

Mapping the Landscape of Distributional Cost-Effectiveness Analysis: A Systematic Review of Applications and Methodological Considerations

Sreenidhi Venkatesh¹, Nishit Dhanji¹, Catrin Treharne¹, Jonathan Pearson-Stuttard¹, Sreeram Ramagopalan²
Corresponding author: sreenidhi.venkatesh@lcp.uk.com

No funding was provided for this study.

1 Health Analytics, Lane Clark & Peacock LLP, London, UK
<https://www.lcp.com/en>

2 King's College London, London, UK

Summary

- + We aimed to identify and characterise all previously published Distributional Cost Effectiveness Analyses (DCEA) to outline notable patterns, trends, key challenges, assumptions, and data limitations in conducting the analyses.
- + 28 studies were included in the systematic literature review conducted across low- and high-income countries, diverse disease areas, distributed across various domains of equity - and most of the interventions proved to be equity improving.
- + There is a significant challenge in gathering consistent and reliable health data, especially in low- and middle-income countries. Under-reporting, lack of clinical trial data, and insufficient information on health-related quality of life make it difficult to accurately evaluate health interventions, particularly for socially vulnerable, deprived, and ethnic minority populations.

Background

- DCEAs extend traditional CEAs by evaluating health outcomes and costs across different groups, helping assess health inequalities and trade-offs between total health and equity [1-3].
- Policymakers balance health maximization (efficiency) and equitable outcomes (equity). DCEA helps quantify these trade-offs, identifying who benefits or loses and assessing the net impact [1,2].
- Persistent global health disparities, such as life expectancy gaps, are driving institutions like NICE to integrate equity considerations, with DCEA offering a structured approach [1].

Objectives

This study aimed to characterise all previously published DCEAs to provide learnings for wider use.

We aimed to:

- Identify patterns in published DCEAs
- Determine the key factors that influence the feasibility and appropriateness of DCEA for different healthcare markets and therapy areas.

Methods

Search Strategy

- Search terms applied were based on the systematic review by Steiger D. et al.[1] (“distributional costs effectiveness analysis” OR “DCEA” OR “distributional economic evaluation.”)
- The search included DCEAs published between 2014 and 2024.
- Searches were conducted in Embase and PubMed databases.

Eligibility Criteria

- Studies explicitly stating the use of DCEA were included.

Data Extraction

- Data extracted included year of publication, geographical area, disease area, intervention, domain of equity, aggregate/full-form analysis, data limitations, and sensitivity analyses.

Data Synthesis and Analysis

- The extracted data were synthesised to identify key study characteristics, patterns and trends, as well as challenges and limitations in conducting DCEAs.

