

# SYSTEMATIC REVIEW OF HEALTH STATE UTILITIES IN CHILDREN WITH ASTHMA

## INTRODUCTION

- A cost-utility analysis was performed alongside the PLEASANT clinical trial [1] to assess the cost-effectiveness of a letter intervention in preventing and lessening exacerbations in school-aged children at the start of a new school term in the UK.
- The economic analysis relied on published literature for health state utility values (HSUVs) as no patient reported outcome measures were collected in the trial.

## OBJECTIVES

- To identify HSUVs for children with asthma and to review the appropriateness of the HSUVs to be used in the PLEASANT economic analysis.

## METHODS

- A systematic review was conducted to identify HSUVs for children with day-to-day asthma symptoms (baseline utility) and children experiencing an asthma exacerbation.
- Ovid MEDLINE® In-Process, Embase®, The Cochrane Library, ECONLIT and SchHARR Health Utilities Database were searched up to 5<sup>th</sup> July 2014. Reference lists of the retrieved papers were screened for relevant papers.

## Inclusion Criteria

- Children with asthma, mixed-age populations but including some children and utility values from preference-based measures.

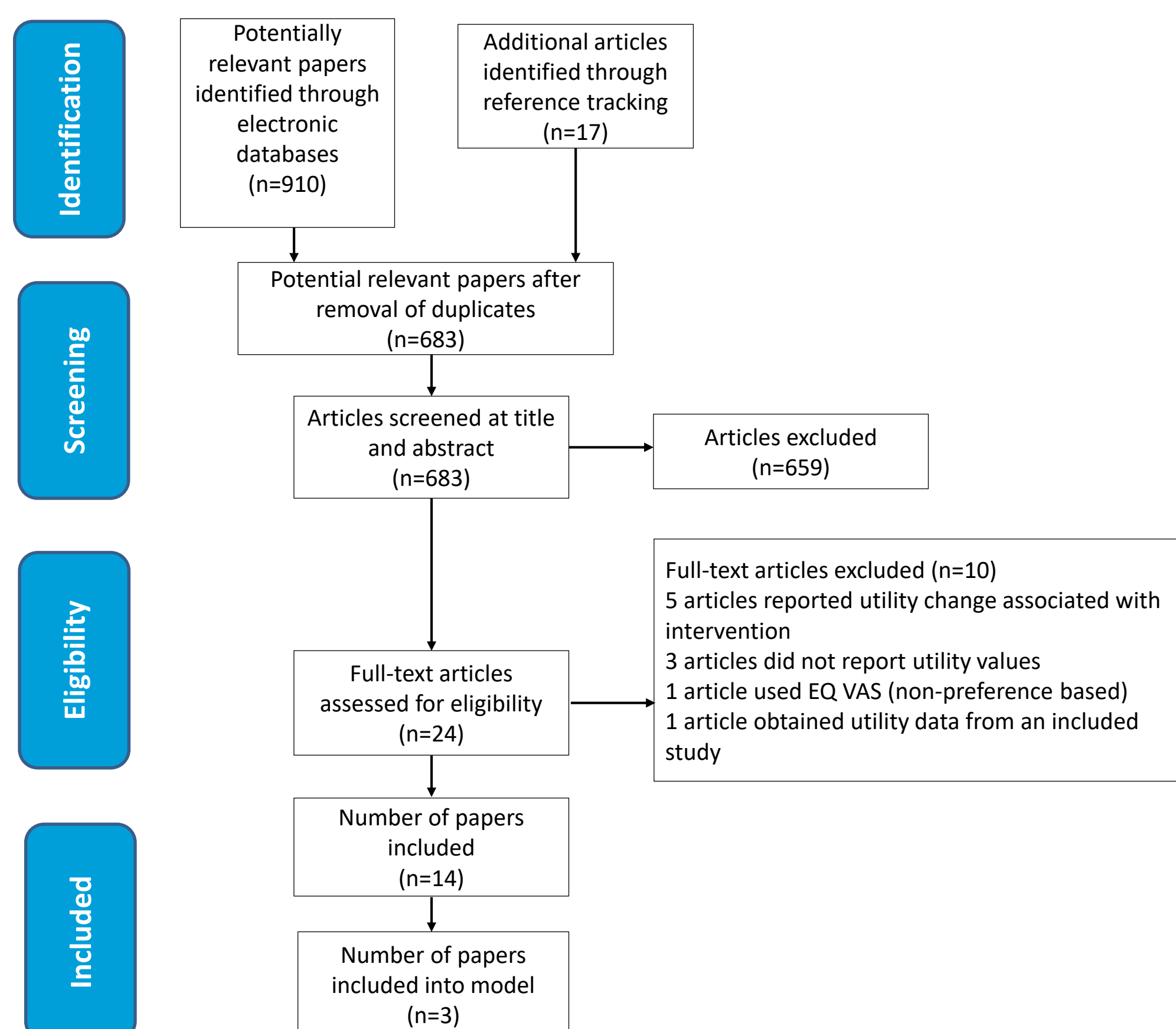
## Exclusion Criteria

- Patients aged  $\geq 18$  years, non-asthma, studies that only presented the utility change associated with a particular intervention, non preference-based utility scores unless mapping to EQ-5D was performed, studies which did not publish utility data and non-English language papers.

