

# Resource allocation, social values and the QALY: a review of the debate and empirical evidence

David L. B. Schwappach MPH PhD

Department of Health Policy and Management, Faculty of Medicine, University Witten/Herdecke, Witten, Germany

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## Abstract

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### Correspondence

David L. B. Schwappach  
University Witten/Herdecke  
Department of Health Policy  
and Management  
Faculty of Medicine  
Alfred-Herrhausen-str. 50  
58448 Witten Germany  
E-mail: dlb@healthecon.de

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Most health economists agree that public preferences should play a major role in setting criteria for distributing scarce resources. The quality-adjusted life year (QALY) is used as a preference-based measure for the outcome of health-care activities in health economic evaluative studies. Traditionally, health economists proposed maximizing the additional health gain in terms of QALYs so as to maximize social welfare. Evidence has grown however, that neither potential health gain as a single relevant determinant of value, nor the rule of maximizing this health gain are sufficient. Concerns about fairness and equity are also important to the public in distributional decisions. This paper reviews the debate on the role and limitations of the QALY in health-care priority setting and the empirical evidence surrounding it. A framework is used to systematically explore the available data on factors considered to be important to the public in health-care resource allocation, and to investigate how these fit with the implicit value judgements inherent in the original QALY formulation. Potential sources of social value are classified into (1) factors that relate to the characteristics of patients and (2) factors related to the characteristics of the intervention's effect on patients' health. As well as these main categories, the article considers preferences for distributional rules. Recent approaches that aim to capture public preferences more comprehensively and to better reflect the value attributed to different health-care programmes in economic evaluation methods are outlined briefly.

## Introduction

Cost-effectiveness-analysis (CEA) and cost-utility-analysis (CUA) are proposed and used as tools to guide policy making in resource allocation decisions. Within these methods, the quality-adjusted life year (QALY) is used as a preference-based measure of outcome, incorporating both length and quality-of-life. The potential gain in QALYs attributable to health-

care is set in relation to associated costs. The cost per QALY is calculated and compared across different health-care activities, patient groups and policies. Traditionally, programmes with the lowest cost per QALY are recommended for prioritization with the aim of maximizing health gain in the population under budget constraints.<sup>1</sup> This strategy includes both the measure of benefit, or carrier of value, objective in resource allocation decisions – the sum of

individual health gain in terms of QALYs – and the rule about how resources should be distributed among competing health-care activities, so as to maximize QALYs. However, evidence has grown that neither potential health gain as a single relevant determinant of value, nor the rule of maximizing this health gain, are sufficient. Concerns for fairness and equity are also important to the public in distributional decisions.

The term ‘social value’ has been recently proposed to describe a measure of societal desirability that adopts a broader perspective in assessing the effects of health-care.<sup>2–4</sup> This construct which ‘explicitly focuses on interpersonal trade-offs’ accommodates different sources of value important to the public when selecting among patient groups or specific health-care activities competing for resources.<sup>5</sup> A variety of factors contribute to the social value of health-care, both on theoretical and on empirical grounds. Generally, these determinants can be thought of as belonging to one of two conceptual classes: (1) factors that relate to the characteristics of patients (e.g. age) and (2) factors related to the characteristics of the intervention’s effect on patients’ health, as the additional health gain.

In addition to the aspects determining the social value of health-care, there remains the question of which principles should be adopted in the actual allocation of resources among patient groups. Social value could act as an alternative maximand, incorporating trade-offs between conflicting objectives, but other decision rules might also be adopted.

This paper reviews the debate on the role and limitations of the QALY in health-care priority setting and the empirical evidence surrounding it. Data sources included electronic searches of MEDLINE, EMBASE, IDEAS, handsearching publications of leading researchers and research institutes, and follow-up of references in selected papers. Search terms covered ‘QALY’, ‘social values’, ‘resource allocation’, ‘public preferences’, ‘health-care rationing’, ‘priority setting’ and ‘public opinion’. Search terms were also logically combined with terms such as

‘questionnaire’, ‘survey’ and ‘statistics and numerical data’. Papers were included either if they presented empirical data on public preferences for resource allocation or rationing, or if they contributed to the theoretical debate on the QALY approach.

