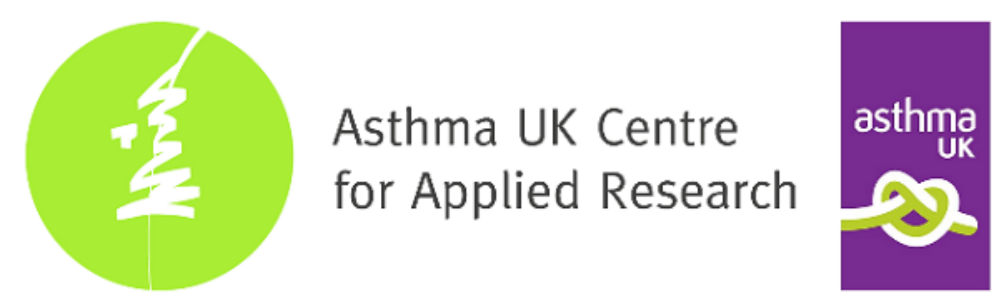


A systematic review to identify and weigh indicators of risk of asthma attacks in children aged 5-12 years



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Background

Asthma attacks in children are responsible for considerable morbidity, days missed from school, hospitalisations, and may be fatal. Asthma attacks are also associated with poor lung growth and future COPD risk¹.

Asthma attacks affect quality of life of children and carers.



Aim

To identify factors associated with the risk of attacks in children aged 5–12 years with asthma, and to quantify their importance and the strength of the underpinning evidence to inform risk stratification.



