based on communication with author)<br>Reporting of participants by allocated group - A<br>Follow up - A |
| Participants | 24 families randomised from 46 families screened; 22 completed study. 16 (73%) were Hispanic and 6 (27%) were African American. Families with children with asthma were enrolled from Martha Eliot Health Centre, an inner-city community health centre which is part of the Boston's children Hospital. Mean age of children randomised was 10.2, 13 (59%) were male and 9 (41%) were female. The control group had 11 families and were matched to the intervention group by ethnicity, age and sex. All children were from low socio-economic background<br>Inclusion criteria: African-American or Hispanic descent, aged 7-13 years with physician diagnosed asthma<br>Exclusion criteria: None described. |
| Interventions | MFAGT is based on allocentric self-orientation and socio-economic context of ethnic minorities. Program delivery included an Hispanic and African-American educator/psychologist. MFAGT also emphasised relational and collaborative asthma management among children, family, their primary physician, and mental health specialist (as opposed to learning in isolation from others). The program framed asthma symptoms and problems within a historical context. It also uses a manual that has 3 modules, each taught in one hour on different days:<br>1. Identifying and monitoring asthma symptoms and learning to effectively use medical/contextual resources (peak flow, medications) to control symptoms.<br>2. Identifying and preventing asthma triggers<br>3. Preventing and coping with an asthma attack (e.g. asthma action plans)<br>SPAI has the same 3 modules above but followed a structured teaching approach without locating asthma symptoms within the socioeconomic or cultural context. Therefore this asthma education/management strategies did not include contingency plans that emphasised cultural resources and reflected a generic approach to asthma education<br>Therefore, participants in the MFAGT arm of the study received the 'culturally specific' programme, |

**La Roche 2006** (*Continued*)

| | |
|---|---|
| | whereas the SPAI participants served as a control group receiving the generic asthma education programme |
| Outcomes | 1. Number of asthma related ED visits<br>2. Individualism-Collectivism scale<br>3. Asthma Behavioural Assessment which consists of Asthma Knowledge (AK) and Asthma Skills (AS), both in parents and children. AK scores range from 0 to 12 and AS range from 17 to 85 |
| Notes | Paper provided data that compared MFAGT to SPAI and to controls. However, as the control group was not randomised, control group data was not included in analysis |

***Risk of bias***

| Item | Authors' judgement | Description |
|---|---|---|
| Allocation concealment? | Yes | A - Adequate |

**Moudgil 2000**

| | |
|---|---|
| Methods | Open, prospective, randomised, controlled, parallel group study examining individually based asthma education and structured follow up for people with asthma.<br>Potential participants were identified through registration and diagnostic records of 12 participating inner city general practices in the Birmingham area. All eligible patients were requested to attend their general practice for review by the researcher<br>Randomisation by computer, allocation method not described. Participants were randomised to intervention or control group prior to initial appointments being sent<br>Quality scores:<br>Allocation concealment - B<br>Blinding - C<br>Reporting of participants by allocated group - B<br>Follow up - B |
| Participants | 689 of the identified 1217 asthmatic patients from the 12 general practices attended for review by the researcher over a one year period (to August 1996). Participants were interviewed in their own language (English, Punjabi, Hindi or Urdu) and were randomised to the intervention or control arm<br>Inclusion criteria: All white European (WE) or Indian sub-continent (ISC) patients with asthma, from 12 participating general practices in the Birmingham area, aged 11-59 years |
| Interventions | Intervention group participants received individual asthma education program in their own dialects (English, Punjabi, Hindi or Urdu) - initial session 40 minutes. Sessions reinforced (method not described) at four- and eight- months. Session delivered by asthma educator, previously unknown to participants, who was fluent in all relevant dialects. Emphasis during education sessions was on appropriate prescribing (encouraging participants to advise their GP's of any necessary changes to treatment); optimising treatment or compliance, including drug delivery (by checking and instructing on use of inhaler devices); improving knowledge about disease severity and medication<br>All intervention group participants were provided with a peak flow meter free of charge, and a booklet to record measurements during the 12 month intervention period, along with an individually tailored self-management plan based on previous best and predicted values for peak flow readings and symptom recognition. Plans were based on existing British Thoracic Society (BTS) guidelines |