## Potential sources of social value and their role within the QALY

### Characteristics of patients

#### *Age of patients*

Ever since the QALY was introduced into health economic evaluation, there has been a debate about whether society might attach different weights to QALYs going to different people. Within the basic QALY formulation, there is no weighting or adjusting according to patients’ characteristics. Although the QALY is sometimes called ‘ageist’, it should be noted that it is not age *per se*, but life expectancy that contributes to QALY calculation. Whether the young or the old are favoured depends *ceteris paribus* simply on their respective life expectancy not their age. Therefore, the QALY has the potential to discriminate against both the old and the young.<sup>6</sup>

Several economic and ethical formulations – either based on efficiency or on equity – have been developed to assess whether and how to introduce age as criterion for resource allocation.<sup>7</sup> One of the main underlying rationales is the equalization of lifetime health, also called the *fair innings*. Although different versions of the argument exist, the basic idea here is that all persons are entitled some equal life-span and those having already lived these years of life should be given less priority. The fair innings argument could be incorporated in health-care allocation in either *absolute* or *relative* ways. In the former approach, the fair innings serves as an age cut-off, and extending younger persons’ lives is favoured against those beyond this threshold, not considering their potential to benefit from treatment. The more common, relative formulation proposed by Williams is that younger age should compensate for a limited

potential to benefit from treatment to *some extent* and only in cases where patients have not yet reached a certain pre-defined age.<sup>8</sup> Whether a younger patient is actually to be prioritized against an older one with a larger potential to benefit, depends on whether the weight attached to the young compensates for his lower life expectancy. Trade-offs are made between the equalization of life-span and the extra health gain produced by treatment. Both relative and absolute importance of age could be easily integrated in the QALY framework, either by counting only QALYs gained before some cut-off age, or by weighting QALYs according to age of patients or relative to their chance of reaching some average life-span. Several empirical studies have been undertaken to investigate public preferences towards age as a criterion for resource allocation, but results have been contradictory. A major concern is that not all studies allow for the separation of age *per se* and duration of treatment effect as distinct sources of value. Preferences for prioritizing younger over older patients in allocation of life saving treatments might reflect concerns for efficiency by assuming a larger potential to benefit in the young (utilitarian ageism), or concerns for equalizing age at death (egalitarian ageism).

Public opinion surveys have found only limited support for age as an explicit and general rationing criterion.<sup>9,10</sup> However, when age-specific services are ranked, or when choices between hypothetical patients have to be made, a moderate or even strong preference for giving priority to the young has been observed.<sup>11,12</sup> The perspective and expression of questions play a major role for the acceptance of age as rationing criterion: while the public seems to be commonly more prepared to agree to positive prioritization in favour of the young, there is much less support for negative discrimination against the elderly.<sup>13,14</sup> Some studies were designed to calculate explicit age weights. A survey conducted in Sweden yielded 1.0, 0.22 and 0.10 as implied (undiscounted) weights for QALYs gained by patients in need of life saving treatment aged 30, 50 or 70 years old.<sup>15</sup> But preferences for the young over the old might not be constant. Lewis

and Charney report from a survey that in the allocation of life-saving treatment, the strength of preference towards the young increases with disparity in the age of hypothetical patients.<sup>16</sup> Among patients aged 20, 30, 40 and 60 years competing for life-saving treatments, respondents to a trade-off survey favoured the young over the old with a peak of age-related preference for patients aged around 28.<sup>17</sup> The extent of age-related preferences exceeded the magnitude that could be expected based on maximizing the total sum of life-years saved. Preferences towards prioritization of older children over the very young were observed in the hypothetical allocation of life-saving and non-life saving treatments.<sup>16,18</sup> More than half of the responders to an Australian survey gave equal priority to saving the life of a child compared to a newborn by allocating a donor organ, but of those willing to choose one over the other, more subjects (44%) favoured the child and only 1% gave priority to the newborn.<sup>19</sup> From respondents' comments the researchers drew the conclusion that some subjects favoured saving the child's life as they were assuming it had a better chance of survival, i.e. they expected a larger benefit. Other comments were interpreted as indicating that the child was recognized 'more a person' than the newborn, so the grief caused by the loss of the child's life might be more painful both to the child itself as well as to its relatives.

