Using Cost-Effectiveness Analysis to Address Health Equity Concerns

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A B S T R A C T

This articles serves as a guide to using cost-effectiveness analysis (CEA) to address health equity concerns. We first introduce the "equity impact plane," a tool for considering trade-offs between improving total health—the objective underpinning conventional CEA—and equity objectives, such as reducing social inequality in health or prioritizing the severely ill. Improving total health may clash with reducing social inequality in health, for example, when effective delivery of services to disadvantaged communities requires additional costs. Who gains and who loses from a cost-increasing health program depends on differences among people in terms of health risks, uptake, quality, adherence, capacity to benefit, and—crucially—who bears the opportunity costs of diverting scarce resources from other uses. We describe two main ways of using CEA to address health equity concerns: 1) equity impact analysis, which quantifies the distribution of costs and effects by equity-relevant variables, such as socioeconomic status, location, ethnicity, sex, and severity of illness; and 2) equity trade-off analysis, which

quantifies trade-offs between improving total health and other equity objectives. One way to analyze equity trade-offs is to count the cost of fairer but less cost-effective options in terms of health forgone. Another method is to explore how much concern for equity is required to choose fairer but less cost-effective options using equity weights or parameters. We hope this article will help the health technology assessment community navigate the practical options now available for conducting equity-informative CEA that gives policymakers a better understanding of equity impacts and trade-offs.

Keywords: cost-effectiveness analysis, delivery of health care, health equity, technology assessment.

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Introduction

Health equity has risen to prominence on policy agendas in the wake of the universal health coverage movement [1–3] and landmark international reports on inequality in health [4,5] and health care [3,6,7]. The cost-effectiveness analysis (CEA) studies that are routinely used around the globe to inform priority setting in health care and public health, however, rarely provide information about who gains and who loses from health programs or about trade-offs between cost-effectiveness and equity in the distribution of health-related outcomes [8–12].

In recent years there have been a number of methodological advances in this area, which have been developed into practical tools, including extended cost-effectiveness analysis and distributional cost-effectiveness analysis [13,14]. This article describes those tools and uses illustrations from high-, middle-, and low-income countries to demonstrate how they can be used to generate useful new information for decision makers about health equity impacts and trade-offs. In so doing, we part company from a venerable school of thought in public finance,

according to which economic analyses of specific public expenditure programs and regulations should focus on potential Pareto efficiency in the sense of the Hicks-Kaldor compensation test and leave equity as a matter for income redistribution through the general taxation and social security system [15,16].

Implicitly or explicitly, all CEA studies already incorporate social value judgments about equity—for example, in scoping and methodologic decisions about the relevant policy options and comparators, which costs and effects to measure, how to compare costs and effects of different kinds, how to aggregate costs and effects for different people and organizations, how to value future costs and effects, and so on [17]. These value judgments are rarely mentioned in applied CEA studies or health technology assessment (HTA) reports but are extensively discussed in textbooks, methods guidance documents, and other underpinning literature [18]. This article shows how to go beyond this standard approach of incorporating prespecified value judgments about equity within applied CEA studies, moving instead toward using CEA techniques to generate new information about the health equity implications of alternative policy options that

facilitate deliberation among decision makers and stakeholders [8,18]. Equity-informative economic evaluation is an input into decision-making processes, not an algorithm for determining decision outcomes [18]. The appropriate weight to give equity considerations in a particular decision is not a matter for analysts to resolve, but something for decision makers to consider in consultation with stakeholders.

We focus on two general categories of policy concern for health equity, which can both be used to address a wide range of more specific concerns: 1) reducing social inequalities in health and financial protection from ill-health; and 2) prioritizing the severely ill. Within the first category, our illustrative examples focus mainly on distributional impacts according to socioeconomic, ethnic, and sex groups, although the methods described are applicable to other differences in health-related outcomes that policymakers may consider unfair, including differences by geographical location, disability, mental illness, and other social variables.

First, we introduce two key concepts that underpin the economic approach to health equity analysis: 1) health equity trade-offs and 2) net equity impact. We then describe two approaches to conducting equity-informative CEA: 1) equity impact analysis, which quantifies the distribution of costs and effects by equity-relevant variables; and 2) equity trade-off analysis, which quantifies trade-offs between improving total health and other equity objectives.

