

Development of a Stepwise Approach to Assessing the Feasibility of Conducting a Distributional Cost-Effectiveness Analysis

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Summary

- Although guidance exists for conducting distributional cost-effectiveness analysis (DCEA), a formal process for evaluating the feasibility of conducting DCEA, whether in aggregate or full form, is currently lacking.
- We have designed a stepwise process to guide the researcher in assessing the feasibility of conducting DCEA. Although simplifying assumptions can be made early in the process to justify using an aggregate DCEA, we recommend completing all steps before making a final decision.

Background

DCEA is a framework that extends traditional cost-effectiveness analysis (CEA) by assessing both the overall health benefits and costs of an intervention, as well as how these benefits and costs are distributed among various social groups at the population level.

DCEA can be either conducted in aggregate or full form. Aggregate DCEA is often favoured due to its lower data and resource requirements, however, it does not provide the complete perspective offered by a full DCEA.

Love-Koh et al. (2020) demonstrated the impact of conducting a full DCEA compared to the aggregate approach, showing that varying all relevant parameters by equity subgroup (i.e., performing a full DCEA) leads to different conclusions about health inequality compared to modelling only differences in prevalence, as done in an aggregate DCEA.

An essential question to consider when performing DCEA is whether conducting a full DCEA and adapting a decision model is both feasible and influential on the health inequality outcomes.

Objectives

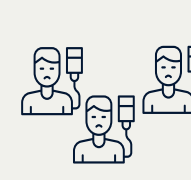


DCEA methods currently lack a practical, step-by-step process for assessing the feasibility of conducting a DCEA, whether in aggregate or full form. This study aimed to fill that gap by developing such an approach.

Methods

For understanding, a brief description of the key differences between a standard CEA, aggregate DCEA and full DCEA is provided in Figure 1.

Both forms of DCEA require data on the distribution of baseline health in the general population and the distribution of health opportunity costs across equity-relevant subgroups, as outlined in Figure 2.

Figure 1. Comparison of CEA, aggregate and full DCEA

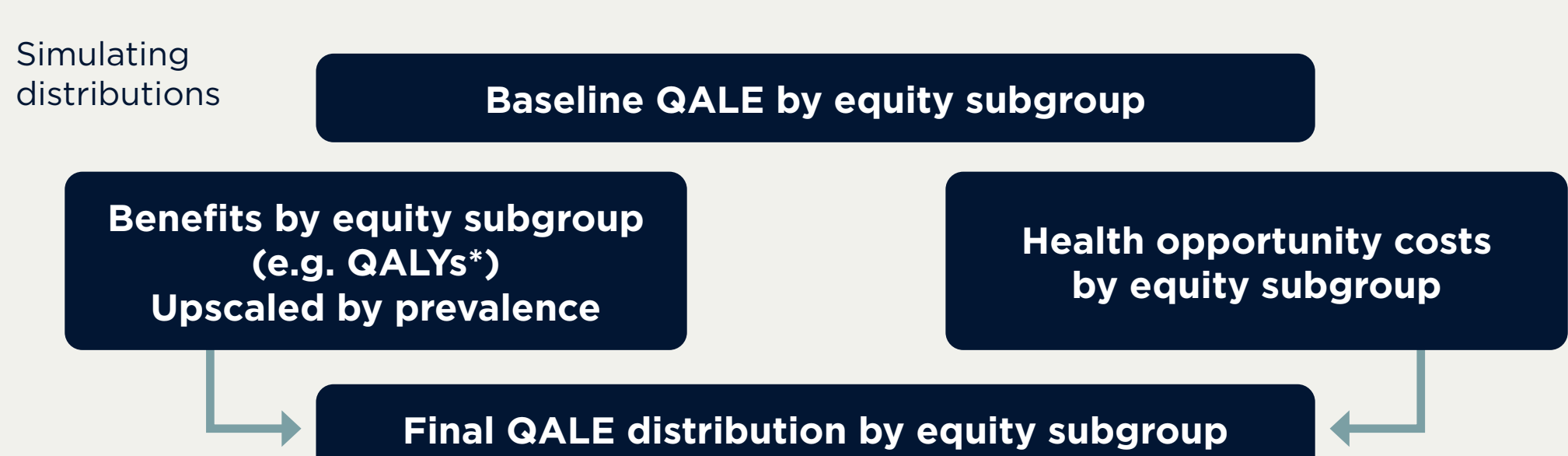
	Standard CEA: Estimates the costs and outcomes of the intervention in (average) patients who receive it, without taking health inequality into account.
	Aggregate DCEA: Scales up the costs and outcomes derived from a CEA to estimate the intervention's equity impact at the population level. Costs and outcomes can be adjusted for equity subgroups, but this requires certain assumptions e.g. QALYs can be accurately distributed using equity weights that have been identified.
	Full DCEA: Similar to aggregate DCEA, costs and outcomes are scaled up; however, the decision analytic model used in the CEA is then modified to perform subgroup analyses, allowing costs and outcomes to vary by equity subgroup.