## RESULTS

- A total of 927 studies were identified from the search and of these, 14 studies met the inclusion criteria (Figure 1).

Figure 1: Flow diagram of search process



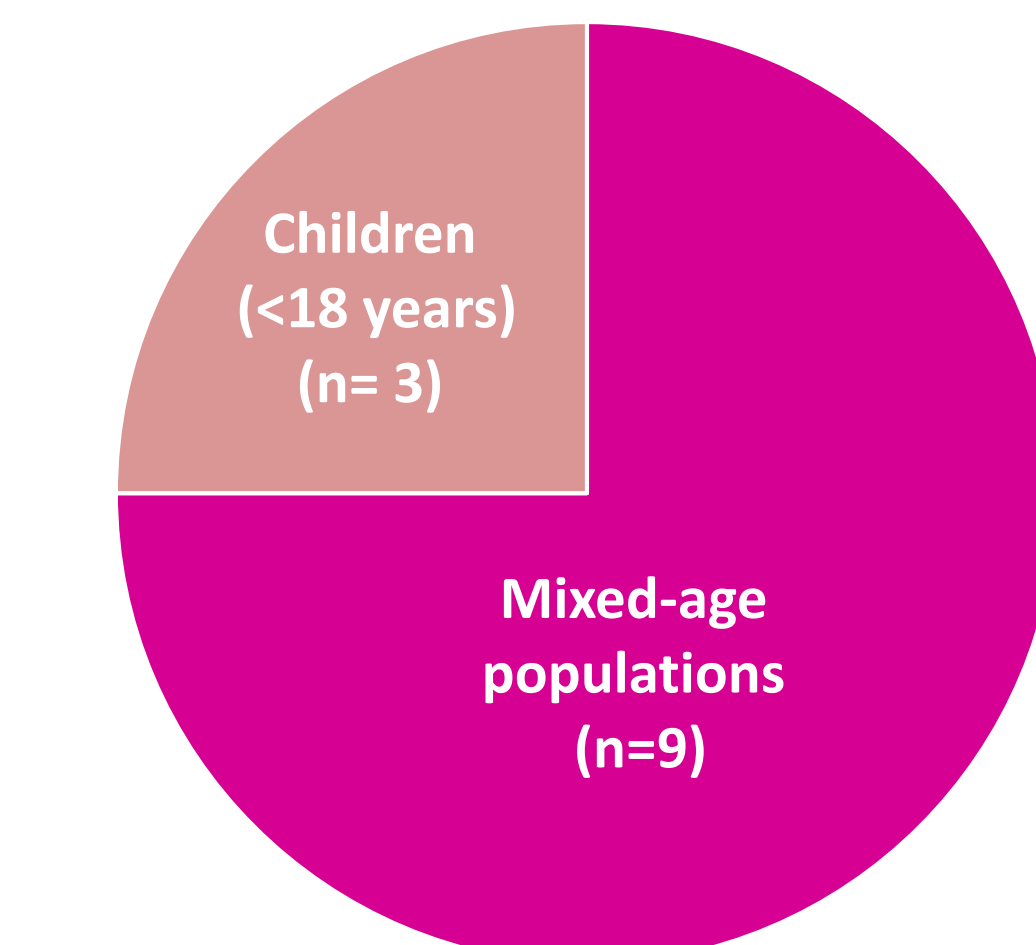
- Identified studies differed in populations and outcome measurements which led to variations in the characteristics of the utility data provided.
- Asthma severity varied widely across studies (Table 1). Most studies recruited mixed-age populations comprised mainly of adults (Figure 2). Of these, only two studies stratified HSUVs by age.
- Relevance of the data reported to the PLEASANT trial health states is summarised in Figure 3. Most studies did not report utility decrement in children with exacerbation.
- The most commonly used method was indirect measurement, mainly EQ-5D (Figure 4 & Table 2). Indirect measures employed in the studies were self-assessed by children except for EQ-5D, which relied on proxy-assessment for children  $< 12$  years (Table 2).
- Three studies mapped condition-specific measures (AQLQ or Mini AQLQ) to EQ-5D. While direct valuation of hypothetical health states by parents was used to a lesser extent (Figure 4). However, valuation using vignettes does not meet the NICE reference case and was not considered suitable for the PLEASANT economic analysis.