**Moudgil 2000** (*Continued*)

| | |
|---|---|
| | Educational literature in the relevant ethnic dialect, describing aspects of asthma and its management, including triggers, medication, delivery devices etc were distributed to all participants in the intervention group (literature provided by Allen & Hanburys)<br>Control group participants were asked to continue with their usual follow up and care for asthma. Therefore, the intervention participants received the culturally specific programme and the control group participants represent a generic programme (no extra culturally specific interventions) |
| Outcomes | 1. Number of asthma related hospital admissions<br>2. Number of asthma related presentations to the Emergency Dept<br>3. Number of asthma related home visits from General Practitioner (GP)<br>4. Number of asthma related visits (during regular hours) to GP<br>5. Prescriptions of oral steroids<br>6. Prescriptions of antibiotics<br>7. Asthma Quality of Life (AQLQ) (Juniper) - contains 32 questions about asthma events in the last 2 weeks and scores responses on 7-point scale (1 = severe limitation or most of the time, 7 = no limitation or none of the time). Domains for activity limitation, symptoms, emotional function and exposure to environmental stimuli. Some terms did not translate directly into the different dialects used and the terms used were agreed by two bilingual persons after a translation-back translation process |
| Notes | |

***Risk of bias***

| **Item** | **Authors' judgement** | **Description** |
|---|---|---|
| Allocation concealment? | Unclear | B - Unclear |

MFAGT: Multifamily asthma group treatment
SPAI: Standard Psycho-educational Asthma Intervention
vs: versus

## Characteristics of excluded studies *[ordered by study ID]*

| Study | Reason for exclusion |
|---|---|
| Anderson ME | Chart audit comparing asthma related health care utilization in asthmatic children between those that attended a chronic illness specific school (known as Kunsberg) that enrolls children into a daily program of disease self-management, and a control cohort that did not attend the Kunsberg school. Excluded as non RCT |
| Apter 2003 | Prospective cohort study of adults with asthma to identify potentially modifiable barriers to inhaled steroid medication adherence; and to examine potential mediators of racial-ethnic differences in adherence. Excluded as non RCT |

(*Continued*)

| | |
|---|---|
| Baren 2001 | RCT aimed at improving the likelihood of asthma patients achieving follow up with their primary care physician (PCP). Study compared usual Emergency Department (ED) care (as a control) with an intervention consisting of a free 5-day course of prednisone, vouchers for transport to and from patient's PCP and a reminder call to make a follow up appointment with patient's PCP, 48 hours after discharge from ED. Excluded as intervention not culturally specific |
| Butz 2006 | RCT comparing a home-based, nebuliser-use targeted asthma education intervention for children aged 2-9 years with usual care. Excluded as intervention not culturally specific |
| Choy 1999 | Pilot study to determine the benefit of an asthma education program for a group of asthmatic patients of low socioeconomic status and education level in Hong Kong. Excluded as non RCT |
| Clark 2004 | RCT comparing asthma outcomes for intervention group receiving school based asthma program, and control group. Children with asthma at intervention group schools received a comprehensive asthma education programme to enhance their disease management skills. Intervention schools also received environmental assessments and classroom activities for other students to increase the awareness of asthma and asthma triggers for non-asthma sufferers. Control group schools were offered the intervention program after the final data collection. Excluded as intervention not culturally specific |
| DePue 2007 | Interventional study examining the use of a school-based asthma education session for children and parents, delivered in English and Spanish, to participants in the Providence, Rhode Island area. Excluded as not RCT. Intervention targeted minority group members however was not culturally specific |
| Evans 1997 | Open, non randomised, controlled study of 22 Child Health Clinics in New York. Intervention consisted of training provided to staff of 11 clinics regarding diagnosis, treatment and continuing care of children with asthma and support to allow clinic to improve continuity of care and follow up. Outcomes from intervention clinics compared to 11 control clinics where staff did not receive any extra training or support. Excluded as non RCT, participants were staff of the clinics rather than asthma patients, and intervention was not culturally specific |
| Evans 1999 | Randomised, multi-site, controlled trial to minimize symptom days (wheeze, loss of sleep, reduction in play activity) through use of an individually tailored, family focused asthma intervention carried out by social workers for families of children with asthma in the inner-city. Excluded as intervention not culturally specific |
| Ford 1997 | Re-analysis of a randomised trial of an asthma education program, assessing the effects of the intervention separately for Caucasian and African American participants. The original trial compared an educational session provided to the intervention group, with a control group that received no additional education from their usual care. Excluded as this re-analysis was not a RCT |
| Gundelman 2004 | RCT comparing the use of an interactive asthma self-management and educational program known as the 'Health Buddy' (a personal, interactive communication device connected to a home phone, allowing participants to monitor their symptoms and transfer the information to a case manager via a secure website) with a control group that used an asthma diary for the same period of time. Excluded as intervention not culturally specific |
| Kay 2006 | RCT of a school based intervention program for children with asthma. Children with asthma attending schools in the 'intervention' group received a computer game based educational program, designed to help children gain asthma self management skills. Attempts were made for children in intervention group to receive asthma action plans from their primary care provider. Intervention schools were also assessed for environmental triggers |

