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# DISTRIBUTIONAL COST-EFFECTIVENESS ANALYSIS: A CASE STUDY ON ITS POTENTIAL PROSPECTS IN HTA

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## BACKGROUND/INTRODUCTION

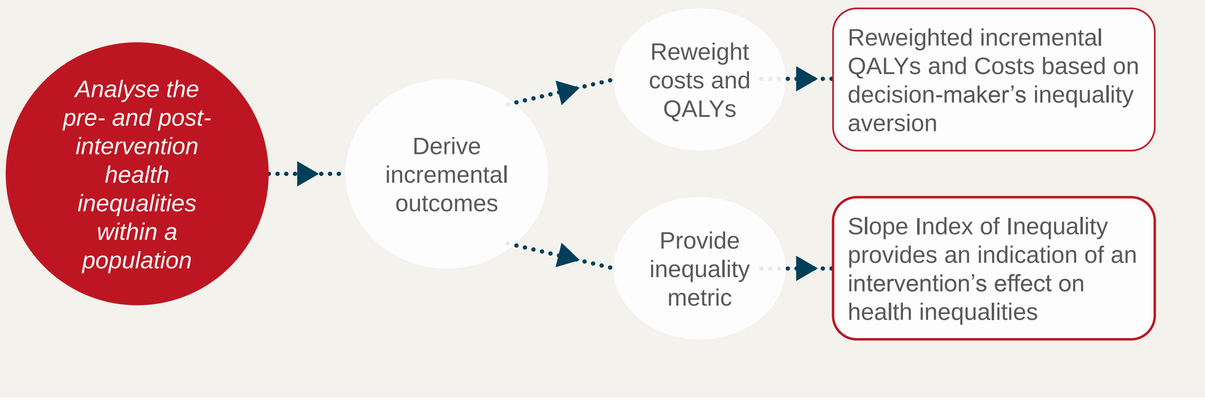
- Principle 9 of NICE's charter aims to reduce health inequalities and so NICE considers inequality or unfairness in the distribution of health to be an important factor in decision-making.
- Current approaches to considering health inequalities in HTA decisions are, generally, unsystematic and, therefore, untransparent.
- However, Distributional Cost-Effectiveness Analysis (DCEA) provides an alternative, systematic approach to valuing health inequalities.

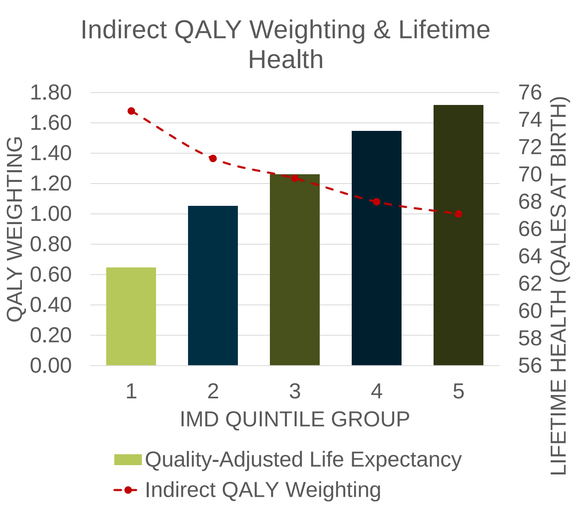
## OBJECTIVE(S)

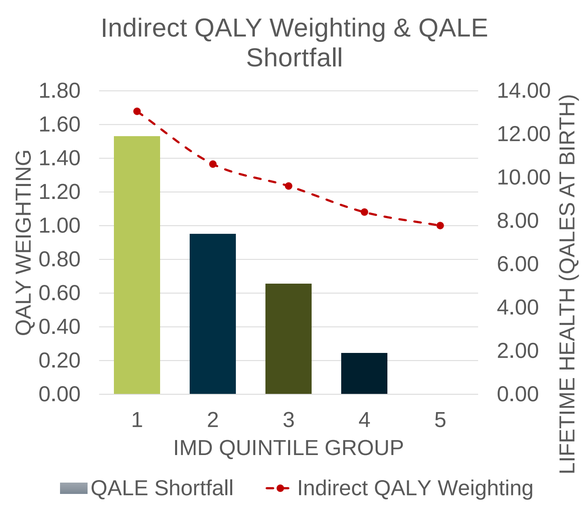
- The aim of this study is to develop a DCEA case-study to explore the prospects of DCEA in Health Technology Assessment (HTA).