## Relevance to PLEASANT trial

Table 1: Characteristics of included studies

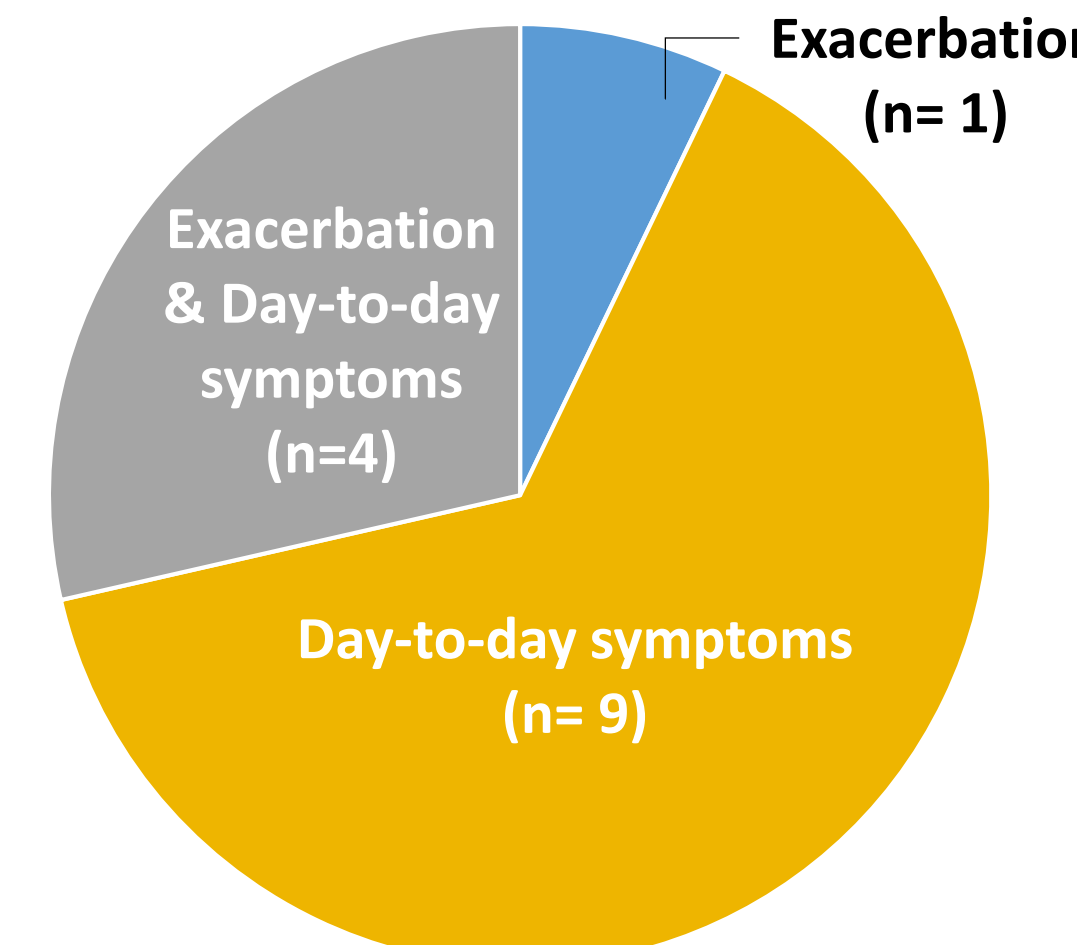
Country	n=14
Netherlands	1 (7%)
UK	3 (21%)
Belgium	1 (7%)
USA	3 (21%)
Canada	2 (14%)
Multinational	3 (21%)
Colombia	1 (7%)
Asthma Severity	
Moderate	2 (14%)
Severe	2 (14%)
Mild-moderate	4 (29%)
Mild-severe	2 (14%)
Moderate-severe	1 (7%)
Severe exacerbation	1 (7%)
Not reported	2 (14%)