In conclusion, there is moderate evidence that the public tends to favour the young over the elderly in health-care allocation, although the existence and strength of these preferences varies across countries, study designs and context of questions. Evidence on the magnitude of age-related preferences and their underlying rationales however, is still limited and not sufficient to derive valid age weights.<sup>20</sup>

#### *Social role of patients*

The conceptual argument, that there are 'situations' or phases of life in which certain individuals contribute more to society than others is the basis on which disability-adjusted life years (DALYs) are calculated. As Murray points out,

'the young, and often the elderly, depend on the rest of society for physical, emotional and financial support. Given different roles and changing levels of dependency with age, it may be appropriate to consider valuing the time lived at a particular age unequally'.<sup>21</sup> Although age weights are incorporated in the DALY formulation to reflect the contribution to social welfare in particular phases of life, age is used as a proxy for the value of a life year to society and not in terms of greater potential to benefit. Consequently, age weights used to calculate DALYs are hump shaped, with a peak at productive ages in early adulthood, giving less priority to the very young and old who are dependent on others and do not contribute to social welfare themselves. Age-related preferences for giving priority to persons in their second or third decade of life over those at earlier ages as observed in some studies, might reveal such concerns for productivity, therefore sometimes labelled 'productivity ageism'.<sup>20</sup> However, there is only limited evidence that the public wants to concentrate health-care resources according to the social role of patients when this is expressed directly, rather than being represented by age. While there is commonly a vast majority of survey participants that refuses to discriminate according to working status, retirement, wealth or poverty of patients, or their position in society, more people are prepared to prioritize in favour of patients with dependants or other social responsibilities.<sup>9,10,13</sup> Olsen and coworkers report on an Australian survey in which respondents were asked whether employed people, parents, or people taking care of others should be given priority compared with their respective counterparts 'if all patients have the same illness and will gain as much from treatment'.<sup>22</sup> The accompanying texts clearly explained the relationship between private income, increased tax revenues and the financing of public services. While 47% agreed to prioritize parents, or people taking care of others (45%), only 27% agreed to prioritize patients in the paid workforce. It is likely that the disparity in importance of family commitments and other productivity factors is highly influenced by other aspects, such as the recognition of present

personal relationships or general concerns for inequality between social groups.

Although not accommodated in the measurement of QALYs, the social role of patients can be an important factor in the calculation of costs within CEA. There has been considerable debate on whether and how to include productivity losses like absence from workplace or informal caregiver time in health economic evaluation.<sup>23-26</sup> Evidence suggests, that the public is opposed to the discriminatory potential of costing productivity losses, and does not wish to strongly prioritize according to social role, in particular not relative to working status even if well-informed about opportunity costs (the value of the foregone benefits because the resource is not available for its highest value use).<sup>22</sup> Attention must be paid to the risk of 'double counting' when both the value of health and productivity losses would be adjusted for patients' social role.<sup>26,27</sup>

#### *Health-related lifestyle of patients*

There is moderate support for the hypothesis that the public wants to allocate resources to those ill 'through no fault of their own' first.<sup>10,11,13,28-33</sup> However, there seems to be a sharp split in public opinion, and those who do not accept lifestyle or self-infliction of disease as a criterion for priority setting, are often reported to be strongly opposed.<sup>9,33</sup> The health-related lifestyle of patients, usually represented by smoking or alcohol abuse, seems to become more important when there is a direct and well-known inducement effect on the condition described in the prioritization scenario. Nord *et al.* report that 60% of survey responders were prepared to give some priority to non-smokers suffering from heart disease or lung cancer.<sup>19</sup> Preferences towards those with a healthy lifestyle might be based either on the prospect of better health outcomes, and thereby on concerns about efficiency, or on a rather moralistic attitude against those with self-inflicted disease. Nord *et al.* interpret the comments of survey respondents that the latter rationale was more important to the majority. Focus groups conducted by the Somerset Health Authority seem

to support this interpretation.<sup>34</sup> While 28% of participants were prepared to refuse smokers that are unwilling to quit a first bypass operation, 51% would deny them a second operation, an increase that is unlikely to reflect only efficiency concerns.

