TAKING EQUITY INTO CONSIDERATION IN ECONOMIC EVALUATIONS OF HEALTH INTERVENTIONS AND OTHER PRIORITY-SETTING TOOLS

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Lack of access to medical services traumatized a mother who found herself "holding and singing lullabies to my baby until she died in my arms" Anonymous, Philippines (Narayan et al., 2000:115)

Equality… is the result of human organization. We are not born equal – Hannah Arendt, 1906-1975

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ABSTRACT

Priority setting in Health is a complex task that needs to be based on explicit criteria. While economic evaluations fulfil these requirements, there still remain further shortcomings in the current theory and practice of economic evaluation. One of them, which has attracted the interest of health economists and other professionals, refers to the equity dimension of health. A large amount of the literature reviewed in this paper addresses methodological solutions for addressing *distributional* concerns in *economic evaluations*. Yet, even though most authors agree with the general aim of reducing health inequalities, practical implementation issues that should inform policy are far from clear. This paper will review methods and tools for priority-setting, taking both equity and efficiency into consideration. This will be followed by recommendations on further research.

1. INTRODUCTION

In the early nineties, health economists were already advocating for a greater consideration of both equity and efficiency criteria in health resource allocation, proposing guidelines for examining a formula for resource allocation that would address this equity-efficiency trade-off (Sheldon & Carr-Hill, 1991:18). Wagstaff (1991:21) was writing: "As the volume of research on quality-adjusted life years (QALYs) has increased, concern has begun to be expressed about the equity aspects of resource allocation decisions based on the results of this research".

Focusing particularly on developing countries, Gwatkin remarked in 2001 that the work to date has produced significant increases in knowledge about the magnitude and nature of health inequalities, but had not yet reached the heart of the matter: "the identification of measures that can effectively deal with inequalities that have been uncovered" (p. 722). This paper will consider methodological solutions for addressing *distributional* concerns in *economic evaluations*, along with practical implementation issues that should inform policy when trying to reduce health inequalities.

The role of both researchers and policy-makers is of paramount importance in economic evaluation and priority setting. They can adopt either the classical *welfare economic* or the *extra-welfarist* economic approach as a normative basis. *Extra-welfarism* is the approach used in this paper when considering the role of the government in resource allocation and shaping health policies. Before going deeper into these concerns, we shall consider the difference between these two concepts:

- *Welfarism* argues that the government should base its redistribution policies on information about the utility functions of individuals and mainly addresses issues of market failures (asymmetry of demand, externalities, public good aspects, etc.). Consequently, *well-being* is identified with *utility*, and does not consider those aspects of life that do not have a reflection in utility (happiness, concern over elderly people, guarantee of civil rights, etc).

- *Extra-welfarism* predicts a broader role for the government in funding and providing health care. For the extra-welfarists, the leading priority-setting criterion is to maximize health. This implies that health care resources should be directed towards the programs and individuals for which health gains are highest (Hauck, Smith & Goddard, 2003:6). The important role of the state in funding and providing health care derives from the fact that positive right goods, such as health care, education, food, "are essential to each individual in that they allow them to express their *fundamental capabilities*, i.e. to make choices that allow them to fully express themselves in society. According to extra-welfarism, the government should guarantee the provision of health care to its citizens as a recognition of their positive freedom rights, not only as a consequence of problems of market failures in health care systems". (Jones, 2002:74-5). Still, extra-welfarists have been criticized for focusing solely on health maximization and thus efficiency considerations. However, most extra-welfarists agree that priority setting should also incorporate equity objectives (Hauck, Smith & Goddard, 2003:6).

Priority setting in Health needs to be based on explicit criteria. In chapter 2, we will see that economic evaluations fulfil these requirements but that there are still some shortcomings in the current theory and practice of economic evaluation; one of these refers to the equity dimension of health. All seem to agree with the general aim of reducing health inequalities. However, practical notions of equity that should inform policy are far from clear. Chapter 3 will try to clarify this concept of equity and issues related to practical implementation. Chapter 4 will review the state of research in the field of equity-efficiency trade-off and present methods and tools taking both equity and efficiency into consideration in the priority-setting process. Finally, chapter 5 will give some recommendations for further research on the subject.