(*Continued*)

| | |
|---|---|
| | to asthma. Control group schools received none of the interventions. Excluded as intervention not culturally specific |
| Kelso 1995 | Prospective intervention study examining the effects of an asthma education session in the Emergency Department plus a scheduled follow up visit to an asthma clinic, in an African-American population. Outcomes compared to a retrospectively identified 'control' group of similar patient characteristics. Excluded as non RCT |
| Mitchell 1986 | RCT of an educational programme for children with asthma and their families. Intervention group received monthly visits from a community child health nurse for six months, during which education was provided regarding asthma anatomy, physiology and triggers, drugs used for asthma, drug compliance checks, encouragement to attend follow-up visits with paediatrician or general practitioner and encouragement to consult with general practitioner rather than Emergency Department for an asthma attack not responding to bronchodilators at home. Control group did not receive any additional asthma education from their usual care. Excluded as intervention was not culturally specific |
| Partridge 2000 | Editorial discussing the prevalence of asthma in ethnic minorities, whether outcomes for asthma care in minority groups are worse than outcomes for asthma care in non-minority groups, and if so, how can these outcomes be improved? Excluded as non RCT |
| Perez 1999 | RCT comparing a parent and child asthma self-management educational program (in addition to usual medical care) with control group that received no additional education from their usual medical care. Excluded as intervention not culturally specific |
| Persky 2007 | Review article outlining the partnerships and initiatives of the Chicago Community Asthma Prevention Program. Excluded as not RCT |
| Sperber 1995 | Retrospective intervention study evaluating differences in outcomes between groups of asthmatics followed by asthma specialist (allergist/immunologist) (intervention group) or general physician or paediatrician (control group). Excluded as non RCT |
| Sullivan 2002 | Prospective cost-effectiveness analysis alongside a randomised trial (see Evans R 1999). Examined the incremental cost-effectiveness of a social-worker based education program and environmental control in children with asthma. Excluded as non RCT |
| Tatis 2005 | Prospective, intervention study examining the effect of an culturally specific asthma education program targeted at a Latino community. Excluded as non RCT |
| Velsor-Freidrich 04 | Non-randomised, controlled study assessing the use of school based 'Open Airways' asthma education program. Schools were conveniently assigned to intervention or control group. Intervention group schools received 'Open Airways' program while control group schools received no educational intervention. Excluded as non RCT |
| Velsor-Friedrich 05 | Randomised controlled non-blinded trial of an inner city school based education and self management programme for African-American children with asthma. Compared self-care abilities, self-care practices and health outcomes between student at two schools which received the intervention program and two schools which served as a comparison group. Excluded as intervention not culturally specific |

## Characteristics of ongoing studies *[ordered by study ID]*

**Buist S**

| | |
|---|---|
| Trial name or title | Shared decision making in improving asthma outcomes |
| Methods | |
| Participants | White, Asian (Hawaii) Hispanic and African-American persons with Asthma |
| Interventions | Does not use a culturally specific education intervention |
| Outcomes | No data available |
| Starting date | Jan 2001 |
| Contact information | Buist AS Principal Investigator<br>buists@ohsu.edu |
| Notes | Information from correspondence with Principal Investigator |

**Butz A**

| | |
|---|---|
| Trial name or title | Improving Asthma Communication in Minority Families |
| Methods | |
| Participants | 93% of participants African-American |
| Interventions | Intervention included teaching children communication skills in order to communicate asthma health issues to their Primary Care provider. Parents completed a one page cue card form to use when talking with the child's physician which included child's symptom frequency, number of ED visits or hospitalisations in last 12 months, current medications and worries, health beliefs or expectations about their child's asthma |
| Outcomes | No data available |
| Starting date | September 2004 |
| Contact information | Butz A Principal Investigator<br>abutz@jhmi.edu |
| Notes | Information from correspondence with Principal Investigator |