#### *Prior health-care consumption of patients*

Few studies have examined whether and to what degree extensive health-care consumption of patients in the past, like a history of life-saving interventions or complex surgery, might be an important attribute for the public in allocating resources. The underlying hypothesis is that society might feel that everybody is entitled to get his life saved once, regardless of the associated costs and benefits, and that everybody should get a first chance before others get a second. Alternatively, one could argue, that those in severe health for the second time in their lives have been somewhat 'betrayed' by life and should therefore be given priority. Olsen *et al.* asked members of the general public to choose between patient groups suffering from a fatal disease, of which one group has already had years of life gained from past health-care for life extending treatment. The authors observed that when this criterion was introduced in the allocation scenario about 6% of responders changed their voting behaviour in favour of the group that had *not* received past health benefits.<sup>22</sup>

Neither lifestyles of patients nor their prior consumption of health-care resources is considered within the QALY approach. Both might sporadically contribute to the effect or cost side in CEA for example, by performing subgroup analysis (e.g. smokers in coronary artery disease studies), but only if they relate to the disease under study and have a reasonable impact on outcomes. In other words, these factors matter only in terms of efficiency, but not with respect to the social value of the patients' lives or concerns about fairness.

#### Characteristics of health effect

Health-care activities take place in a *context* of individual health, need and capability. On a

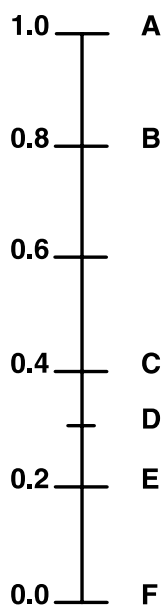
conceptual level, changes in health caused by medical care can be described in relation to several attributes:

- the 'start point', that is the initial level of health without, or prior to, the specific health-care activity;
- the 'end point', that is the level of health after treatment;
- the change in health, that is the distance between start and end point on some health scale;
- the duration of the health effect in terms of years or proportional life-span and;
- the direction of this change, that is, whether it is an improvement in health or a prevented decline.

The QALY approach in its original formulation accommodates only the third and fourth information as a measure of health-care benefit. One of the main criticisms raised against the QALY, therefore, is the transformation of the value of health states into a valuation of health changes not considering other characteristics as potential carriers of value.

#### *'Start point' before treatment*

Based on the potential gain in QALYs one would expect indifference in peoples' value judgements about equally sized treatment effects, such as an improvement from health state E to C (Fig. 1) as compared with a move from B to A. In fact, there is strong empirical evidence that the public tends to give priority to the 'worst off', and that the initial severity-of-illness carries its own value despite treatment effect prospects.<sup>13</sup> Several studies have shown that the public is prepared to sacrifice overall health gain to some extent in order to help the most severely ill.<sup>35-39</sup> Such decisions might be made on the premise of equalizing quality-of-life in society, because prioritizing patients already in better health would expand inequality between patients. A special case of the severity-of-illness argument, namely the societal duty to help those close to dying even if their lives *cannot* be saved, might also explain why high priority is



**Figure 1** Hypothetical health states (A–F) and preference scores.

frequently attached to palliative care, although the health gain in terms of QALYs might be negligible.<sup>5,11</sup> Preferences towards the severely ill can be interpreted as a broad variant of the ‘rule of rescue’, the general aversion against denying help to those in ‘the face of death’ and in immediate need. Despite broad severity-of-illness, it is *presence* in need, time and in the recognition of identifiable individuals that takes effect in the rule of rescue and that places extra value on rescuing these patients. Broad and restricted variants of the rule of rescue are well supported by the public in resource allocation decisions.<sup>22,33,35</sup> Initial severity-of-illness has only a secondary impact on QALYs insofar as lower initial health increases the theoretically achievable health gains, estimated QALYs might substantially underestimate the social value of health-care aimed at those in poorer health. The failure of health economic methods to capture society’s values regarding medical care in the face of death might at least in part explain the Oregon experience.<sup>40</sup> Weighting and trade-off models have been developed to integrate both value objectives (giving priority to the severely ill vs. those that benefit most from treatment).<sup>41</sup>

