Inquiry into the Relationship between Equity Weights and the Value of the QALY

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ABSTRACT

Background: A commonly held view of the decision rule in economic evaluations in health care is that the final incremental cost-effectiveness ratio needs to be judged against some threshold, which is equal for all quality-adjusted life-year (QALY) gains. This reflects the assumption that "a QALY is a QALY" no matter who receives it, or the equity notion that all QALY gains are equally valuable, regardless of the context in which they are realized. If such an assumption does not adequately reflect the distributional concerns in society, however, different thresholds could be used for different QALY gains, whose relative values can be seen as "equity weights." **Aim:** Our aim was to explore the relationship between equity or distributional concerns and

the social value of QALYs within the health economics literature. In light of the empirical interest in equity-related concerns as well as the nature and height of the incremental cost-effectiveness ratio threshold, this study investigates the "common ground" between the two streams of literature and considers how the empirical literature estimating the incremental cost-effectiveness ratio threshold treats existing distributional considerations.

Keywords: distributional concern, economic evaluations, efficiency, equity, QALY, threshold, WTP.

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Introduction

Some form of rationing or priority setting in the health care sector is inevitable given finite resources. In such a context, efficiency and equity are two important objectives. The goal of maximizing efficiency in resource allocation can be restated as maximizing the amount of health produced per euro spent [1]. Under such a maxim, scarce resources are allocated to patient groups and interventions that produce the most health per unit invested and steered away from those that produce less. To inform social decisions in health and increase the efficiency in the use of resources, policymakers in some countries rely on the results of economic evaluations, often in the form of a cost-utility analysis (CUA). The results of a CUA are commonly summarized in an incremental cost-effectiveness ratio (ICER)—a measure of the additional costs and benefits of the intervention relative to an adequate comparator. In a CUA, benefits are expressed in terms of quality-adjusted life-years, or QALYs. The meaning and acceptability of any ICER is determined by judging it in relation to some monetary threshold value, whose nature is a matter of debate (e.g., [2]). Here, we consider it to represent the monetary value society places on a QALY (assuming, thus, a flexible and, in a conventional sense, optimal health care budget ensuring that the cost-effectiveness of marginal spending in the health care sector equals the societal value placed on a gained QALY [e.g., [2]]). The ICER threshold then defines the monetary value below which an intervention can be considered efficient (or welfare improving) and above which it is not.

The implicit equity approach commonly taken in a CUA is to assign equal value to each QALY, irrespective of the characteristics of recipients or the intervention (i.e., "a QALY is a QALY"). This approach has been the topic of much debate, also because it seems partly at odds with another equity approach—the explicit concern for an increasingly equitable distribution of health and health care (note that an equitable distribution of health depends only partly on the health care system, i.e., on the distribution of health care [3,4]), implying different values for different QALYs (i.e., "a QALY is *not* a QALY"). This explicit concern for equity is reflected in assigning differing weights to QALYs depending on the recipients' or interventions' characteristics.

Equity is a broad notion comprising many aspects and is best seen as a multidimensional concept (e.g., [3–6]). Striving for an equitable distribution of health and health care mostly is a reflection of societal preferences for the distribution of health (care). The common notion of "economic efficiency" may, however, not fully represent such societal preferences (e.g., [7–10]). In fact, there is a large body of literature suggesting that the allocation decisions in health care should take the *relative* social value of QALYs in different populations into account. This supports the notion that a QALY is not a QALY regardless of who gets it (e.g., [6,8,10–24]). Within the framework of economic evaluations, this implies assigning more weight to QALYs achieved in certain subgroups. Subsequently, more resources will be steered in their direction, ceteris paribus, even though they may not be the most efficient QALY producers.

On what basis QALYs are to be weighted depends on the particular argument that determines what is unfairly unequal, that is,

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which characteristics of patients or illnesses are perceived to make someone worse off (in terms of health) by members of society and thus more deserving of health improvements. Which characteristics of patients or illnesses should determine the weight attached to health gains, and which notions are defendable and consistent with moral arguments, intuitions, observable societal values, and judgments, is a matter of current discussion and investigation (e.g., [25,26]).

Some form of a trade-off between the objectives of efficiency and equity can ensure both are incorporated into priority setting [1] and into economic evaluations. If adequately addressed, the trade-off would provide decision makers with more information relevant to health care decisions [27]. One important issue is how to make this trade-off explicit, transparent, and systematic rather than a matter of intuition and implicit values. If we consider economic evaluation a helpful tool in health care decision making, one condition for a sound and explicit equity-efficiency trade-off is a thoughtful incorporation of equity concerns in economic evaluations. In that sense, it is important to consider the decision-making framework of CUA, written as follows:

$$V_i \times \Delta Q_i - \Delta c > 0 \tag{1}$$

where v_i denotes the value attached to an additional unit of QALYs of type i, ΔQ_i denotes the incremental QALY gain of type i, and Δc denotes the incremental cost of the intervention. Type i denotes the "equity segment" to which the QALY gain, and thus the corresponding value v_i, belongs. The common decision rule in economic evaluations is for benefits to outweigh costs, and thus Equation 1 can be rewritten as

$$\Delta c / \Delta Q_i < V_i \tag{2}$$

which shows that the costs incurred to produce QALYs of equity type i should not exceed the value per QALY of type i. Often, one threshold is used for all QALY gains under the assumption that "a QALY is a QALY," or the equity notion that all QALY gains are equally valuable regardless of their context. If such an assumption does not adequately reflect distributional concerns in society, different thresholds can be used for different QALY gains whose relative values can be seen as "equity weights." Therefore, a clear relationship exists between equity or distributional concerns on the one hand and the social value of QALYs on the other. This study focuses on that relationship.