## METHODS

- DCEA reweights standard cost-effectiveness outcomes, specifically incremental QALYs and costs, based on a decision-maker's aversion to inequality and the pre-intervention health inequalities that exist within a general population.
- Since Hepatitis C disproportionately affects more deprived socio-economic groups within England, we use Hepatitis C as a case study.
- We derive incremental QALYs (1.24) and costs (£20,661) from NICE TA507 (Sofosbuvir/velpatasvir/voxilaprevir vs. Pegylated interferon alpha 2a), which reported an incremental cost-effectiveness ratio (ICER) of £16,654.
- From these data, we then analyse the health equity impact of Sofosbuvir/velpatasvir/voxilaprevir within the chronic Hepatitis C DAA- naïve population of England.




## DISCUSSION

- Our approach employs an aggregate approach to DCEA, which utilises the summary, incremental outcomes of a standard cost-effectiveness analysis.
- Our case-study only incorporates moderate health opportunity costs incurred across each deprivation quintile. Varying health opportunity costs shares can have significant influence on an intervention's effect on health inequalities.
- Our approach does not utilise the Equally-Distributed Equivalent function, which calculates the Net Health Benefit (NHB) at the individual-level. However, using the derivative of the Atkinson Social Welfare Function is ordinally equivalent.
- The Slope Index of Inequality provides a clear and transparent way of calculating an intervention's impact on health inequalities.
- Although DCEA provides a promising approach to quantitatively assessing the health equity impact of an intervention, applying a consistent reference-case is desirable for Health Technology Assessment (HTA) submissions.

## REFERENCES

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3. Love-Koh, J. et al. 2015. The Social Distribution of Health: Estimating Quality-Adjusted Life Expectancy in England, Value In Health
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## RESULTS

- Based on an aversion to inequality value of 11, the DCEA-weighted ICER reduces to £13,177 (a 21% reduction), with a large concomitant gain in net health benefit (NHB).
- A Slope Index of Inequality (SII) regression (SII = -21,262) indicates that the intervention also reduces overall health inequality.
- However, since majority of eligible patients (56%) fall within the most deprived socio-economic groups of England, a scenario analysis was performed where the proportions of patients across deprivation quintiles were assumed equal (20% per quintile).
- In this scenario, both health inequality (SII = 224) and the ICER increase (£24,194), while gains in NHB are minimal.