#### ‘End point’ after treatment

While usually interpreted by means of health-care effectiveness, health state after treatment is of special *patient-related* relevance in resource allocation. If two patient groups suffer equally from life-threatening conditions (F), but patients in one group can be completely cured (A) while others can merely be returned to their state of pre-existing chronic condition or disability (C), resource allocation decisions simply based on gain in QALYs, would obviously favour saving the healthy patients’ lives. The underlying reason is that the QALY approach operates with a rather universal definition of ‘perfect health’ as a theoretical optimum rather than with an individual maximum potential to benefit available to patients. Therefore, the QALY has been labelled as discriminating against the disabled or those with chronic conditions.<sup>4,42</sup> There is empirical evidence, however, that the public prefers to give equal priority to those with and without disabilities in the allocation of life saving technologies.<sup>19,43,44</sup>

Using the person trade-off technique, Ubel surveyed 250 members of the general public on the importance of saving the lives of disabled persons.<sup>45</sup> While participants gave equal priority to patients who could be completely cured or returned to pre-existing paraplegia, patients who would experience the onset of paraplegia after having their lives saved were given lower priority. This became even more true if the onset of paraplegia was avoidable with alternative treatments. Although currently pre-existing disabilities are not taken into account on the individual patient level in health economic evaluation, limited potential to benefit can have a major impact in situations where (life saving) treatment is targeted at the particular disability or chronic condition that determines this potential. Popular examples include the treatment of life-threatening disease-specific complications in patients with HIV or angina that can be treated and therefore accomplish the maximum quality-of-life available to them, but cannot be cured.<sup>4</sup>

Also, there have been suggestions to introduce ‘actual health’-adjusted definitions of ‘perfect health’ as the top anchor of the preference-based

quality-of-life scale, taking into account the presence of chronic diseases.<sup>46,47</sup> Fryback and Lawrence criticize studies that attach the equivalent value of 'perfect health' to states that denote only the absence of a particular condition, on the grounds that they generate systematic bias in the estimation of health-care benefit. They argue instead that, in cases where patients are still subject to chronic conditions, 'perfect health' should be inflated to accurately reflect this (lower) health state after treatment although chronic condition and actual health problems *do not relate*. However, the available evidence suggests that the public does not prefer to concentrate resources according to an abstract optimal health state after treatment, but rather in relation to the realization of patients' limited potential to benefit.

#### *'Size' of health effect*

There is strong empirical evidence that health gain matters to the public in the allocation of health-care resources.<sup>11,19,22,33,43,48,49</sup> However, the qualitative study by Dolan suggests that health gains are often evaluated in terms of the final level of health rather than as relative improvements.<sup>50</sup> In general, there seems to be reluctance to allocate resources on treatments that leave patients in comparatively poor health.<sup>48</sup> Taken together with the observation that people are opposed to discrimination against those with pre-existing conditions, it seems likely that the public is well prepared to distinguish between levels of health in relation to health-care effectiveness or patients' limited potential to benefit. There is also some evidence that the public attaches greater weight to quality-of-life effects than could be expected based on the quality-of-life component in the QALY.<sup>11,48</sup>

#### *'Duration' of benefit*

In the basic QALY approach there is a strict assumption of proportionality between social value and duration of health improvement.<sup>2</sup> For example, a treatment that raises quality-of-life in patients from health state B to A for 20 years is assumed to have twice the value of the same