The relationship between the threshold and distributional concerns already exists, albeit sometimes implicitly. The National Institute for Clinical Excellence, for instance, requests that a technology with an ICER of more than £20,000 per QALY reference "the particular features of the condition and population receiving the technology" to increase its chances of being reimbursed [28]. Seemingly, therefore, if the condition or population appeals to certain notions of deservingness, the ICER threshold might be higher. Recently, the National Institute for Clinical Excellence even indicated that certain interventions (e.g., life-prolonging) might be approved despite less favorable cost-effectiveness [29–31], depending on the context in which such QALYs are gained. In the Netherlands, rather than formulating an exception to a more or less fixed threshold, a general rule has been formulated highlighting the relationship between equity concerns and the QALY value. Based on a specific notion of equitable distribution of health (care), the threshold varies with the severity of the disease (e.g., [32]).

Although the distributional concerns and the ICER threshold are related in practice, as shown in the examples above, it is interesting to explore how that relationship has been treated in the health economics literature—especially in light of recent and lively empirical interest in equity-related concerns as well as the nature and height of the ICER threshold. Our study investigates the "common ground" between the empirical literature on estimating the monetary value of a QALY, which is seen here as the

appropriate ICER threshold (e.g., [2]), and the literature on distributional considerations in allocating health and health care. For example, do existing studies allude to or discuss the variations in ICER threshold estimates stemming from possible distributional concerns, such as health status, socioeconomic characteristics, or health care consumption history? Have any empirical studies estimated the value of QALY gains achieved in different segments of the population, where the segments were defined in terms of equity-relevant characteristics (e.g., age or severity of illness)? Our study looks to answer these questions by providing a thematic (rather than systematic) overview of the empirical literature on prominent distributional concerns and the empirical literature on the ICER threshold, and to establish their complementarity. For recent systematic reviews of the literature regarding equity considerations, we refer to Dolan et al. [10] and Schwappach [18].

The Context of the Equity-Efficiency Trade-Off

In the context of economic evaluations, the trade-off between equity and efficiency, studied in both the general public and policymakers [10,18,33,34], enables the maximization of *equity*-adjusted health outcomes, rather than simply the maximization of health outcomes. In principle, the concerns for equity can be introduced into economic evaluations or the subsequent decision-making process by using qualitative and/or quantitative evidence on social preferences (the question of *how* to incorporate any preferences for the distribution of health effects is separate from the question of how to derive them [35]).

The qualitative approach provides decision makers with a descriptive review of potentially relevant information on equity-related impacts alongside "standard" economic evaluation results [35]. Reimbursement decisions could then take account of this information, but it is left to the policymakers to decide on their relative importance (although quantitative information can be derived from subsequent decisions). For instance, the rankings of interventions based on their ICERs can be reordered on the basis of qualitative information about the values and priorities expressed by the public (e.g., as in the "Oregon experiment," [36]). Appraisal phases in the full process of decision making, such as those used in the United Kingdom and the Netherlands, also may be seen as qualitative approaches that account for nonquantified, yet important aspects in reaching a final decision.

Quantitative evidence can be used to adjust—explicitly and quantitatively—either the cost-effectiveness threshold or the ICER. The most prominent quantitative approaches are equity weighting and multicriteria decision analysis (for the latter, see [37,38]). Equity weighting allows a quantitative adjustment of the estimated ICER to account for equity concerns, which is the focus here. Equity weights (e.g., [39–42]) are a way of attributing more or less importance (or value) to health benefits achieved in some circumstances relative to others. They can be estimated in several ways, such as through willingness-to-pay (WTP) exercises, through person trade-off exercises, or through conjoint analysis (e.g., [7,10,43,44]). The obtained weights can subsequently be applied within economic evaluations either by adjusting the QALY gains within the ICER or by adjusting the ICER threshold. The two approaches should yield mathematically equal outcomes [45].

In general terms, we can fix the threshold value (v_i) in the conventional decision rule (2) by allowing equity weights on the left-hand side, reflecting the relative value of QALYs gained relative to the reference QALY value (v^*):

$$\Delta c / (\alpha_i \times \Delta Q_j) < V^* \tag{3}$$

where α_i is the relative value of the QALY compared with the reference QALY, that is, v_i / v^*. Using a fixed threshold with equity weights is thus essentially equal to using a flexible threshold and no