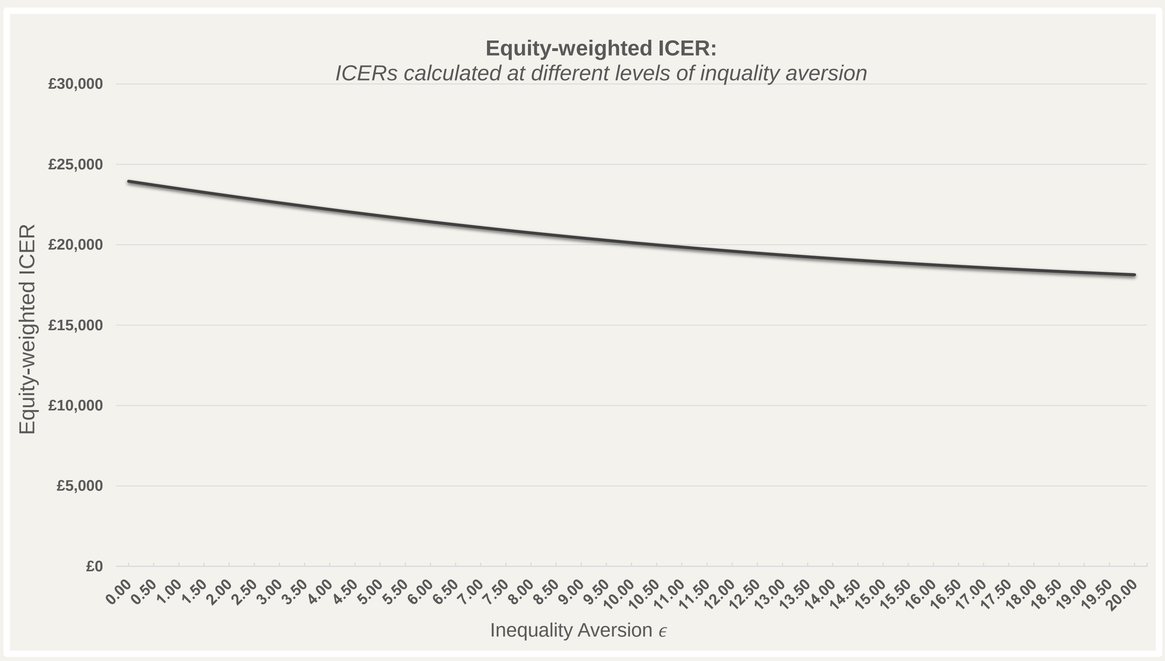


**Figure 1** Based on the high levels of health inequality in Hepatitis C, there are significant reductions in the ICER across different levels of inequality aversion.

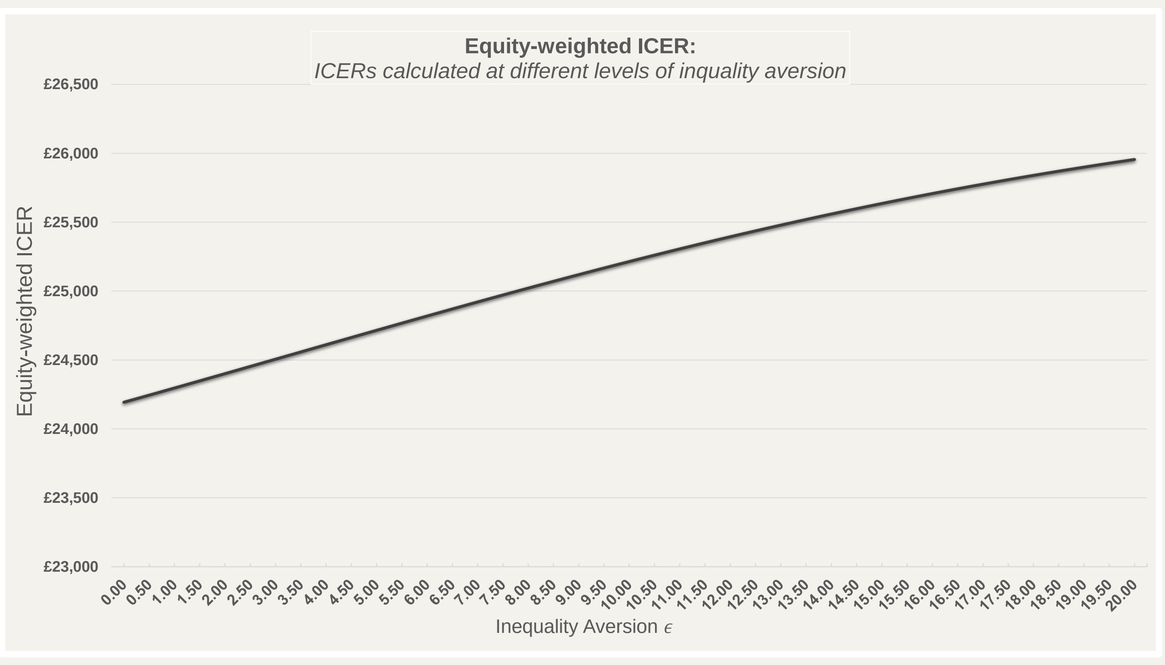


**Figure 2** Scenario analysis demonstrating how the distribution of deprivation can affect the ICER in relation to aversion to inequality. In instances where the benefits are equally distributed, but opportunity costs are greater for more deprived individuals, the intervention may, in fact, increase health inequality.

## CONCLUSIONS

- By providing quantitative estimates on both equity and efficiency of an intervention, DCEA enables a more standardised and systematic approach for industry and HTA agencies to value how a medical product may affect health inequalities.
- However, the development of a standardised reference-case for HTA submissions is desirable. This is because it is important to clearly understand what and which data, such as ethnicity across deprivation quintiles, is required prior to implementing the analysis.
- DCEA clearly provides a quantitative and more systematic approach to valuing health inequalities in HTA decisions. DCEA thus also provides manufacturers with the potential for more clear negotiations pertaining to how a product may reduce health inequalities.
- However, it will be important for HTA agencies to develop a clear reference-case for DCEA to enable a standardised framework for DCEA submissions.