Abbreviations: CEA, cost-effectiveness analysis; DCEA, distributional cost-effectiveness analysis; QALY, quality-adjusted life years.

A process for assessing the feasibility of conducting a DCEA was developed. Criteria considered included equity domains, and how the equity staircase model parameters might vary by equity subgroups (Cookson et al. 2022). A key consideration was also data availability and the quality of available data sources. Likely stakeholder acceptance was evaluated when developing the feasibility approach.

The stepwise process was applied using non-small cell lung cancer as a case study. A targeted literature search was conducted from an England perspective, using PubMed and grey literature to identify and evaluate data sources for each input. These data sources were then assessed for accessibility, content, and quality, applying a standardised Red-Amber-Green (RAG) rating system.

Figure 2. Elements of a DCEA



*Full DCEA generates estimates by equity subgroups by modifying the standard CEA model to incorporate subgroup analysis.

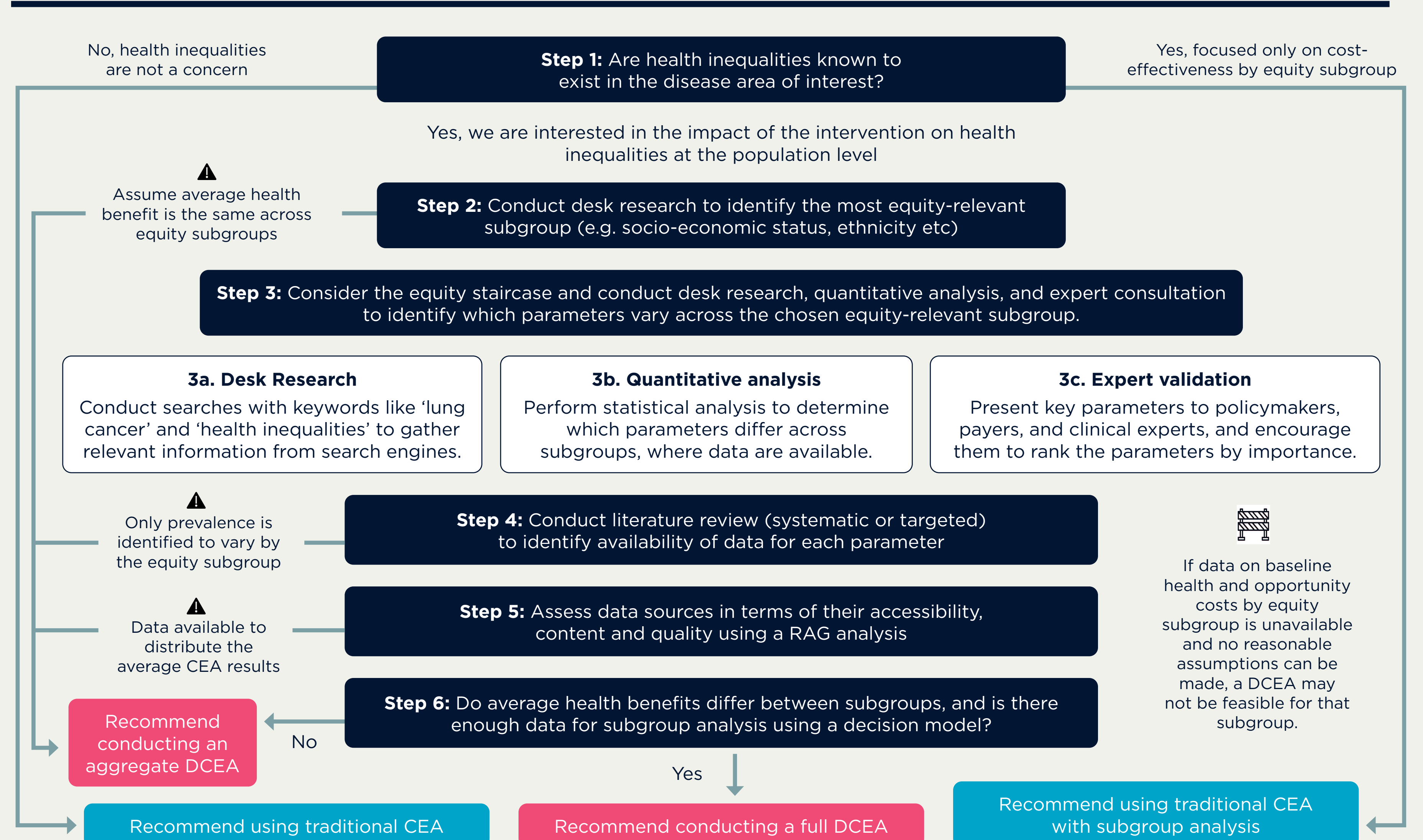
Evaluating distributions

Abbreviations: DCEA, distributional cost-effectiveness analysis; QALE, quality-adjusted life expectancy; QALY, quality-adjusted life year.

Results

The step-by-step approach shown in Figure 3 should be followed to first assess whether a DCEA is appropriate, and then to evaluate the feasibility of conducting either an aggregate or full DCEA, determining which option is most appropriate.

Figure 3. Process for assessing the feasibility of conducting DCEAs



After the researcher has completed these steps, they can make a well-informed decision about the feasibility of conducting a DCEA and carefully choose between an aggregate or full DCEA approach.

Lung cancer case study

- The Index of Multiple Deprivation (IMD) was identified as the most relevant equity subgroup, with incidence and mortality as key parameters of interest to vary by IMD.
