

# Vitamin D for the management of asthma

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# Background

- ▶ Asthma is a ***chronic inflammatory condition*** of the airways, characterised by recurrent attacks of breathlessness, wheezing, cough, and chest tightness, commonly termed '***exacerbations***'.
- ▶ Vitamin D is a ***fat-soluble micronutrient***: cholecalciferol (vitamin D<sub>3</sub>) and ergocalciferol (vitamin D<sub>2</sub>).

# Background

- ▶ Cholecalciferol (D3) is synthesised in human skin *by sunlight*; or supplied by *diet*.
- ▶ Ergocalciferol (D2) is *ingested in the diet*.
- ▶ *Inadequate vitamin D* status has been reported to be common *among people with asthma*.

# Vitamin D to prevent asthma attacks

## Review question

- ▶ Does vitamin D *prevent asthma attacks* or *improve control of asthma symptoms* or both?

## Background

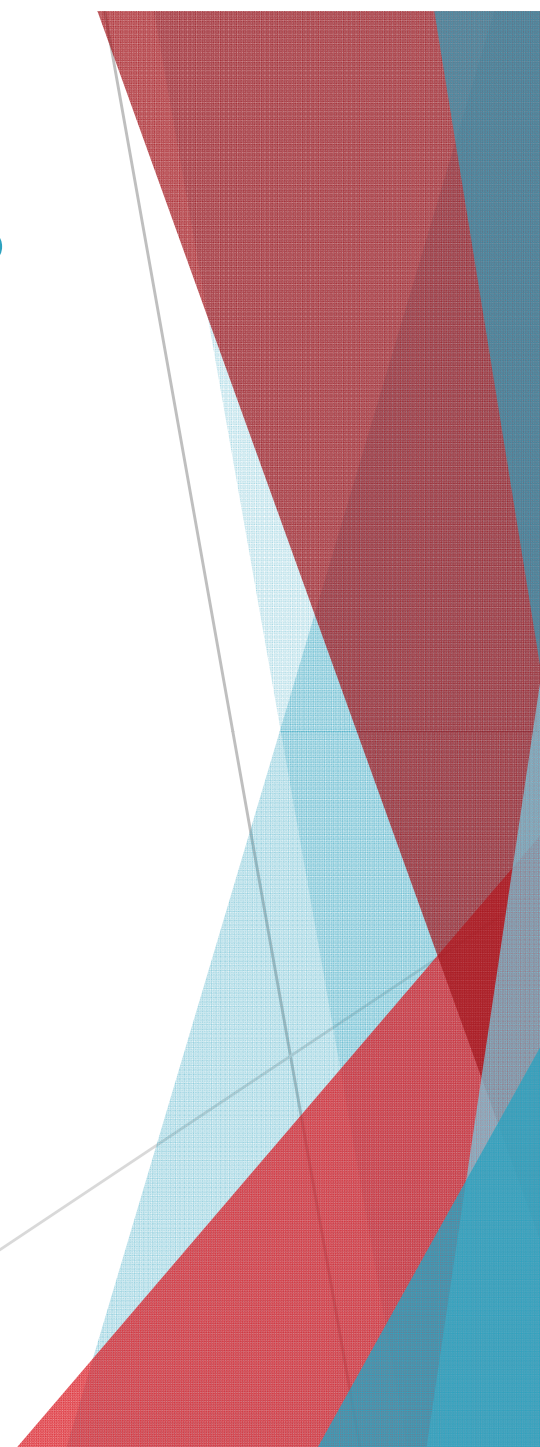
- ▶ *Low blood levels of vitamin D* linked to an *increased risk of asthma attacks* in children and adults .
- ▶ Results from several studies about the benefit of vitamin D in asthma have *not been evaluated as a group*
- ▶ Cochrane decided to synthesize all the studies and gave the conclusions

# Why it is important to do this review

- ▶ Potential of administration of vitamin D to *reduce exacerbation risk and improve asthma symptom control*.
- ▶ Several published trials of vitamin D in children with asthma have reported the *reductions in exacerbation rates* among children randomised

# Why it is important to do this review

- ▶ Meta-analysis of these trials has the potential to increase statistical power to detect effects of administering vitamin D on exacerbation risk
- We conducted a meta-analysis that was restricted to *double-blind, placebo-controlled trials* of at least 12 weeks' duration to determine the effect of vitamin D on the primary outcome of exacerbation



# Search methods

We searched the Cochrane Airways Group Trial Register and reference lists of articles.