**Drotar D**

| | |
|---|---|
| Trial name or title | Reducing Barriers to Pediatric Asthma Treatment Adherence |
| Methods | |
| Participants | African-American children and adolescents with asthma |
| Interventions | Study does not compare a culturally specific intervention to a generic intervention or usual care |
| Outcomes | No data available. |
| Starting date | |
| Contact information | Drotar D, Principal Investigator<br>dennis.drotar@cchmc.org |
| Notes | Information gained from correspondence with Principal Investigator |

## DATA AND ANALYSES

### Comparison 1. Adult studies

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|---|---|---|---|---|
| 1 Asthma exacerbations during study period | 1 | | Odds Ratio (M-H, Fixed, 95% CI) | Totals not selected |
| 1.1 Number of participants who had a hospital admission for asthma during study period | 1 | | Odds Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 1.2 Number of participants requiring additional steroids for asthma during study period | 1 | | Odds Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 1.3 Number of participants who had ED visits for asthma during study period | 1 | | Odds Ratio (M-H, Fixed, 95% CI) | Not estimable |
| 2 Asthma Quality of Life scores | 2 | 293 | Mean Difference (IV, Fixed, 95% CI) | 0.25 [0.09, 0.41] |

### Comparison 2. Paediatric studies

| Outcome or subgroup title | No. of studies | No. of participants | Statistical method | Effect size |
|---|---|---|---|---|
| 1 Asthma under control | 1 | | Odds Ratio (Fixed, 95% CI) | Totals not selected |
| 2 ED visits (Risk Difference) | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 2.1 Mean number of ED visits for asthma in year post intervention | 1 | | Mean Difference (IV, Fixed, 95% CI) | Not estimable |
| 3 ED Visits (Rate Ratio) | 1 | | Risk Ratio (Fixed, 95% CI) | Totals not selected |
| 4 Hospitalisations (Rate Ratio) | 1 | | Risk Ratio (Fixed, 95% CI) | Totals not selected |
| 5 Change in Carers' AsthmaQuality of Life Score | 1 | | Risk Difference (Fixed, 95% CI) | Totals not selected |
| 6 Change in Carers' Asthma Knowledge | 1 | | Risk Difference (Fixed, 95% CI) | Totals not selected |
| 7 Children's Asthma Knowledge scores | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 8 Change in Children's Asthma Knowledge | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 9 Parent's Asthma Knowledge scores | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |
| 10 Change in Parent's Asthma Knowledge | 1 | | Mean Difference (IV, Fixed, 95% CI) | Totals not selected |

### Analysis 1.1. Comparison 1 Adult studies, Outcome 1 Asthma exacerbations during study period.

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 1 Adult studies

Outcome: 1 Asthma exacerbations during study period

| Study or subgroup | Culture specific n/N | Usual Care n/N | Odds Ratio M-H,Fixed,95% CI | Odds Ratio M-H,Fixed,95% CI |
|---|---|---|---|---|
| 1 Number of participants who had a hospital admission for asthma during study period | | | | |
| Moudgil 2000 | 8/151 | 9/143 | | 0.83 [ 0.31, 2.22 ] |
| 2 Number of participants requiring additional steroids for asthma during study period | | | | |
| Moudgil 2000 | 30/151 | 29/143 | | 0.97 [ 0.55, 1.73 ] |
| 3 Number of participants who had ED visits for asthma during study period | | | | |
| Moudgil 2000 | 6/151 | 2/143 | | 2.92 [ 0.58, 14.70 ] |


### Analysis 1.2. Comparison 1 Adult studies, Outcome 2 Asthma Quality of Life scores.

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 1 Adult studies

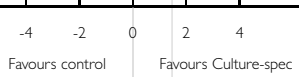
Outcome: 2 Asthma Quality of Life scores

| Study or subgroup | Culture specific N | Mean(SD) | Usual Care N | Mean(SD) | Mean Difference IV,Fixed,95% CI | Weight | Mean Difference IV,Fixed,95% CI |
|---|---|---|---|---|---|---|---|
| Blixen 2001 | 7 | 4.59 (1.48) | 6 | 4.43 (1.52) | | 0.9 % | 0.16 [ -1.48, 1.80 ] |
| Moudgil 2000 | 140 | 6.11 (0.81) | 140 | 5.86 (0.51) | | 99.1 % | 0.25 [ 0.09, 0.41 ] |
| **Total (95% CI)** | **147** | | **146** | | | **100.0 %** | **0.25 [ 0.09, 0.41 ]** |