improvement lasting 10 years. There is only limited evidence on the actual value people place on the duration of health-care benefits. As the importance of duration is an interplay of life expectancy, age-related preferences, time preference and in the broader sense an aversion to discriminate against those with a limited time to benefit, the impact of each factor can hardly be decomposed. Attaching less value to health effects of longer duration than could be expected based on strict proportionality, is usually attributed to the discounting of future health benefits and therefore a matter of simple time preference. But as Nord points out, although discounting future benefits might have the same effect on present value, the underlying purpose is quite different to the decreasing marginal value based on 'duration of benefit' concerns.<sup>2</sup> Discounting is aimed at devaluing health effects occurring in the future, regardless of their duration. For example, a 'first year benefit' occurring 10 years ahead is discounted at the same rate as the last year of a health effect starting in the present and lasting for 10 years. In contrast, a decreasing marginal value based on diminishing returns in respect of quantity would result in a higher value attached to the first year of benefit occurring in 10 years than to the last of a 10-year benefit scenario.<sup>51</sup> No valid statement can be made regarding the underlying rationales and the extent to which people (de-)value long duration benefits. Despite complex time preferences it seems that a QALY is regarded of less value, the more QALYs an individual has already received.<sup>52,53</sup> The failure of the QALY to capture actual health scenarios and its valuation of health streams as single events has led to the development of other measures of health-care benefit, such as the 'healthy year equivalent' (HYE).<sup>54</sup>

#### *'Direction' of health effect*

The 'direction' in which changes in health are experienced is usually not accounted for in utility assessment. Whether health-care improves health, e.g. from health state C to B, or prevents (further) decline from B to C, does not have any impact on the value attached to

the movement between health states. Although prevention and prophylaxis play an important role in health-care, there are few empirical studies investigating the value people place on avoided decline as compared with improvements in health gained by curative treatments. In a British survey asking participants to rank various health services according to their priority, the supply of 'preventive screening services and immunizations' scored third rank before 'surgery, such as hip replacement, to help people carry out everyday tasks' (rank 4) and 'high technology surgery, organ transplants and procedures which treat life-threatening conditions' (rank 7).<sup>11</sup> The high priority placed on prevention might be because of the fact that respondents expected the benefit of prevention and population screening to come with certainty, without harm and to be distributed to a large number of persons. When explicit trade-offs between health gains achieved by curative or preventive treatments are involved, there seems to be a slight trend to prioritize preventive health-care. Ubel *et al.* surveyed prospective jurors on how to allocate funds to health-care activities that have the same magnitude of benefit, either by improving the level of functioning or preventing further decline in nursing home residents.<sup>37</sup> While there was a general attitude towards prevention, this was no longer statistically significant when the strength of preference was taken into account. Also, preferences for prioritizing the severely ill were present for preventive and curative interventions. When asked to trade-off the value of different programmes saving varying numbers of lives either by acute or preventive care, responders to a Swedish survey slightly favoured prevention over acute care with a mean of 1.2–1.4 lives saved by acute care being judged equivalent to one life saved by prevention.<sup>55</sup> More research is needed however, that investigates the value of prevented decline as an outcome from individual health-care rather as a result of population screening because the latter is likely to be highly influenced by framing effects and distributional concerns.

### Distributional preferences

Several criteria have been analysed in the light of whether the public regard them as important sources of value. Assuming that all relevant factors could be captured in the measurement of social value, the question remains of how society wishes to relate this social value to resource allocation. Abstracting from the unit of measurement and its perspective in accommodating conflicting value objectives, preferences for the actual distribution of resources among different patient groups might only in part depend on the social value of health-care activities or patients' characteristics. The process of distributing or even the final state of distribution itself might be equally important. Distributional preferences have been observed that cannot be accommodated by a more comprehensive perspective in value measurement, the reason being that some people are unwilling to trade-off the characteristics of patients or treatments *at all*.<sup>5,50</sup> Precisely, they refuse to maximize any specific 'outcome', whether it is simply health gain or complex measures adjusted for other sources of value, but prefer to give equal priority to everybody (*egalitarian input*). Such preferences could be derived either from the 'disutility of denial' personally experienced by individuals asked to state their willingness to prioritize among patients, or from the 'disutility of deprivation' experienced by those who would be denied treatment as a result of explicit rationing.<sup>56</sup> The idea of 'random allocation' as suggested by Harris and discussed by Menzel and McKie *et al.* can be interpreted as being based on egalitarian principles, taking the latter view into account.<sup>57–59</sup> Decisions based on such rules would always result in non-maximizing allocations, as distributional preferences are not functions of the characteristics of the goods to be distributed or their recipients, but of the distribution itself.