2. ECONOMIC EVALUATIONS

In the broad health context, the usual clinical evaluation has been seeking to answer the question: "Does this intervention do more good than harm?" In economic evaluations, we go one step forward and ask ourselves: "In addition to the *effectiveness* of this intervention, were health care resources used in an *efficient* way?"

The concept of **efficiency** may be interpreted in different ways. The literature often uses the concept of efficiency referred to as Pareto-optimality. This concept of efficiency was elaborated over a century ago by the economist Vilfredo Pareto, nowadays still frequently used, who argued that : "an economically efficient (optimal) outcome in society is one under which it is impossible to improve the lot of any person without hurting someone else". In our health economics context, "lot" has to be considered as "the level of welfare" and welfare as "a measure of an individual's or a society's level of well-being".[1] Well-being in turn can be interpreted as *utility* or as *health*. As we will take an extra-welfarist approach seen in the introduction, *health* will be our outcome measure.

Efficiency and thus economic analysis are important because resources – such as people, time, equipment, knowledge, etc – are scarce. Consequently, choices must be made through organized consideration of the factors involved. Drummond *et al.* (1997:7-8) list three main reasons for using economic evaluations when making choices to commit resources to one use instead of another:

1. *Without systematic analysis, it is difficult to identify clearly the relevant alternatives.* The new proposal must be compared to the existing activities and programmes competing.

2. *The viewpoint assumed in an analysis is important.* Viewpoints may be the patient, the Ministry of Health budget, the community or society, etc.

3. *Without some attempt at measurement, the uncertainty surrounding orders of magnitude can be critical.* The concept of opportunity cost is important in this context, as "the real cost of any programme is not the number of dollars appearing on the programme budget, but rather the health outcomes achievable in some other programme which have been forgone by committing the resources in question to the first programme".

Economic analysis deals with inputs and outputs of activities, sometimes called *costs* and *consequences* (or also *benefits*, *outcomes*). It can for example analyse whether the additional benefits of a new intervention are greater that the additional costs over the existing one or compared to doing nothing. Johannesson (1996:221-236) stresses the importance of economic evaluations of health care programmes as an aid to decisions and policy making in different contexts: the development of treatment guidelines, decisions within health care organizations, introduction of new medical technologies, reimbursement decisions, and pricing decisions. Two of these contexts will be of main importance to us in this paper; decisions within health care organizations and reimbursement decisions, as they introduce the question of equity of access or delivery.

This chapter introduces the four different types of economic evaluations: cost-minimization, cost-effectiveness, cost-benefit and cost-utility. The latter will be emphasized, as it will play an important role in chapter 4. We will then go through some methodological and practical issues. Finally, we will consider some shortcomings regarding the equity dimension.

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[1] The definitions are from Folland, Goodman & Stano (2001), pp. 420, 615 and 617.

2.1 DIFFERENT TYPES

All forms of economic evaluations employ – or are supposed to employ – the same costing methods, of which we will see briefly some aspects in the of the next section "methodological issues". However, they differ in the way that the outcomes of health interventions are measured. We will see here four different forms of economic evaluations, but will give a special emphasis on one of them – the cost-utility analysis, as QALYs will be of major importance in our subject.

2.1.1 Cost-minimization analysis

Cost-minimization analysis (CMA) is a special form of cost-effectiveness analysis (CEA) and also the simplest form of economic evaluation. Only costs are compared across alternative, as the outcomes are similar for the interventions being compared. For example, two different programmes involving minor surgery would be compared, and both would have the same outcome, i.e. the number of operations completed successfully. However, they would differ in the procedures and thus imply different costs. In fact, as Drummond *et al.* (1997:12) underline it, "few studies are designed, from the outset, to be cost-minimization analysis. Either they are designed as cost-effectiveness analysis and end up being simplified because the consequences turn out to be equivalent, or they are designed as cost analysis in the knowledge that previous clinical research has demonstrated equivalence in consequences." In CMA and in CEA, the measures of effectiveness can be, for example, years of life gained, mmHg blood pressure reduction, etc.