Heterogeneity: $Chi^2$ = 0.01, df = 1 (P = 0.91); $I^2$ =0.0%

Test for overall effect: Z = 3.09 (P = 0.0020)

Test for subgroup differences: Not applicable



### Analysis 2.1. Comparison 2 Paediatric studies, Outcome 1 Asthma under control.

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 2 Paediatric studies

Outcome: 1 Asthma under control

| Study or subgroup | Culture-specific N | Control N | log [Odds Ratio] (SE) | Odds Ratio IV,Fixed,95% CI | Odds Ratio IV,Fixed,95% CI |
|---|---|---|---|---|---|
| Canino 2008 | 68 | 62 | 1.208 (0.427) | | 3.35 [ 1.45, 7.73 ] |


### Analysis 2.2. Comparison 2 Paediatric studies, Outcome 2 ED visits (Risk Difference).

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 2 Paediatric studies

Outcome: 2 ED visits (Risk Difference)

| Study or subgroup | Culture specific N | Mean(SD) | Usual Care N | Mean(SD) | Mean Difference IV,Fixed,95% CI | Mean Difference IV,Fixed,95% CI |
|---|---|---|---|---|---|---|
| 1 Mean number of ED visits for asthma in year post intervention | | | | | | |
| La Roche 2006 | 11 | 0.7 (0.9) | 11 | 1.2 (1.7) | | -0.50 [ -1.64, 0.64 ] |

### Analysis 2.3. Comparison 2 Paediatric studies, Outcome 3 ED Visits (Rate Ratio).

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 2 Paediatric studies

Outcome: 3 ED Visits (Rate Ratio)

| Study or subgroup | Culture-specific N | Usual care N | log [Risk Ratio] (SE) | Risk Ratio IV,Fixed,95% CI | Risk Ratio IV,Fixed,95% CI |
|---|---|---|---|---|---|
| Canino 2008 | 109 | 108 | -0.46 (0.21) | | 0.63 [ 0.42, 0.95 ] |

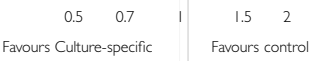

### Analysis 2.4. Comparison 2 Paediatric studies, Outcome 4 Hospitalisations (Rate Ratio).

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 2 Paediatric studies

Outcome: 4 Hospitalisations (Rate Ratio)

| Study or subgroup | Experimental N | Control N | log [Risk Ratio] (SE) | Risk Ratio IV,Fixed,95% CI | Risk Ratio IV,Fixed,95% CI |
|---|---|---|---|---|---|
| Canino 2008 | 106 | 106 | -1.139 (0.4) | | 0.32 [ 0.15, 0.70 ] |



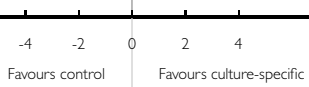
### Analysis 2.5. Comparison 2 Paediatric studies, Outcome 5 Change in Carers' AsthmaQuality of Life Score.

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 2 Paediatric studies

Outcome: 5 Change in Carers' AsthmaQuality of Life Score

| Study or subgroup | Experimental N | Control N | Risk Difference (SE) | Risk Difference IV,Fixed,95% CI | Risk Difference IV,Fixed,95% CI |
|---|---|---|---|---|---|
| Canino 2008 | 108 | 109 | 3.15 (1.675) | | 3.15 [ -0.13, 6.43 ] |



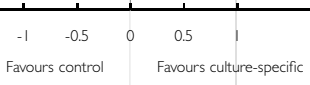

### Analysis 2.6. Comparison 2 Paediatric studies, Outcome 6 Change in Carers' Asthma Knowledge.

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 2 Paediatric studies

Outcome: 6 Change in Carers' Asthma Knowledge

| Study or subgroup | Risk Difference (SE) | Risk Difference IV,Fixed,95% CI | Risk Difference IV,Fixed,95% CI |
|---|---|---|---|
| Canino 2008 | 1.1 (0.3) | | 1.10 [ 0.51, 1.69 ] |