Date of last search: January 2016.

## Selection criteria

- ▶ Double-blind, randomised, placebo-controlled trials of vitamin D in children and adults with asthma

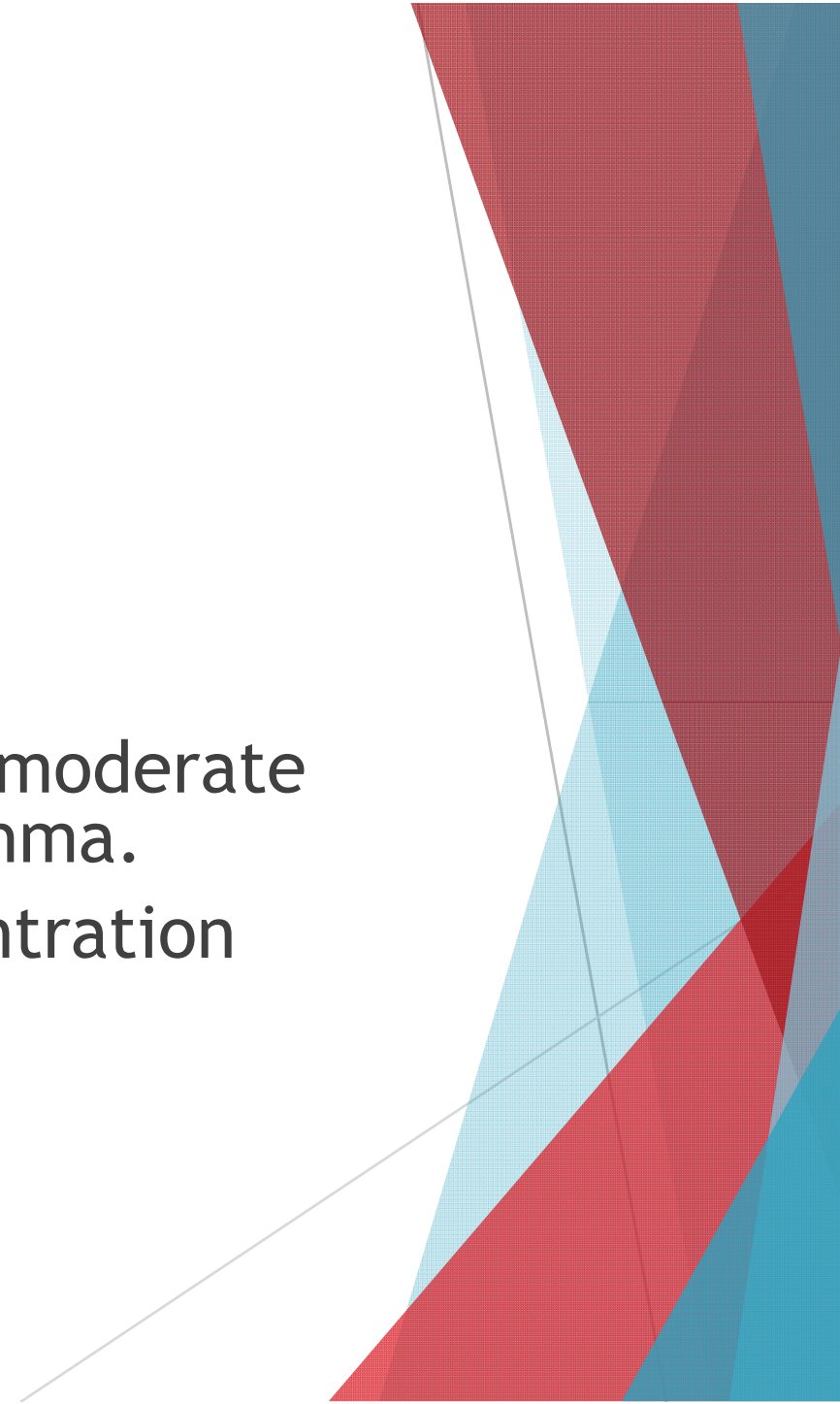
## Data collection and analysis

- ▶ Two review authors independently applied study inclusion criteria, extracted the data, and assessed risk of bias



# Participants

- ▶ 7RCT involved 435 children
- ▶ 2 RCT involved 658 adults
- ▶ Participants were ethnically diverse
- ▶ The majority of participants had mild/moderate asthma, and a minority had severe asthma.
- ▶ Median baseline serum 25(OH)D concentration ranged from 48 nmol/L to 89nmol/L





# Intervention

- ▶ All studies administered oral vitamin D<sub>3</sub> (cholecalciferol)
- ▶ 4 studies used daily dosing ranging from *500 IU/day* to *1200IU/day*
- ▶ 1 used *weekly dosing* ([Majak 2009](#))
- ▶ 1 used *monthly dosing* ([Yadav 2014](#))
- ▶ 1 used *two-monthly dosing* ([Martineau 2015](#))
- ▶ 2 gave a *bolus dose*, followed by *daily dosing* ([Castro 2014](#); [Jensen 2016](#))