There are three main messages to be drawn from existing empirical data. First, there is often a significant proportion of survey respondents who refuse to accept any



prioritization.<sup>13</sup> Qualitative studies report that individuals giving equal priority to different patients in need of treatment often argue that 'we should not play God' or 'a life is a life and everyone is equal'.<sup>50</sup> However, one has to consider that support for the 'equal-priority-to-all'-argument may have its origin at least in part in survey participants' attempt to avoid hard decisions. While reluctance to take personal responsibility for prioritization decisions and the potential distress associated with denying care has often been observed in members of the general public, this does not necessarily mean that subjects expressing this burden are 'true' egalitarians. They may simply wish to delegate this decision.<sup>60</sup> Also, preferences for equity over efficiency are reported to be very vulnerable to framing and order effects.<sup>61</sup>

Based on a survey that investigated the stability of preferences for an equal distribution of resources, the authors conclude that preferences for equity are sometimes 'all or nothing':<sup>62</sup> while respondents were willing to sacrifice the saving of additional lives by screening parts of the population in favour of offering the screening test to the population *as a whole*, fewer maintained this view when equity was 'no longer absolute' and the less effective treatment could no longer be supplied to the entire population.<sup>62</sup>

The second mismatch between observed distributional preferences and those underlying QALY-maximization applies to the majority of the public that does accept prioritization. There seems to be general reluctance against *extreme final* distributions. Often people who agree to prioritize one patient group refuse to allocate *all* resources to this group but rather distribute a minor part to the disfavoured.<sup>63</sup> A reasonable explanation for such decisions is that the public wishes to maintain hope and the chance for treatment for all patients.<sup>5</sup> Were these preferences confirmed and proved to be stable, they could heavily influence the transformation of results of health economic evaluation into policy recommendations, because the 'maintenance of hope' argument is strictly opposed to any *absolute* distribution of resources. For example, the introduction of age-based cut-off points as

rationing criteria for specific high technology care could not be accepted as it leaves patients beyond the cut-off age without any chance for treatment.

As recent research suggests, it appears to be a major problem that while a large proportion of the public is prepared to relate the characteristics of health-care or its recipients to the allocation of resources *to some extent*, many are opposed to the various and multidimensional assumptions on strict proportionality and coherence underlying the QALY-maximization approach. Nord *et al.* stressed questions about the proportionality of health and financial outcomes in resource allocation based in a survey in which costs of treatment and prioritization were linked.<sup>64</sup> Participants were asked to prioritize equally suffering patient groups for treatment, of which one was less costly. The vast majority chose not to 'discriminate against those who happened to have a high cost illness ... (except in cases where costs are extremely high)'. Although they were clearly informed about the effects of their choices, none of them changed their mind after learning that as a result of their choice fewer patients could be treated. Another problem of strict proportionality arises from unweighted interpersonal aggregation: whether 100 QALYs are distributed to 100 or to two patients is regarded to be of equal value ('distributive neutrality'). It appears, however, that this assumption is often violated and the public prefers the diffusion of additional health gain over its concentration.<sup>44,53,65</sup>

In addition to general policy recommendations made on the premise of economics' traditional assumptions on health maximization and distributive neutrality, certain situations in economic evaluation occur that can be assumed to be in serious conflict with the public's distributional preferences in particular. For example, conventionally eliminating treatment strategies under extended dominance from consideration in CEA is likely to contradict public preferences. The term 'extended dominance' describes situations where a combination of the most and the least effective treatment provided to certain proportions of the population each, is more

effective and less costly compared with the intermediate option offered to the whole population. Ethical doubts arise, since for patients suffering equally from the same condition, unequal treatment is explicitly recommended.<sup>66</sup>