Results

Figure 1: PRISMA Flow Diagram

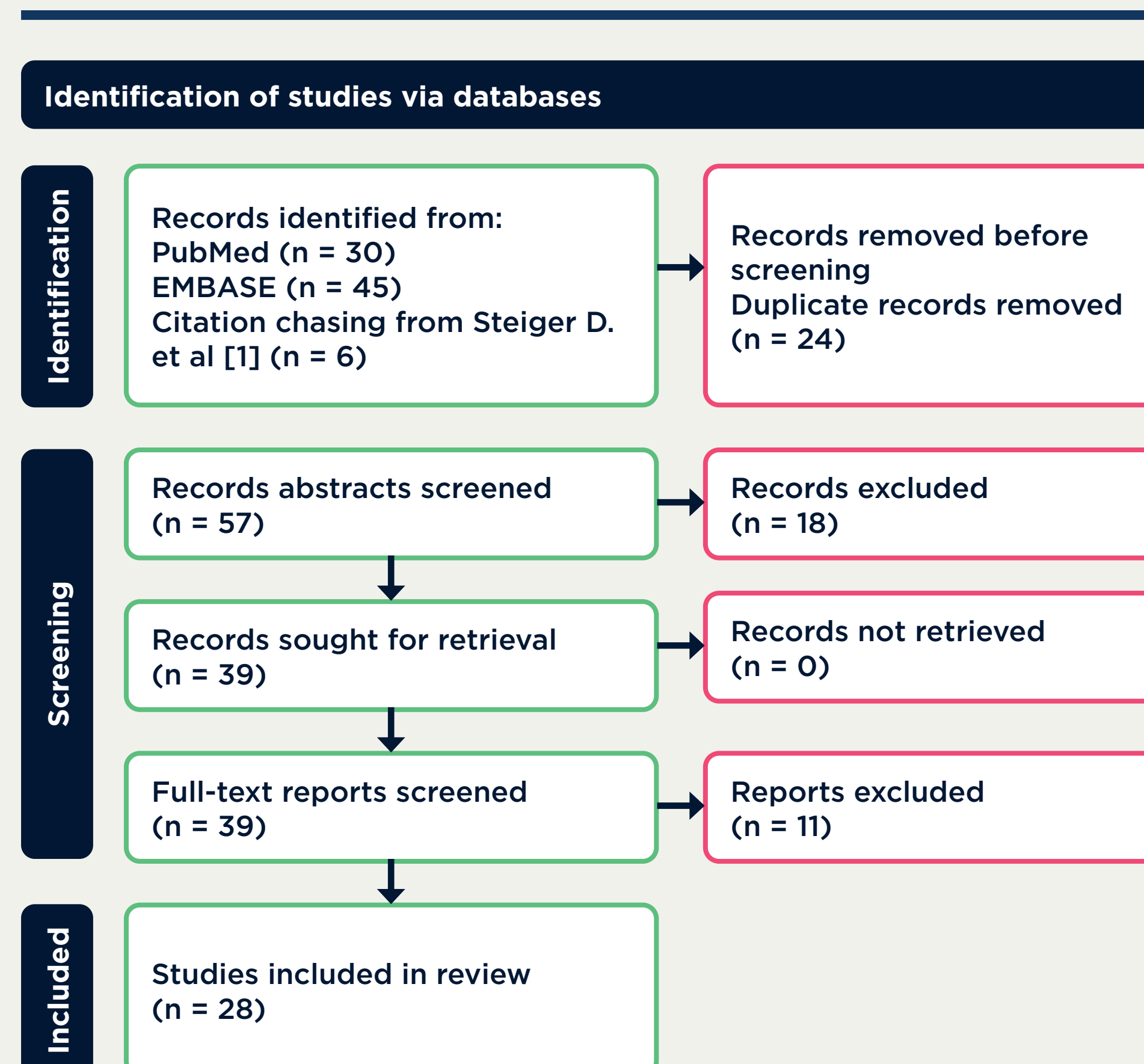
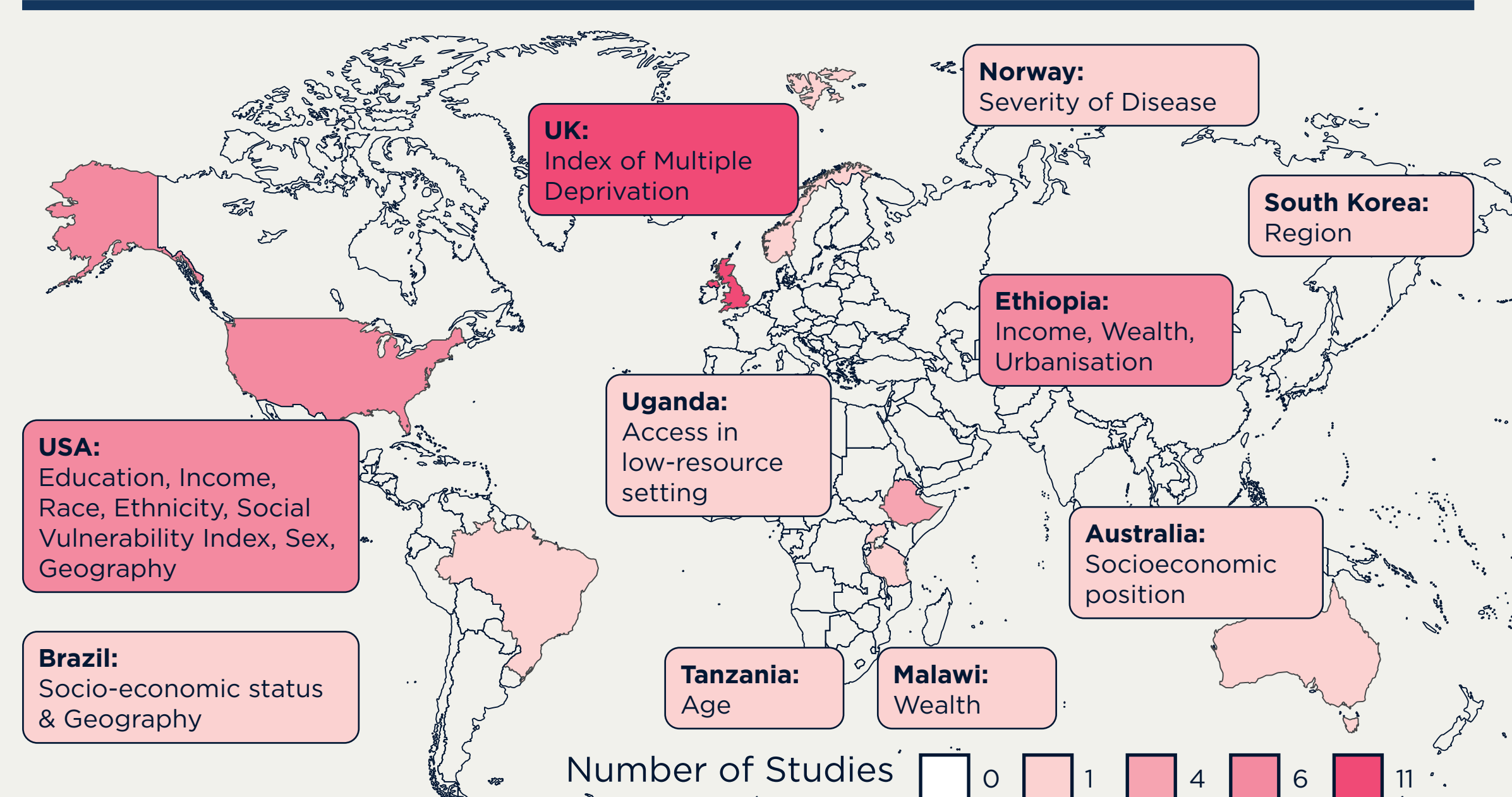