2.1.2 Cost-effectiveness analysis

In CEA, both cost and consequences of the different alternatives are examined. One single outcome, such as cases found or life-years gained, is chosen and outcomes are compared with costs. The incremental cost-effectiveness ratio (ICER, also sometimes referred as C/E ratio) is calculated as such:

$$\text{ICER} = \frac{C_A - C_B}{E_A - E_B}$$

where C_A and C_B are the costs of the interventions A and B, while E_A and E_B are the effects (or measures of effectiveness) of interventions A and B. The intervention B can be the option of doing nothing, or minimum care, usual care, or the highest valued alternative intervention. Interventions that have a relative low ICER would have a high chance of being chosen over the alternative intervention. However, "which value is low enough for the intervention to be chosen is a subjective decision, depending ultimately on the value society places on a unit of health effect". (Hauck, Smith & Goddard, 2003:9)

2.1.3 Cost-benefit analysis

In cost-benefit analysis (CBA), the consequences of health care programmes are valued in money terms. The advantage of this method is a direct answer to the question of whether the benefits of the treatment justify the costs. In addition, CBA can account for other potentially important non-health outcomes of an intervention, such as an increase in productivity gains, or a decrease in

criminality through a certain mental health intervention (James *et al.* 2004:7) .The main difficulty in this form of economic evaluation is to value health outcomes in money terms. Different methods have been used in the past and nowadays, the dominant approach in studies is by assessing individuals' willingness-to-pay (WTP) for improved health.

2.1.4 Cost-utility analysis

The literature often does not differentiate CEA and cost-utility analysis (CUA), and refers to both as CEA. The only difference between both is that CUA is using a generic (or summary) measure of health status, such as the very well known quality-adjusted life-year (QALY)[2]. Other generic measures of health status have been proposed, such as disability-adjusted life-year (DALY), healthy-year equivalents (HYE), saved-young-life equivalents (SAVE). This paper will focus on the most well known and widely used generic measure, QALY. This measure is especially used in the literature on the equity-efficiency trade-off debates. Some other measures, such as years of healthy life (YHL), health-adjusted person years (HAPY) and health-adjusted life expectancy (HALE) are just aliases.

In CUA, the incremental cost (usually in dollars) of a programme is compared to the incremental health improvement (in QALY gained) attributable to the programme. The results are thus usually expressed as cost per QALY gained. In order to calculate the QALYs gained, health states first have to be valued on an interval going from 1, perfect health, to 0, death. Note that health states can also have a negative value, which is the case when the health state is considered worse than death. In addition to the *length* of life, CUA thus include the *quality* of life component, which is of paramount importance when measuring health outcomes.

2.1.4.1 Valuating health states

For our concern, understanding the valuation of health states will be of crucial importance. There are different methods to obtain values for health states[3]. Among these methods, there are techniques to measure directly the preferences of individuals, such as the standard gamble, the visual analogue scale or the time trade-off. We will see the standard gamble in more details. There are also pre-scored "multi-attribute health status classification systems", such as quality of well-being (QWB), health utilities index (HUI), or EuroQol (EQ-5D). The latter will be described.

The **standard gamble** can be used for both chronic and temporary health states. We will see the chronic case. As summarized in figure 2.1, the standard gamble consists in asking individuals to make a choice between the certainty of remaining in a given chronic state i and an alternative which would be a treatment with two possible outcomes: perfect health and death. The probability p of the perfect health outcome is then varied until the respondent is indifferent between two alternatives: the gamble and the certainty. At the point of indifference, the required preference value for state i is simply p.