## Perspectives

Several approaches have been developed to improve the formulation and measurement of social value and the reflection of public preferences. However, they are all still at an experimental stage and to the author's knowledge, none of them is currently applied in health economic evaluative studies. While in most models the core piece from which social value is derived remains the additional health gain in terms of QALYs, several researchers have tried to integrate one or the other concern by weighting QALYs and trading-off 'efficiency' and 'equity'.<sup>8</sup> Depending on the equalization objective, such equity weights can be simply applied within the QALY-maximization approach, e.g. by maximizing age-weighted QALYs, or can be incorporated as a parameter of aversion to inequality into more complex (health-related) social welfare functions (HRSWF). The specification of a HRSWF and an 'equity-efficiency-trade-off' is particularly required to reflect aversion towards inequalities in health *outcomes* (e.g. per capita health status), which cannot be accounted for by (weighted) health maximization.<sup>67,68</sup> Johannesson and Gerdtham report some preliminary experimental results on the determination and the shape of a HRSWF.<sup>69</sup>

Nord, Menzel, and Ubel *et al.* present a methodological framework ('*cost-value-analysis*') based on the person trade-off technique that takes into account particular concerns of severity-of-illness and potential-to-benefit arguments.<sup>2-5,70</sup> The main distinct feature of the 'efficiency-equity-trade-off' procedure is, that different sources of social value are decomposed rather than being incorporated into one parameter of aversion towards inequalities in distribution of health outcomes. In the cost-value-framework, special 'severity'-weights are

attached to health states to reflect public preferences for giving priority to the severely ill. Also, the authors recommend the adjustment of QALY calculation with respect to patients' potential to benefit from treatment. In particular, they propose attaching full quality-of-life weight to the lives of patients with permanent disabilities or chronic conditions in valuation of life-saving activities to avoid discrimination.<sup>4</sup> For example, saving the lives of individuals with and without paraplegia would both be denoted as a quality-of-life weight of 1. However, the authors recognize that this technique results in the '*QALY trap*'. In the simple QALY framework a health state is assigned to one single value, identical in all contexts in which it is affected, but assigning a value equivalent to 'full health' in saving the life of persons with paraplegia implies at the same time that curing paraplegia has no value (because patients are assumed to be in full health). They advocate the use of distinct values for the same health state depending on whether it is the objective of health-care (e.g. curing paraplegia) or is present in persons in life-threatening conditions (e.g. saving the lives of patients with paraplegia). Although only discussed with respect to the potential-to-benefit argument, the authors impose the general question of introducing '*context*' in the valuation of health-care activities. While the specification of a HRSWF is well grounded in economic theory, the framework proposed by Nord *et al.* has striking advantages because of its practical application. 'Social value measurement' fits directly into health economic evaluation as a supplement to CEA. Because of its decomposed nature, it is very flexible and transparent – properties that could be of special interest from an international comparative perspective. However, as it fails to reflect certain concerns for distributive justice, it might be more appropriate to the programme – rather than to the policy-level.

In conclusion, neither the general public as a whole, nor individual members, exclusively support the criteria accommodated in the QALY, the assumptions of multidimensional proportionality, and in particular, the distributional

rules following from health gain maximization. While the QALY can be refined and adjusted to include other sources of social value, such as patients' characteristics or severity-of-illness, – at least theoretically, – multidimensional proportionality and the maximization rule remain a serious problem. Critics of the QALY should note however, that this is not a problem with the QALY, *per se*, but one that occurs essentially with any strictly outcome-oriented allocation of resources. At the end of the day, even after extensive adjustment, it is not just the QALY that remains highly problematic, but the lack of alternative frameworks to reflect ethical concerns in a format useable and accepted by policy makers. The observed diversity of public preferences, the coexistence of pluralistic viewpoints and several thresholds indicating the switch among competing criteria and principles, make it necessary not only to collect empirical evidence but also to start a debate about the basis which concerns and objectives are acceptable for public policy and which should be rejected.<sup>33,71,72</sup>

'Empirical ethics', as suggested by Richardson, an interplay between empirical enquiry into public objectives and ethical discourse, could guide a promising future direction for health economic evaluation.<sup>73</sup>

If health economic recommendations for resource allocation decisions are to reflect public preferences, future research is needed to develop more complex *multicriteria* models of public opinion, integrating a number of accepted although distinct principles, their strengths, and related aspiration levels. One factor incorporated in such models – perhaps the core piece – would probably still be some measure of health outcome, subject to thresholds determining its particular weight. However, one might then raise the question of whether the QALY is the best measure available to fulfil this promise.

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