- Robust evidence was available by IMD for estimating the baseline distribution, health opportunity costs, incidence, and mortality. In addition to published literature, relevant datasets identified include the Hospital Episode Statistics dataset in England, which provides patient-level data on e.g. hospital admissions, outpatient visits, etc. and by IMD, as well as data on lung cancer in England. The RAG analysis is presented in Table 1.
- Although limited or no evidence was available for disease progression and health-related quality of life, a full DCEA would still be recommended as robust data is available by the most relevant parameters (incidence & mortality)

Table 1. Evidence available to support a DCEA in lung cancer

Parameter	Domain of equity				
	IMD 1	IMD 2	IMD 3	IMD 4	IMD 5
Baseline distribution	●	●	●	●	●
Health opportunity cost	●	●	●	●	●
Incidence	●	●	●	●	●
Disease progression	●	●	●	●	●
Mortality	●	●	●	●	●
HRQoL (EQ-5D)	●	●	●	●	●

● Strong evidence available ● Limited evidence available ● Little/ No evidence available

Abbreviations: DCEA, distributional cost-effectiveness analysis; EQ-5D, EurQoL five-dimension; HRQoL, health-related quality of life; IMD, index of multiple deprivation.

Conclusions

The approach developed assesses the feasibility of conducting a DCEA and determines the most suitable methodology. The process will help the researcher understand both the data requirements and availability.

Steps can be modified based on resource availability; for example, whilst we conducted a targeted literature search for data sources, a systematic literature review could be performed for completeness.

References:

Love-Koh J, Pennington B, Owen L, Taylor M, Griffin S. How health inequalities accumulate and combine to affect treatment value: A distributional cost-effectiveness analysis of smoking cessation interventions. *Social science & medicine*. 2020;265:113339-113339.
Cookson R, Griffin S, Norheim, O. F., & Culyer, A. J. (Eds.). (2020). *Distributional cost-effectiveness analysis: quantifying health equity impacts and trade-offs*. Oxford University Press.
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