# Outcomes

## ▶ Asthma exacerbation treated with systemic corticosteroids

- ▶ Reduction in the rate of asthma exacerbations treated with systemic corticosteroids (*RR 0.63, 95% confidence interval (CI) 0.45 to 0.88; 680 participants; 3 studies; high-quality evidence;*).
- ▶ Benefit of vitamin D for the outcomes of time to first exacerbation (*HR 0.69, 95% CI 0.48 to 1.00; 658 participants; 2 studies; moderate-quality evidence*)

# Outcomes

- ▶ Benefit of vitamin D for proportion of participants experiencing one or more exacerbation (*OR 0.74, 95% CI 0.49 to 1.10; 933 participants; 7 studies; moderate-quality evidence*)

## Asthma exacerbation precipitating emergency department or requiring hospitalisation

- ▶ Reduction in the proportion of participants experiencing an asthma exacerbation precipitating an emergency department visit or hospital admission or both (*OR 0.39, 95% CI 0.19 to 0.78; NNTB 27, 95% CI 20 to 76; 963 participants; 7 studies; high-quality evidence*)

# Outcomes

- ▶ **Adverse reaction to vitamin D**
  - ▶ Two participants in one trial experienced hypercalciuria ([Jensen 2016](#)).
  - ▶ No other study reported episodes of hypercalciuria or any other adverse events potentially attributable to administration of vitamin D.