### Analysis 2.7. Comparison 2 Paediatric studies, Outcome 7 Children's Asthma Knowledge scores.

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 2 Paediatric studies

Outcome: 7 Children's Asthma Knowledge scores

| Study or subgroup | Culture specific N | Mean(SD) | Usual Care N | Mean(SD) | Mean Difference IV,Fixed,95% CI | Mean Difference IV,Fixed,95% CI |
|---|---|---|---|---|---|---|
| La Roche 2006 | 11 | 13.3 (2) | 11 | 10 (3.2) | | 3.30 [ 1.07, 5.53 ] |


### Analysis 2.8. Comparison 2 Paediatric studies, Outcome 8 Change in Children's Asthma Knowledge.

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 2 Paediatric studies

Outcome: 8 Change in Children's Asthma Knowledge

| Study or subgroup | Culture Specific N | Mean(SD) | Control N | Mean(SD) | Mean Difference IV,Fixed,95% CI | Mean Difference IV,Fixed,95% CI |
|---|---|---|---|---|---|---|
| La Roche 2006 | 11 | 3.81 (2) | 11 | 2 (3.2) | | 1.81 [ -0.42, 4.04 ] |

### Analysis 2.9. Comparison 2 Paediatric studies, Outcome 9 Parent's Asthma Knowledge scores.

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 2 Paediatric studies

Outcome: 9 Parent's Asthma Knowledge scores

| Study or subgroup | Culturally specific N | Mean(SD) | Usual Care N | Mean(SD) | Mean Difference IV,Fixed,95% CI | Mean Difference IV,Fixed,95% CI |
|---|---|---|---|---|---|---|
| La Roche 2006 | 11 | 13.6 (2.6) | 11 | 11.7 (2) | | 1.90 [ -0.04, 3.84 ] |

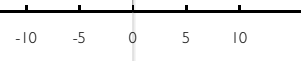

### Analysis 2.10. Comparison 2 Paediatric studies, Outcome 10 Change in Parent's Asthma Knowledge.

Review: Culture-specific programs for children and adults from minority groups who have asthma

Comparison: 2 Paediatric studies

Outcome: 10 Change in Parent's Asthma Knowledge

| Study or subgroup | Culture specific N | Mean(SD) | Control N | Mean(SD) | Mean Difference IV,Fixed,95% CI | Mean Difference IV,Fixed,95% CI |
|---|---|---|---|---|---|---|
| La Roche 2006 | 11 | 3.1 (2.6) | 11 | 0.1 (2) | | 3.00 [ 1.06, 4.94 ] |



# APPENDICES

## Appendix 1. Search strategies

| MEDLINE/OLD MEDLINE | EMBASE strategy | CENTRAL STRATEGY |
|---|---|---|
| (Combined with RCT filter)<br><br>1 exp asthma/<br>2 exp Bronchial Spasm/<br>3 asthma$.mp.<br>4 wheez$.mp.<br>5 bronchospas$.mp.<br>6 (bronch$ adj3 spas$).mp.<br>7 bronchoconstrict$.mp.<br>8 (bronch$ adj3 constrict$).mp.<br>9 or/1-8<br>10 oceanic ancestry group/ or (aboriginal$ or aborigine$).mp.<br>11 minority groups/ or indigenous.mp.<br>12 culture/ or ethnology/ or culture specific.mp. or cultural.mp.<br>13 or/10-12<br>14 self care/ or self administration/ or self medication/ or self efficacy/ or self manage$.mp.<br>15 "patient acceptance of health care"/ or patient compliance/ or patient participation/ or patient satisfaction/ or treatment refusal/<br>16 patient education/ or patient care planning/ or patient-centered care/<br>17 health services indigenous/ or indigenous health$.mp.<br>18 (educat$ or program$ or learn$ or specific).mp.<br>19 or/14-18<br>20 9 and 13 and 19 | (Combined with RCT filter)<br><br>1 exp asthma/<br>2 Bronchospasm/<br>3 asthma$.mp.<br>4 wheez$.mp.<br>5 bronchospas$.mp.<br>6 (bronch$ adj3 spas$).mp.<br>7 bronchoconstrict$.mp.<br>8 (bronch$ adj3 constrict$).mp.<br>9 or/1-8<br>10 (aboriginal$ or aborigine$ or indigenous).mp. or exp minority group/<br>11 culture/ or ethnology/ or culture specific.mp. or cultural.mp.<br>12 10 or 11<br>13 self care/ or self administration/ or self medication/ or self efficacy/ or self manage$.mp.<br>14 patient attitude/ or patient compliance/ or patient participation/ or patient satisfaction/ or refusal to participate/ or treatment refusal/<br>15 health education/ or health promotion/ or nutrition education/ or patient education/<br>16 exp patient care/ or health care planning/ or patient care planning/<br>17 health services indigenous/ or indigenous health$.mp. or aboriginal$ health$.mp. or aborigine$ health$.mp.<br>18 (educat$ or program$ or learn$ or specific).mp.<br>19 or/13-18<br>20 9 and 12 and 19 | #1 MeSH descriptor Asthma explode all trees<br>#2 MeSH descriptor Bronchial Spasm explode all trees<br>#3 asthma*<br>#4 wheez*<br>#5 bronchospas*<br>#6 bronch* near spas*<br>#7 bronchoconstrict*<br>#8 bronch* near constrict*<br>#9 (#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7 OR #8)<br>#10 MeSH descriptor Oceanic Ancestry Group, this term only<br>#11 (aboriginal* or aborigine*)<br>#12 indigenous<br>#13 MeSH descriptor Minority Groups, this term only<br>#14MeSH descriptor Culture, this term only<br>#15 MeSH descriptor Ethnology, this term only<br>#16 culture-specific<br>#17 cultural<br>#18 MeSH descriptor Cultural Diversity, this term only<br>#19MeSH descriptor Cultural Deprivation, this term only<br>#20 MeSH descriptor Cultural Characteristics, this term only<br>#21 MeSH descriptor Anthropology, Cultural, this term only<br>#22 (#10 OR #11 OR #12 OR #13 OR # 14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21)<br>#23 MeSH descriptor Self Care, this term only<br>#24 MeSH descriptor Self Administration, this term only<br>#25 MeSH descriptor Self Medication, this term only<br>#26 MeSH descriptor Self Efficacy, this |