Figure 2: Populations featured in the included studies, n= 12 studies



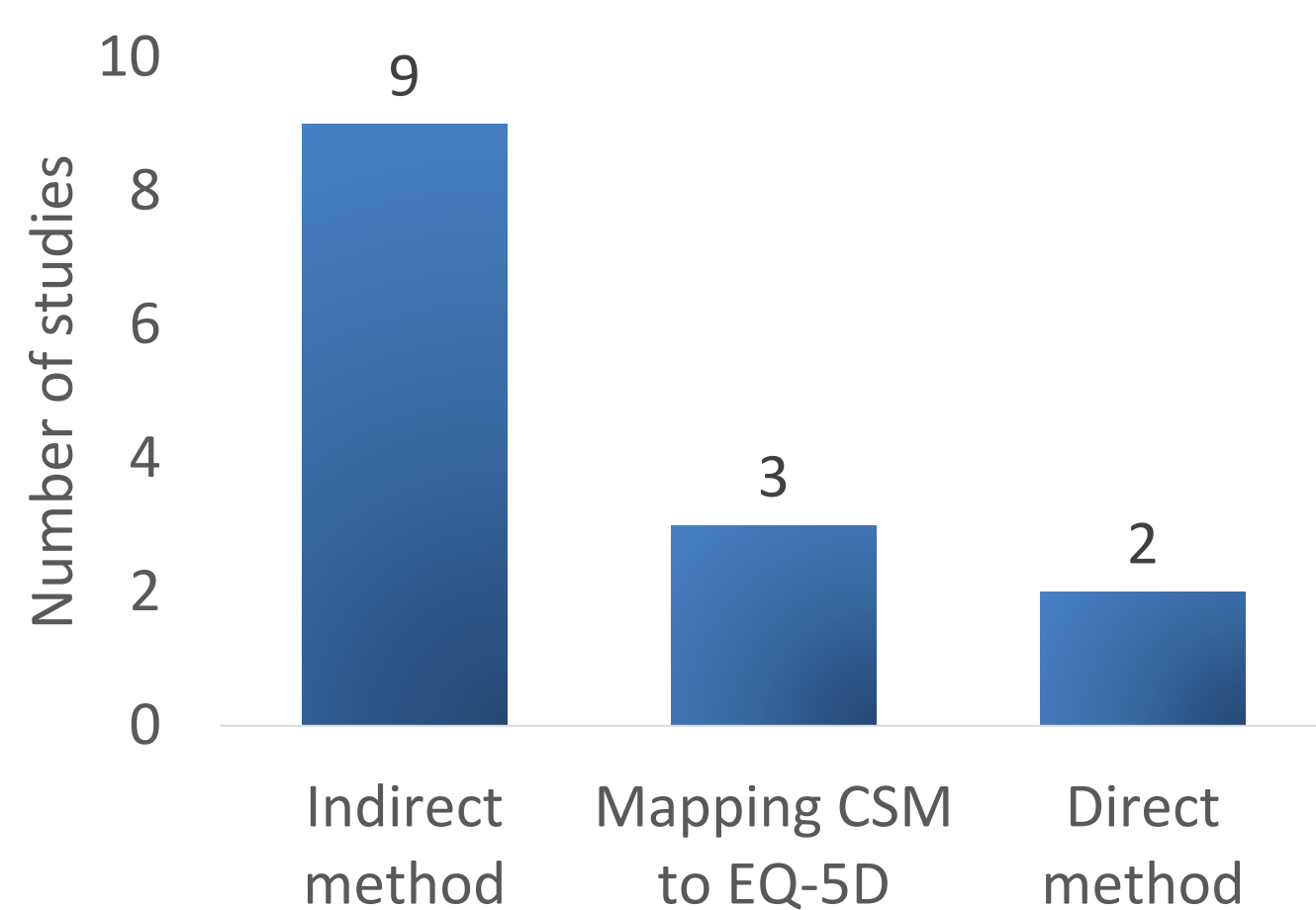
\*Two other studies involved direct valuation of vignettes by parents