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[2] The terminology "cost-utility analysis" can be in a way misleading as QALY is a measure of people's health and generally not a measure of the utility they derive from it, such as in the welfarist sense. This terminology is used because QALYs are derived using utility theory in an experimental setting (Wagstaff, 1991:22-3). As per Drummond et al (1997:183), a QALY is in general not a utility, but could turn out to be one only under quite restrictive assumptions.

[3] A problem with the fact that different methods are used is that different values for the effects of programs will be generated. As Hauck, Smith & Goddard (2003:9) point out, "This has the potential to reduce greatly the comparability of studies, which in turn reduces the value of using relative CE ratios to make priority-setting decisions".

Figure 2.1: Standard gamble for a chronic health state preferred to death
Source: Drummond MF & Sheldon T, 2002:93
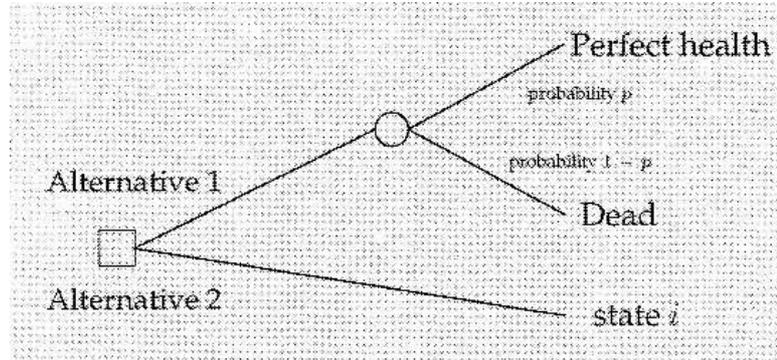
EuroQol (EQ-5D) is a system with five attributes: mobility, self-care, usual activity, pain/discomfort, anxiety/depression. For each attribute, you have to choose between three levels: whether you have "no problem", "some problems", or "major problems". Two separate health states are also listed; "unconscious" and "dead". So there are a total of 245 health states in all.

In order to calculate the QALYs of the health state somebody is experiencing, relevant coefficients from a scoring function have to be subtracted from 1. For example, the state 11223, which is full mobility, full self-care, some problems in usual activity, some pain/discomfort and major anxiety/depression is 0.255. State 23322 has a value of 0.079, close to death, and 33332 a value of -0.429, which is below death. Note that the preferences for the scoring function were measured with the time trade-off technique (TTO) on a random sample of about 3000 adults among the United Kingdom population (Drummond *et al.*, 1997:162-4).

2.1.4.2 Calculating QALY gained

In order to obtain the total QALY score of an individual without programme and with programme, one must multiply (or "weight") each remaining period of time of this individual's life by the expected quality of life in the period in question. In figure 2.2 below, the area representing the QALYs gained with the treatment programme can be compared with the QALYs experienced without programme. The cost-utility ratio indicates the additional costs required to generate a year of perfect health (one QALY).

Figure 2.2: Quality-adjusted life-years gained from an intervention
Source: Drummond MF & Sheldon T, 2002:89

We can see from this figure that QALY is a measure that captures changes in both the quality of life (morbidity in area A) and length of life (mortality in area B).
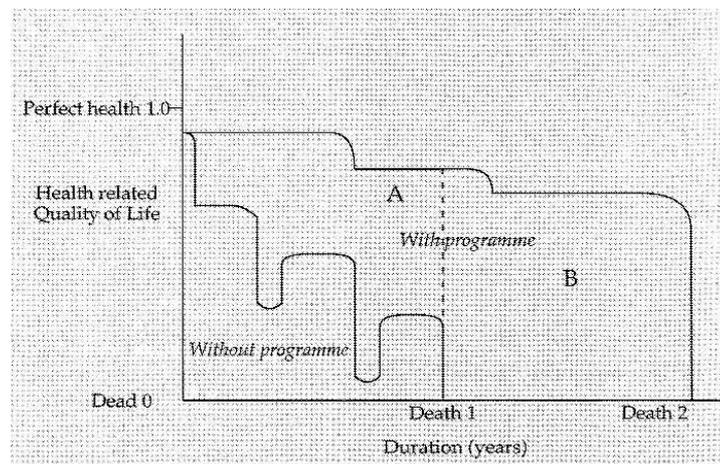
2.2 METHODOLOGICAL AND PRACTICAL ISSUES

