



**Cochrane**  
**Library**

Cochrane Database of Systematic Reviews

## Tailored interventions based on exhaled nitric oxide versus clinical symptoms for asthma in children and adults (Review)

Petsky HL, Cates CJ, Li A, Kynaston JA, Turner C, Chang AB

Petsky HL, Cates CJ, Li A, Kynaston JA, Turner C, Chang AB.

Tailored interventions based on exhaled nitric oxide versus clinical symptoms for asthma in children and adults.

*Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD006340.

DOI: [10.1002/14651858.CD006340.pub3](https://doi.org/10.1002/14651858.CD006340.pub3).

[www.cochranelibrary.com](http://www.cochranelibrary.com)

**Tailored interventions based on exhaled nitric oxide versus clinical symptoms for asthma in children and adults (Review)**

Copyright © 2010 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

**WILEY**

[Intervention Review]

# Tailored interventions based on exhaled nitric oxide versus clinical symptoms for asthma in children and adults

Helen L Petsky<sup>1</sup>, Christopher J Cates<sup>2</sup>, Albert Li<sup>3</sup>, Jennifer A Kynaston<sup>4</sup>, Cathy Turner<sup>5</sup>, Anne B Chang<sup>6</sup>

<sup>1</sup>Department of Respiratory Medicine, Royal Children's Hospital, Brisbane, Australia. <sup>2</sup>Community Health Sciences, St George's, University of London, London, UK. <sup>3</sup>Department of Paediatrics, Prince of Wales Hospital, Shatin, Hong Kong. <sup>4</sup>Royal Children's Hospital, Brisbane, Australia. <sup>5</sup>School of Nursing, University of Queensland, Herston, Australia. <sup>6</sup>Queensland Children's Respiratory Centre and Queensland Children's Medical Research Institute, Royal Children's Hospital, Brisbane and Menzies School of Health Research, CDU, Darwin, Brisbane, Australia

**Contact address:** Helen L Petsky, Department of Respiratory Medicine, Royal Children's Hospital, Herston Road, Brisbane, Queensland, 4029, Australia. [helen\\_petsky@health.qld.gov.au](mailto:helen_petsky@health.qld.gov.au).

**Editorial group:** Cochrane Airways Group.

**Publication status and date:** Edited (conclusions changed), published in Issue 1, 2010.

**Citation:** Petsky HL, Cates CJ, Li A, Kynaston JA, Turner C, Chang AB. Tailored interventions based on exhaled nitric oxide versus clinical symptoms for asthma in children and adults. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD006340. DOI: [10.1002/14651858.CD006340.pub3](https://doi.org/10.1002/14651858.CD006340.pub3).

Copyright © 2010 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

## ABSTRACT

### Background

The measurement of severity and control of asthma in both children and adults can be based on subjective or objective measures. It has been advocated that fractional exhaled nitric oxide (FeNO) can be used to monitor airway inflammation as it correlates with some markers of asthma. Interventions for asthma therapies have been traditionally based on symptoms and/or spirometry.

### Objectives

To evaluate the efficacy of tailoring asthma interventions based on exhaled nitric oxide in comparison to clinical symptoms (with or without spirometry/peak flow) for asthma related outcomes in children and adults.

### Search methods

We searched the Cochrane Airways Group Specialised Register of Trials, the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE and reference lists of articles. The last search was completed in February 2009.

### Selection criteria

All randomised controlled comparisons of adjustment of asthma therapy based on exhaled nitric oxide compared to traditional methods (primarily clinical symptoms and spirometry/peak flow).

### Data collection and analysis

Results of searches were reviewed against pre-determined criteria for inclusion. Relevant studies were independently selected in duplicate. Two authors independently assessed trial quality and extracted data. Authors were contacted for further information with response from one.

### Main results

Two studies have been added for this update, which now includes six (2 adults and 4 children/adolescent) studies; these studies differed in a variety of ways including definition of asthma exacerbations, FeNO cut off levels, the way in which FeNO was used to adjust therapy and duration of study. Of 1053 participants randomised, 1010 completed the trials. In the meta-analysis, there was no significant difference

**Tailored interventions based on exhaled nitric oxide versus clinical symptoms for asthma in children and adults (Review)**

**1**

Copyright © 2010 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

between groups for the primary outcome of asthma exacerbations or for other outcomes (clinical symptoms, FeNO level and spirometry). In post-hoc analysis, a significant reduction in mean final daily dose inhaled corticosteroid per adult was found in the group where treatment was based on FeNO in comparison to clinical symptoms, (mean difference -450 mcg; 95% CI -677 to -223 mcg budesonide equivalent/day). However, the total amount of inhaled corticosteroid used in one of the adult studies was 11% greater in the FeNO arm. In contrast, in the paediatric studies, there was a significant increase in inhaled corticosteroid dose in the FeNO strategy arm (mean difference of 140 mcg; 95% CI 29 to 251, mcg budesonide equivalent/day).

### Authors' conclusions

Tailoring the dose of inhaled corticosteroids based on exhaled nitric oxide in comparison to clinical symptoms was carried out in different ways in the six studies and found only modest benefit at best and potentially higher doses of inhaled corticosteroids in children. The role of utilising exhaled nitric oxide to tailor the dose of inhaled corticosteroids cannot be routinely recommended for clinical practice at this stage and remains uncertain.

## PLAIN LANGUAGE SUMMARY

### Tailoring asthma interventions based on exhaled nitric oxide

In this review involving 1010 adults and children with asthma, we found that tailoring the dose of inhaled corticosteroids based on exhaled nitric oxide (compared to clinical symptoms with or without spirometry/peak flow) was beneficial in reducing the final (but not the overall) daily inhaled corticosteroid doses in adults. However in children inhaled corticosteroid dose was increased when exhaled nitric oxide guided strategy was used. There was no difference between groups in other asthma outcomes (exacerbations, spirometry, FeNO or symptom control). Thus tailoring the dose of inhaled corticosteroids based on exhaled nitric oxide cannot be routinely advocated.