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How big is the health inequality impact of a new treatment, and how much is it worth?

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Distributional cost-effectiveness analysis (DCEA) quantifies how an intervention affects health inequality between social groups, and analyses trade-offs with the total health impact. But the resulting statistics can be hard to interpret, which limits their use by decision makers accustomed to the quality-adjusted life-year (QALY) and the incremental cost-effectiveness ratio (ICER). Our research proposed two complementary metrics to make DCEA information more transparent and usable: the predicted health gap and the inequality-adjusted ICER.

The predicted health gap measures the size of impact on social inequality in health. It shows the change in the gap in total predicted QALYs between the least and most socially disadvantaged fifths of the population. Reported as a proportion of the intervention's health opportunity cost, this allows even-handed comparison across treatments that differ in scale and unit cost. The measure is in QALYs, reflects effects on the middle groups rather than only the two extremes, and can be sense-checked against the simple gap in observed QALYs.

The inequality-adjusted ICER considers how much that impact is worth in a funding decision. We adjusted the ICER for inequality impact using equity weights derived from a social welfare function. Dividing the standard ICER by this inequality-adjusted ICER gives a health inequality modifier (HIM): a single number showing how much more or less generous the cost-effectiveness threshold would need to be once inequality impact is factored in. A modifier above one means a treatment reduces inequality and merits a more generous threshold; below one means it widens inequality and merits a stricter one.

Applying these metrics to hypothetical new treatments for 1,336 diseases in England demonstrated that:

- Health inequality impact magnitude depends on cost-effectiveness. A given inequality in disease prevalence produces a larger inequality impact when the treatment is more cost-effective. Less cost-effective treatments impose larger health opportunity costs, which reduce (and potentially reverse) the inequality impact. For a set of borderline cost-effective interventions, health inequality impacts were ≤ −5% for 1.6% of diseases, ≥ +5% for 41.8% and ≥ +20% for 1.6%. However, for less cost-effective sets the negative proportions increased and the positive proportions fell.

- Most health inequality modifiers are modest. Assuming a medium degree of inequality aversion, the modifier ranged from a 4% reduction in the threshold for the most inequality-increasing treatments to an 18% increase for the most inequality-reducing. The threshold was raised by at least 10% for about one disease in ten. Even with a high degree of inequality aversion, modifiers almost never exceeded 1.35.

Our findings are directly relevant to the methods NICE uses to assess health inequality impacts of healthcare interventions. Indeed, in 2025 NICE methods guidance began allowing DCEA evidence of a substantial inequality impact to inform evaluations, while ruling out explicit equity weighting and handling any additional priority for disadvantaged groups through case-by-case deliberation. Our future research will continue to refine and develop these methods to further inform decision-making.

Read the full papers, funding sources and disclaimers in PharmacoEconomics (the predicted health gap) and Value in Health (the inequality-adjusted ICER).

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