It has been found that decision-makers do not widely use the results of economic evaluation research. Many reasons are discussed in the literature, both methodological and practical. Recommendations generally tend to the same conclusions: efforts should be made to make economic evaluations as simple and transparent as possible (Hauck, Smith & Goddard, 2003: 22). We will briefly discuss here some key issues faced by researchers and policy-makers.

2.2.1 Who decides on quality weights

Much debate surrounds who should be involved in placing values on health states. The dominant stand point seems to judge the general public's preferences as the most valid, yet there are debates about rather considering other preferences, such as that of patients, experts or policymakers. In addition to those, the view of health care professionals is important as it is often the one judged to represent the patient's best interest.

Having patients valuing health state would – at least to some extend – overcome a major problem reported in the literature, which is that we fail to recognize adaptation processes. For example, a health state 23322 would most probably not have been valued 0.079, i.e. close to death, by a patient in that state. Dolan (2005:13) explains it very well: "The public only focus on the transitional losses and the fear associated with their change of health and ignore the adaptation, whilst patients focus only on the adaptation and ignore the transitional losses."[4] He proposes a valuation technique called Day Reconstruction Method (DRM) which may help overcoming this problem

Another concern is whether values assigned to health states should be ex ante or ex post, i.e. before or after health care programmes. Nord (1999:80-82) argues that QALYs are supposed to aid ex ante judgments of interventions, but are most helpful if they are based on data from real experiences with illness, and thus measured ex post. This is however often not clear in the QALY literature and in economic evaluations.

2.2.2 Target populations

The target population can have an important impact on the cost-effectiveness of an intervention. This is why C/E analysis should be undertaken in subgroups within a target population. This could for example bring to light the difference of C/E ratio between a programme for urban children in comparison with rural children, or young versus elderly women.

2.2.3 Perspective of the analysis

Economic evaluations can be carried out from different perspectives, which will greatly affect the

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[4]   Dolan (2005:11-15) reports that when people are asked to imagine for example paraplegia, they are thinking about it as being 24/7, all day everyday. In health economic valuation studies, the attention is drawn to transitional loss, not thinking that in such a physical state you may still enjoy your social life, get the same fun from watching television. This is why valuations from the general public are generally lower that valuations from patients.

cost-effectiveness or cost-utility ratio of a programme. The societal perspective is the broadest and incorporates all costs (health care, social services, education, patients and family) and all health effects, regardless of who incurs or obtains them. Indeed, economic evaluations could optimally include consideration of the quality of life of carers and other family members. Other perspectives are: governmental, health care institution, patient and family, third-party payer. Hauck, Smith & Goddard (2003:13) state that economic evaluations tend to be the most useful in the priority-setting process when using the societal perspective.

Wailoo *et al.* (2005:537) are arguing in their editorials that the United Kingdom's National Institute for Clinical Excellence (NICE) issues clinical guidelines with too little cost-effectiveness evidence and too little social viewpoint. They advise NICE to describe clearly the individual viewpoints of patients and society in its clinical guidelines.

2.2.4 Generalizability

Health care decision makers have limited resources to conduct primary research and may wish to transfer results from other economic evaluations to their own setting. Unfortunately, researchers often encounter a lack of transferability of study results. This is due to many studies not clearly reporting the methods used to calculate the costs and/or not providing all the necessary data inputs, rendering the recalculation of the results impossible (Mumford *et al.* 1998:33). Walker and Fox-Rushby (2000) even demonstrated through a critical review of published economic evaluations of communicable disease interventions in developing countries that the usefulness of this literature for international comparisons has to be questioned, due to many methodological inconsistencies.