Characteristics

68 studies included

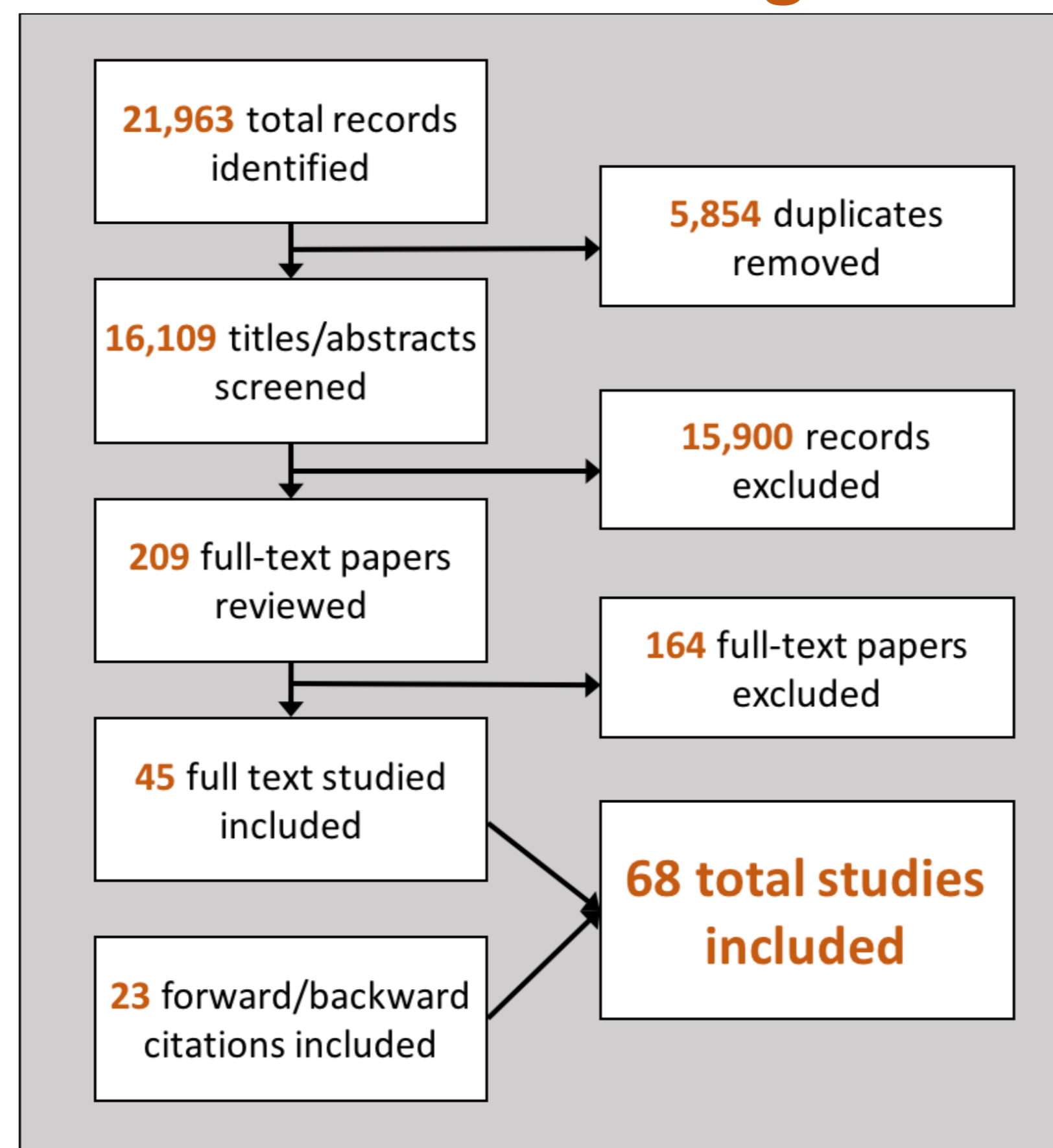


Where?