(*Continued*)

| | | |
|---|---|---|
| | | term only<br>#27 self manage*<br>#28 MeSH descriptor Patient Acceptance of Health Care explode all trees<br>#29 MeSH descriptor Patient Education explode all trees<br>#30 MeSH descriptor Patient Care Planning explode all trees<br>#31 MeSH descriptor Patient-Centered Care explode all trees<br>#32 MeSH descriptor Health Services, Indigenous, this term only<br>#33 indigenous health*<br>#34 aboriginal* health*<br>#35 (educat*) or (program*) or (learn*) or (specific)<br>#36 (#23 OR #24 OR #25 OR #26 OR #27 OR #28 OR #29 OR #30 OR #31 OR #32 OR #33 OR #34 OR #35<br>#37 (#9 AND #22 AND #36) |

## WHAT'S NEW

Last assessed as up-to-date: 29 August 2008.

| Date | Event | Description |
|---|---|---|
| 1 December 2008 | New citation required but conclusions have not changed | Author list changed |

## HISTORY

Protocol first published: Issue 3, 2007

Review first published: Issue 2, 2008

| Date | Event | Description |
|---|---|---|
| 17 October 2008 | New citation required but conclusions have not changed | One new author added to the byline of the review. The conclusions of the review have not been substantively amended by the addition of the study by Canino et al |

(*Continued*)

| | | |
|---|---|---|
| 30 August 2008 | New search has been performed | Literature searches re-run; One new study added (Canino 2008) |
| 17 June 2008 | Amended | Converted to new review format. |
| 11 December 2007 | New citation required and conclusions have changed | Substantive amendment |

## CONTRIBUTIONS OF AUTHORS

Protocol: ABC and EJB wrote protocol based on a previous protocol

Review: EJB and ABC selected relevant papers from searches, extracted and analysed data and wrote review. CJC also extracted and analysed data and wrote review. PSM, NB and SGK contributed to writing the review.

## DECLARATIONS OF INTEREST

ABC is currently involved in a randomised controlled trial examining the effect of Torres Straits Islander healthcare workers in Torres Straits Island children with asthma.

## SOURCES OF SUPPORT


### Internal sources

- No sources of support supplied

### External sources

- National Health and Medical Research Council, Australia.
- Australian Cochrane Airways Group Network Scholarship, Australia.


## INDEX TERMS

### Medical Subject Headings (MeSH)

*Culture; *Minority Groups; Adolescent; Asthma [ethnology; *therapy]; Patient Education as Topic [*methods]; Randomized Controlled Trials as Topic

## MeSH check words

Adult; Child; Humans; Middle Aged; Young Adult