# Outcomes

## ▶ Costs from healthcare providers

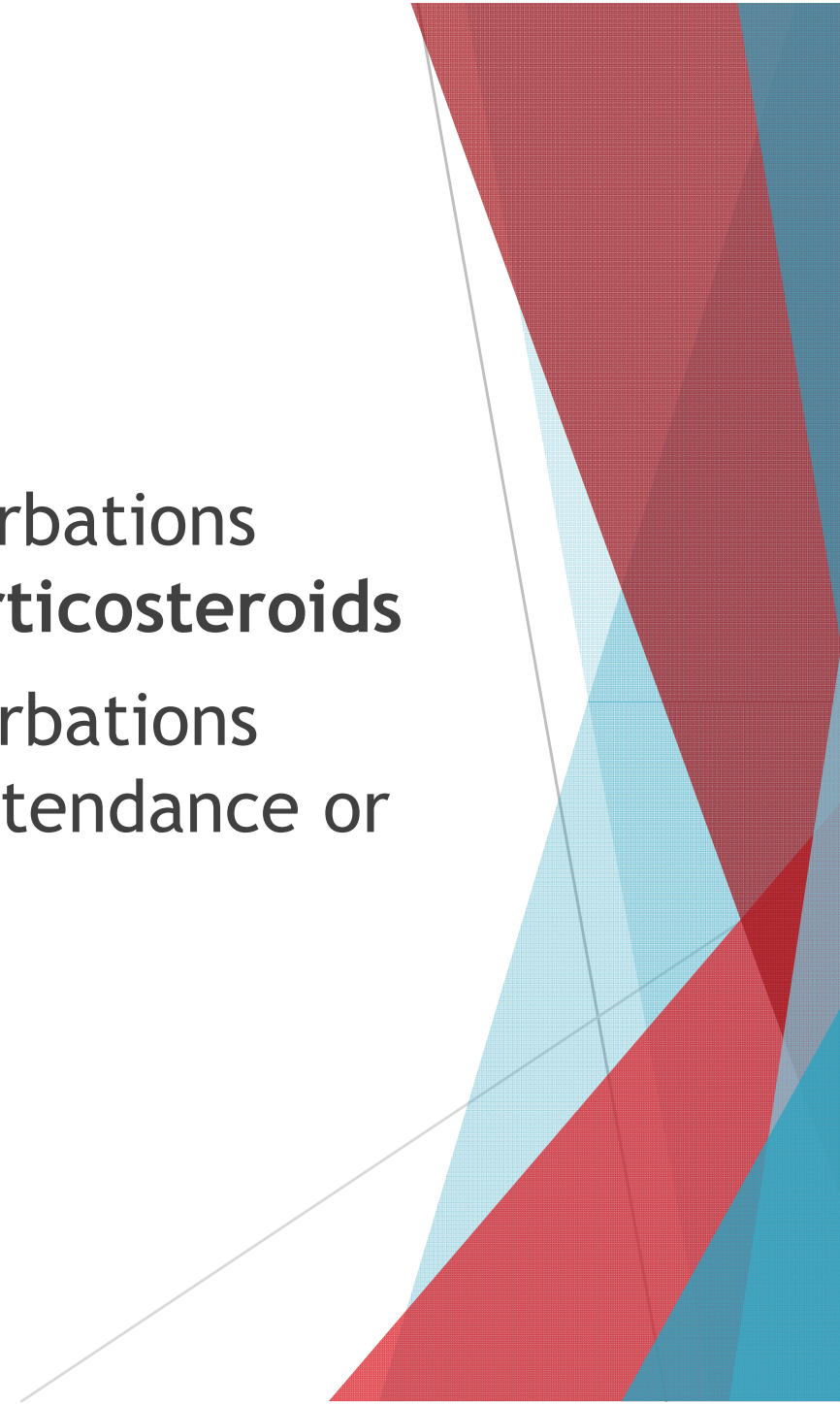
- ▶ No effect on total costs associated with asthma/upper respiratory infection over 12 months (*adjusted mean difference GBP 66.78, 95% CI GBP -263.47 to GBP 397.03*).

## ▶ Use of inhaled beta2-agonists

- ▶ One trial investigated the effects of vitamin D on the number of uses of inhaled relief medication per 24 hours ([Martineau 2015](#))
- ▶ Allocation to vitamin D did not influence this outcome at 12 months (*adjusted ratio of geometric means 1.00, 95% CI 0.77 to 1.28*).

# Conclusion

- ▶ **Reduction in the rate of asthma exacerbations requiring treatment with systemic corticosteroids**
- ▶ **Reduction in the risk of asthma exacerbations resulting in emergency department attendance or hospitalisation**
- ▶ **No effect of vitamin D on ACT score**



# Conclusion

- ▶ Vitamin D did not influence the risk of any serious adverse event
  - ▶ No fatal asthma exacerbations were reported in any trial included in this meta-analysis.
- That caution is warranted in applying this evidence to clinical practice*



THANK YOU  
FOR YOUR  
ATTENTION