When? 1993-2017

What? 28 cohort studies
4 case-control studies
36 cross-sectional studies

PRISMA flow diagram



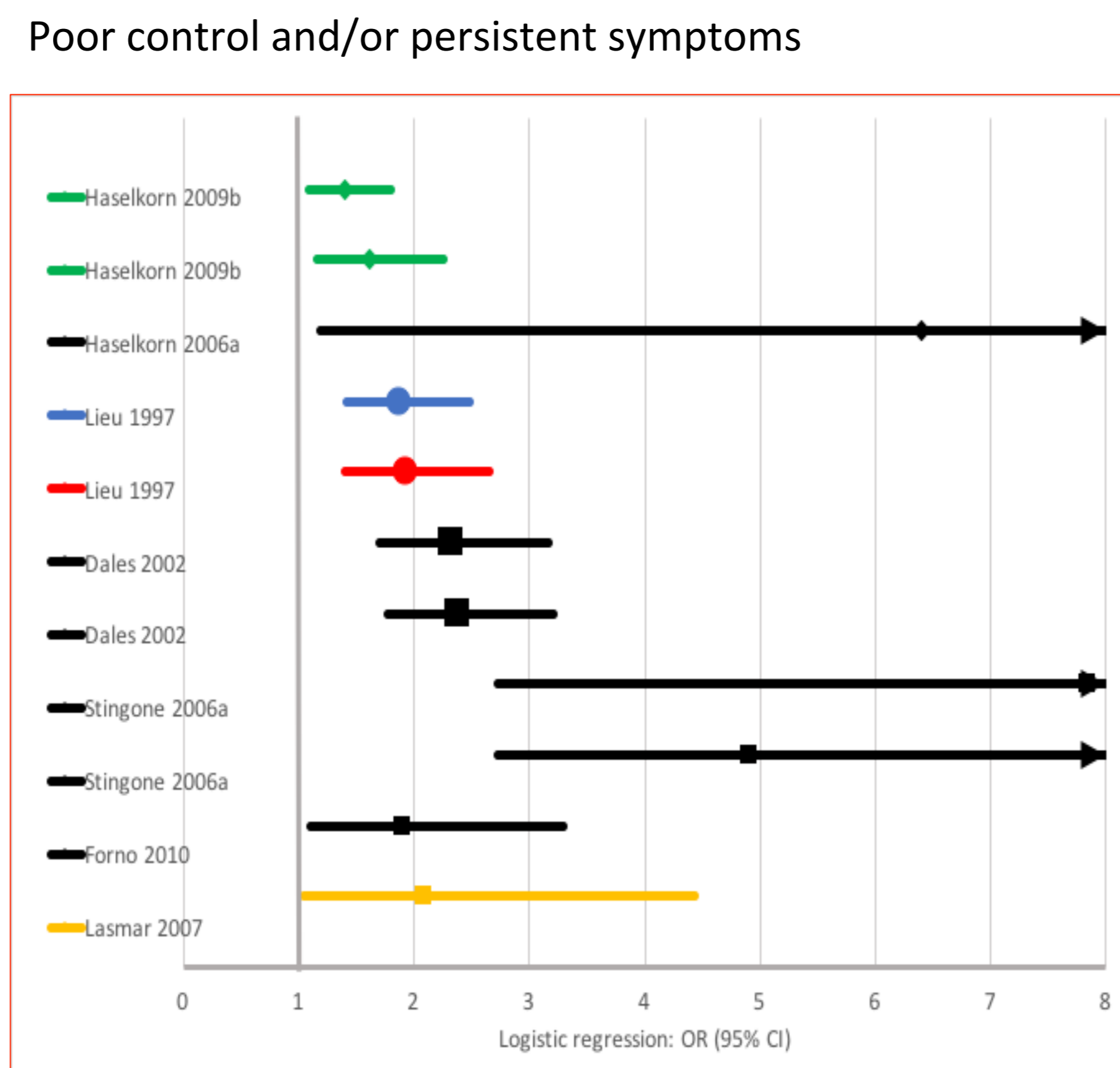
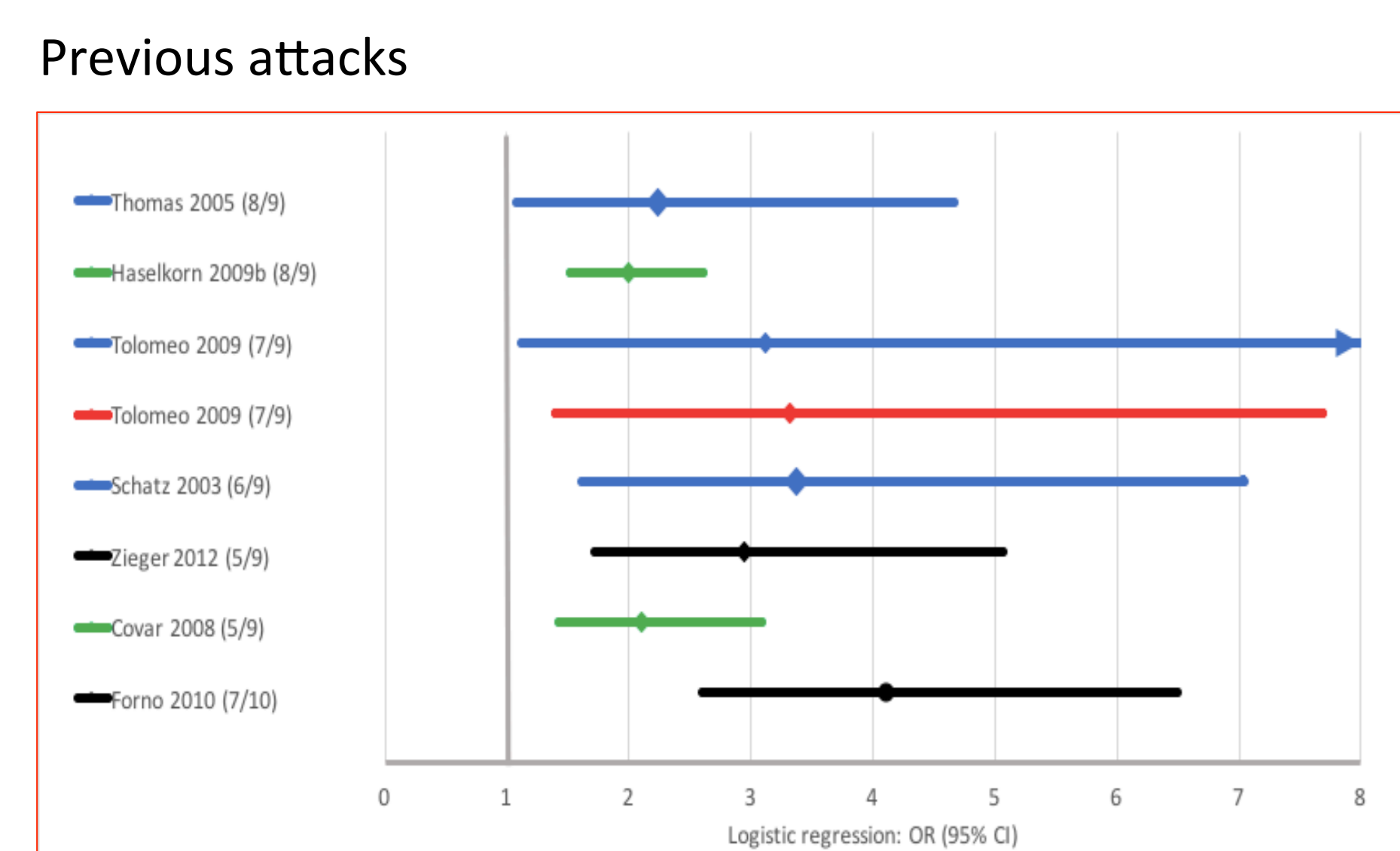
Categories of risk factors found:

- Asthma disease status
- Medication use
- Allergy & atopy
- Social context
- Healthcare & services
- Environment
- Demography
- Comorbidities



Risk factor weighting

Forest plots for the two greatest risk factors:



Study design	Size: Number of children	Outcome	Decision rules
● Cohort	● <1,000	● Combination outcome	OR < 1.1 to reflect
● Case-control	● 1,001 - 10,000	● Hospitalisation	OR 1.1-1.5 slightly increased risk
● Cross-sectional	● >10,001	● ED visit	OR 1.5-2.5 moderately increased risk
		● Oral steroid (OCS) course	OR > 2.5 greatly increased risk
		● Urgent/unscheduled care	Integration based on number, design and quality of studies, consistency of results, biological plausibility.

Key to the Forest plots
The scale on all the Forest plots has been curtailed at an OR of 8 to enable comparison between the plots for the different factors. If the confidence intervals are very wide, and the upper limit extends beyond the plot this is indicated with a line with an arrow.



Methods

Systematic review using Cochrane methodology

We searched for studies examining association between risk factors and attacks (defined by ERS-ATS task force²) in children 5-12 with doctor-diagnosed asthma

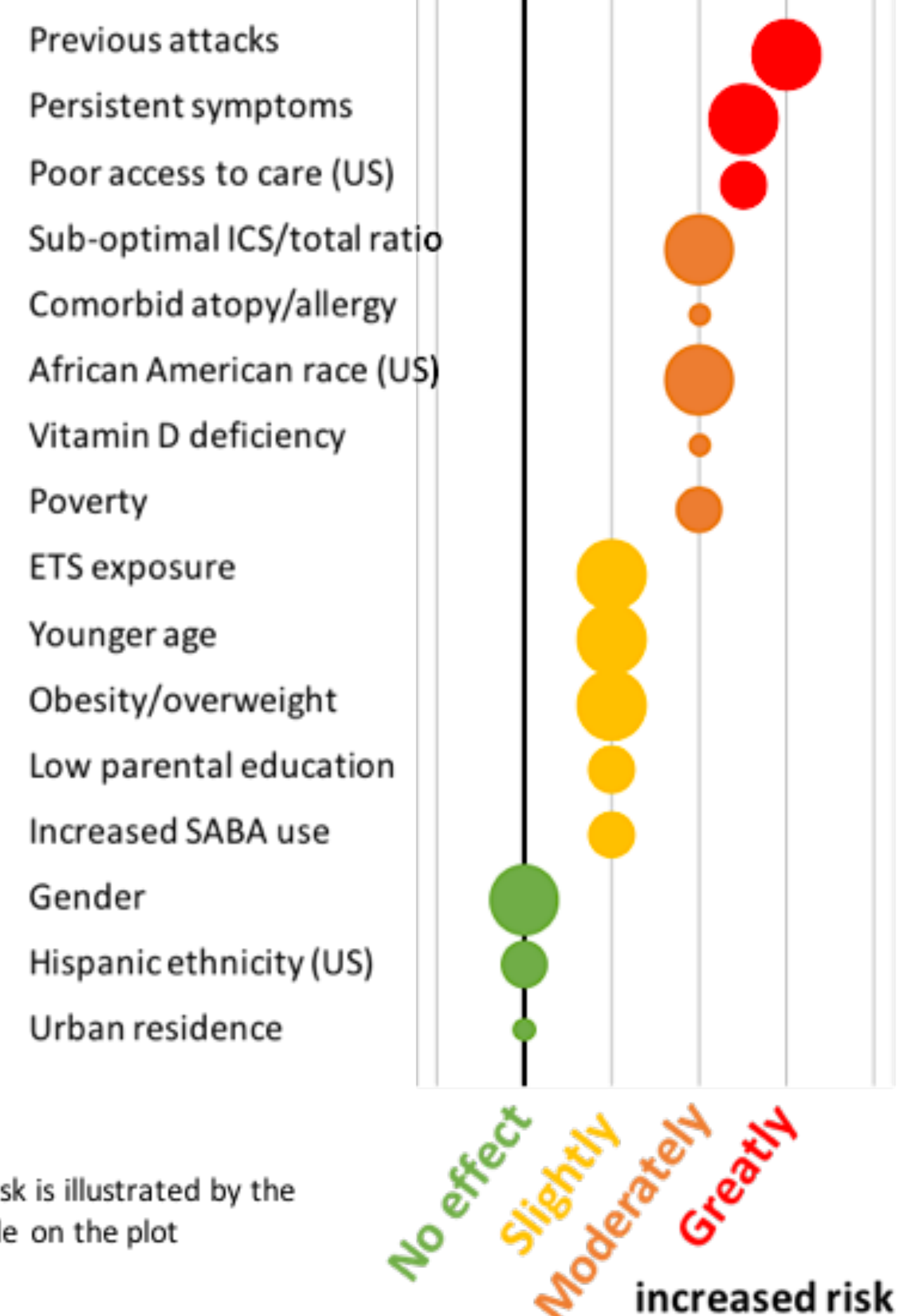
- 6 electronic databases; 2 trial registries; citation tracking.
- Two independent reviewers; Newcastle-Ottawa scales.

Risk factor weighting undertaken by an expert panel informed by: number of studies, design and quality of studies, consistency of results, and biological plausibility of risk factor.

Protocol: Tagiyeva N et al, *npjPrim Care Respir Med* 2017



Risk factor weighting: Bubble plot



The assessment of risk is illustrated by the position of the bubble on the plot

The size of the bubbles indicates the confidence with which the assessment was made.

ICS = inhaled corticosteroid; SABA = short-acting beta₂ agonist; ETS = environmental tobacco smoke

References:

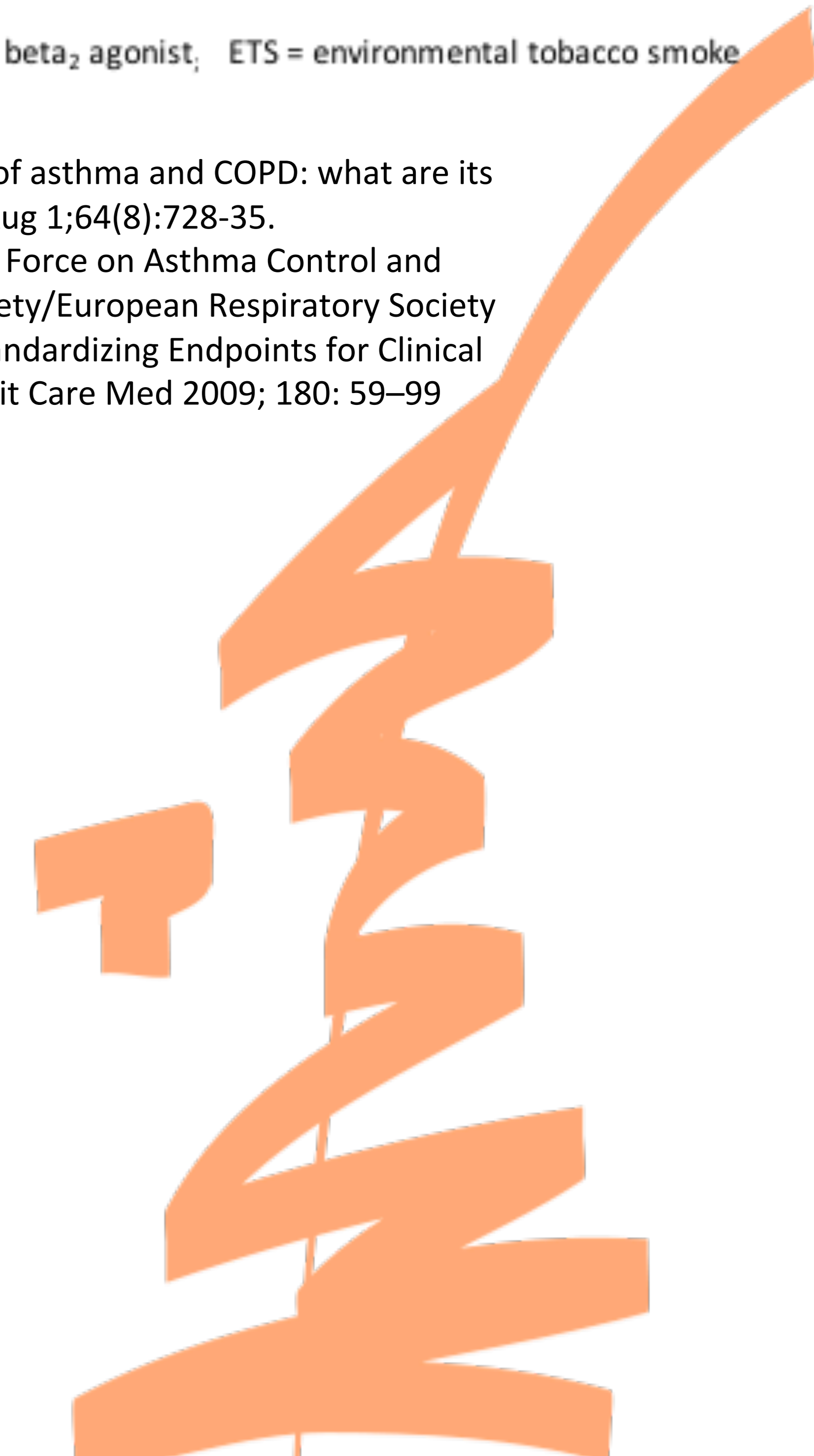
1. Gibson PG, Simpson JL. The overlap syndrome of asthma and COPD: what are its features and how important is it?. *Thorax*. 2009 Aug 1;64(8):728-35.
2. Reddel HK, et al. on behalf of the ATS/ERS Task Force on Asthma Control and Exacerbations: An Official American Thoracic Society/European Respiratory Society statement: Asthma Control and Exacerbations Standardizing Endpoints for Clinical Asthma Trials and Clinical Practice. *Am J Respir Crit Care Med* 2009; 180: 59–99



Implications

It is possible to identify the child with asthma at high risk for future attacks.

- The factors associated with increased risk for asthma attacks are identifiable in routine practice, and many are modifiable.
- Identifying that their child is 'at-risk' for asthma attacks enables parents to take decisions about modifying risk.
- Clinicians alerted to the 'at-risk' child can target care, specifically instituting evidence-based management.
- Poor access to care and living in poverty should be targeted by policymakers and health service planners to reduce risk of attacks in high-risk populations of children.
- Formal prognostic modelling is needed to validate these factors.



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