Figure 3: Types of health states reported in the included studies, n= 14 studies



## Relevance to NICE reference case

Figure 4: Types of outcome measures used in the included studies, n= 14 studies



CSM: Condition-specific measure; EQ-5D: EuroQOL 5-dimension questionnaire

Table 2: Types of indirect measurements used

Methods of Elicitation	Type	Frequency of use (n=9 studies)	Valuation	Tariff	Respondent
EQ-5D	Generic	5	TTO, VAS	UK-4 Belgian-1	Children ( $\geq 12$ years) or Proxy
HUI 2	Generic	1	VAS, SG	Canada	Children (7-17 years)
HUI 3	Generic	1	VAS, SG	Canada	Children ( $\geq 12$ years)
PAHOM	Asthma-specific	2	VAS, SG	US	Children (7-12 years)

EQ-5D: EuroQOL 5-dimension questionnaire; HUI 2: Health Utilities Index (Mark 2); HUI 3: Health Utilities Index (Mark 3); PAHOM: Pediatric Asthma Health Outcome Measure; TTO: time trade-off; SG: standard gamble; VAS: visual analogue scale

## APPLICABILITY ISSUES

- Some of the applicability issues were i) EQ-5D elicited from non-UK population, ii) HSUVs derived from non-UK tariff and iii) utility decrement for exacerbation was not reported.
- None of the studies measured health utilities in children with exacerbation using EQ-5D or other preference-based measures. Some studies estimated utility decrement via mapping from condition-specific measures to EQ-5D, either subjectively or using an unpublished mapping algorithm with insufficient details provided to assess validity.
- In the absence of a robust estimate of HSUV for children with asthma exacerbation, utility data from adults identified from the review were selected as the best estimates to inform the PLEASANT economic analysis. These estimates have been used in a number of published economic evaluations [2,3].
- However, utility decrement from the adult population may not reflect the actual decrement in children. Therefore, alternative data have been explored in a sensitivity analysis. HSUVs applied in the PLEASANT economic analysis are summarised in Table 3.

Table 3: Health state utility values applied in PLEASANT

Health state	Health utility value	Description of state from source study	Instrument Used	Source
<b>Base case</b>				
No exacerbation	0.96	Children (7-18 years) in the Netherlands with mild to moderate asthma (n=27)	EQ-5D child version UK adult tariff	Willems et al. (4)
Exacerbation not requiring hospitalisation (including those managed in emergency department)	-0.1 relative to no exacerbation	Adults with moderate or severe asthma at baseline and history of one exacerbation requiring oral steroid (without hospitalisation) in the previous 4 weeks (n=22)	EQ-5D UK adult tariff	Lloyd et al. (5)
Exacerbation requiring hospitalisation	-0.2 relative to no exacerbation	Adults with moderate or severe asthma at baseline and history of one exacerbation with hospitalisation in the previous 4 weeks (n=5)	EQ-5D UK adult tariff	Lloyd et al. (5)
<b>Sensitivity analysis</b>				
No exacerbation	As per base case	As per base case	As per base case	As per base case
Any exacerbation	-0.216 relative to no exacerbation	Patients aged $\geq 12$ years enrolled in the GOAL study who experienced an exacerbation (requiring oral steroid, or an emergency department visit or hospitalisation)	AQLQ values mapped to EQ-5D (tariff not stated)	Briggs et al. (6)

## CONCLUSIONS

- There is a lack of robust estimates on HSUVs for children with asthma exacerbation.
- Future studies in children with asthma should incorporate collection of HSUVs into the study design, taking into account the ethical and methodological considerations of quality-of-life assessment during exacerbation.

## REFERENCES

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