Figure 2: Countries in which DCEAs have been conducted and the Domains of Equity considered



Key challenges and limitations

- **Under-Reporting and Inconsistent Baseline Data:** There is significant under-reporting and variability in baseline population health data, particularly in low- and middle-income countries.
- **Insufficient Data on Intervention Uptake:** Across most studies, data on differential uptake of interventions by subgroups was insufficient, leading to a risk of over- or under-estimating the true impact of interventions on HRQoL.
- **Limited Information on Deprived Populations and Ethnic Minorities:** There is a lack of information and clinical trial data about lower-income individuals and ethnic minorities, leading to assumptions about the health benefits of interventions.
- **Rural vs. Urban Disparities in LEDCs:** Data gaps regarding population characteristics, particularly in rural areas of low-income countries led to authors comparing the research population with that of a neighbouring country.
- **Incorporating Socioeconomic Variables:** A lack of reliable data on socioeconomic variables frequently poses challenges when estimating health distributions and inequalities.
- **Inconsistencies in DCEA definitions and methodology:** Due to differences in what is considered a DCEA, 11/39 studies were initially included, however, full-review of the report indicated that the methodology was not consistent.

Conclusions

- This systematic review highlights a growing application of DCEA across disease areas, geographies and equity domains.
- Further research is needed to assess how data limitations are best mitigated; however, considering the variety of case studies identified, DCEA can already be used more widely to identify health interventions that can reduce health inequalities.

References:

1. Steiger D, Chatterjee C, Groot W, Pavlova M. Challenges and Limitations in Distributional Cost-Effectiveness Analysis: A Systematic Literature Review. *International Journal of Environmental Research and Public Health*. 2022 Dec 28;20(1):505.
2. Meunier A, Longworth L, Kowal S, Ramagopalan S, Love-Koh J, Griffin S. Distributional Cost-Effectiveness Analysis of Health Technologies: Data Requirements and Challenges. *Value in Health*. 2022 Aug.
3. Asaria M, Griffin S, Cookson R. Distributional Cost-Effectiveness Analysis. *Medical Decision Making*. 2015 Apr 23;36(1):8-19.

Patterns and trends in DCEA literature

- We identified a total of 28 relevant studies.
- We identified 16 studies reporting aggregate DCEAs, and 12 studies reporting full-form DCEAs. Aggregate approaches were all conducted from a UK or US perspective.
- The number of DCEAs published has increased over time (from only 1 DCEA in 2014 to 7 in 2023).
- The studies cover a diverse range of disease areas and have been conducted in both low- and high-income countries, with the UK being the most common perspective adopted (n=11).
- Both rural and urban settings have been explored.
- Many of the studies conducted in low- and middle-income countries have focused on health packages and coverage.
- In higher-income countries, studies have primarily concentrated on treatments for cancer and lifestyle-related disorders.
- Most of the studies (90%) have concluded that the interventions are equity-improving.

Figure 3: Therapeutic Areas covered in the DCEAs