Health Equity Trade-offs

The policy objective underpinning conventional CEA can be thought of as a health equity objective: the quasi-utilitarian objective of maximizing total health in the general population [19,20]. CEA compares the costs and effects of two or more mutually exclusive policy options [21]. To facilitate comparison between policies in different disease areas with diverse and distinct mortality and morbidity impacts, health effects are often measured using a composite summary index of health, such as the quality-adjusted life-year (QALY) or the disability-adjusted life-year (DALY). This allows the comparative effectiveness of programs to be assessed in terms of both individual and population-level health.

Population-level health gain is simply the unweighted sum total of all individual health gains, based on the standard value judgment that "a QALY is a QALY." This also allows the calculation of an incremental cost per QALY gained, or per DALY averted, of one policy option compared with another. A cost-increasing policy option can be considered cost-effective if its cost per unit of health gain compares favorably with alternative ways of using resources. This recognition of opportunity costs—that resources used in the provision of a program would have generated value if used elsewhere—is fundamental to CEA.

Every benefit attributed to a program must be assessed relative to those displaced when resources are diverted from alternative activities. In a public health system with a fixed budget, the displaced activities will comprise alternative health programs that would have produced alternative health benefits. Cost-effectiveness can then be defined as a test of whether a program will improve total health. A cost-effective policy will have a positive net health impact because its health gains will outweigh the health losses that result from shifting expenditure away from other health programs. By contrast, a cost-ineffective policy will have a negative net health impact because the health losses that result from shifting expenditure away from other health programs will outweigh the health gains.
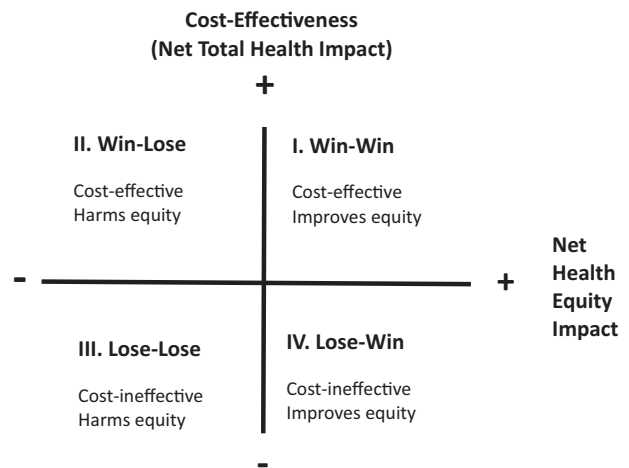
CEA can thus help decision makers to choose cost-effective investments that increase total health and avoid cost-ineffective investments that reduce total health. This interpretation of opportunity costs in terms of forgone health benefits is more problematic if there is no fixed health budget. Opportunity costs then may fall instead on household consumption (via increased taxes or insurance premiums) or on reductions in public expenditure on programs not primarily designed to improve health. Regardless, thinking about trade-offs between cost-effectiveness and health equity is useful even if the test of cost-effectiveness, or value for money, is not interpreted in terms of health maximization.

The health equity impact plane in Figure 1 is a simple way of thinking about the potential trade-offs between cost-effectiveness and an alternative health equity objective, such as reducing inequality in lifetime health or giving priority to those who are currently severely ill. The vertical axis shows the cost-effectiveness of a health program. As explained, it is often useful to think of cost-effectiveness as a measure of net total health impact: the total health benefits of the program minus the forgone health benefits that would have been obtained by spending the same money on other health programs.

The horizontal axis shows the net health equity impact of the program. This refers to the net impact on the alternative health equity objective, again after allowing for program opportunity costs as well as program benefits [21]. The net equity impact may be assessed informally by the decision maker in light of disaggregated information or by using formal health equity metrics that combine disaggregated information in a summary index [22,23]. Different equity metrics can yield different conclusions, and the choice of metric requires justification based on explicit value judgments about a number of difficult conceptual questions, including equality of what? (e.g., outcome or opportunity), equality between whom? (e.g., all individuals or particular social groups), and equality indexed how? (e.g., absolute or relative indices) [24,25]. In practice, the choice of metric will often reflect pragmatic considerations of data availability as well as value judgments—for example, because opportunity is hard to measure, health outcomes may sometimes be a useful proxy indicator for impacts on health opportunities [26].

In Figure 1, a policy that falls in quadrant I improves both total health and equity ("win-win"); in quadrant III, the policy harms both ("lose-lose"). In these two cases, the impacts on health maximization and health equity are in the same direction, so trade-offs are irrelevant. In contrast, in the other two quadrants, impacts on health maximization and equity are opposed and trade-offs become relevant. In quadrant II, the policy is good for total health but bad for equity ("win-lose"), and in quadrant IV,

Fig. 1 – Health equity impact plane.