Different attempts have been made to improve the generalizability of economic evaluations for its use in other settings, thus saving time and money. Therefore, guidelines have been developed by organizations such as the one developed by WHO on generalized CEA (Murray *et al.*, 2000; Baltussen *et al.*, 2002; Hutton & Baltussen, 2002). The aim is to reach a certain level of standardizations in the methodology used in economic evaluation, and thus to increase their transparency and transferability.

The products of these attempts are usually league tables of different interventions ranked by increasing order of cost-utility ratio (C/U ratio). League tables are useful for decision-makers, for them to select the interventions with the lowest C/U ratio. In order to decrease their potential dangers, Hauck, Smith & Goddard (2003:19-20) advise that league table of different interventions should use the same methodology, address the same condition, in the same setting, for one target population with preferably similar characteristics.

2.2.5 Discounting benefits to present values

In order to reflect our positive rate of time preference (we prefer to receive benefits earlier or to incur costs later), cost and benefits in economic evaluations are often discounted to present values. The future cost or benefit can then simply be converted to the present value by multiplying it by the discount factor $1/(1+r)^n$ where r is the discount rate and n is the number of years from now (Johannesson, 1996:129).

Debates on what discount rate should be used are still open. Nevertheless, a clear recommendation was given in 1996 by the Panel on Cost-Effectiveness in Health and Medicine to use 3% discount rate in the reference case for both future costs and health effects. The panel argues that failure to discount health outcomes will lead to inconsistent choices over time, as for example delaying investments, which will always result in a program's becoming more cost-effective (Weinstein et al, 1996:1257).

On the other hand, discounting health outcomes at a positive rate may lead to major harm being imposed on future generation, especially when the effects may not be seen until the distant future. An outcome occurring in 64 years and discounted at 3% would be valued in the present day at only 15.1% of its non-discounted value (at 6% it would be valued only 2.4%). As a result, policies that for example avoid the emergence of future antimicrobial resistance may seem much less cost-effective than policies that reduce the transmission of already resistant organism, for which the benefits can be seen today (Smith *et al.*, 2001). In order to avoid this, the WHO guideline for generalized CEA recommends health effects not to be discounted in the base-case analysis and a discount factor of 3% to be applied in sensitivity analysis (Baltussen *et al.*, 2002:56).

Consequently, discounting will remain having pros and cons, and the debate is likely to continue. However, a common view is that future CUA should include sensitivity analysis using rates in the range of 0% to 7% in order to achieve consistency and transferability across analyzes.

2.2.6 Practical Barriers

Hauck, Smith & Goddard (2003:16-7) point out an important barrier to the use of economic evaluations by policy makers. Politicians and researchers have different incentive structures, organizational cultures and beliefs, and objectives and approaches to work. On one side, researchers' careers depend upon publishing their findings in reputable journals. Research is usually conducted over a long time horizon and does not produce definitive answers to policy questions. On the other side, public policy-makers advance in their careers by providing timely solutions to policy questions and prefer unequivocal answers to policy questions. Different strategies are proposed to be adopted by researchers, in order to overcome these differences: making the research question specific without losing sight of policy relevance, making clear recommendations, identifying the implementation mechanism, use a language that is not difficult to understand, etc.

2.3 SHORTCOMINGS REGARDING THE EQUITY DIMENSION

As Drummond *et al.* (1997:44) point out, of primary concern from a policy viewpoint is the fact that economic evaluations do not usually incorporate into the analysis distributional concern on costs and consequences among different population groups. The identity of the recipient group (e.g. the poor, working mothers) may be an important factor - if not the motivation itself - for funding or subsidizing the programme. Sassi, Le Grand and Archard (2001:762-3) go even further, stating that there is no consensus in the United Kingdom's National Health System (NHS) on how to deal with policies that may cause a conflict between the goals of equity and efficiency and a lack of a clear and consistent definition of equity. "The equity versus efficiency dilemma has been virtually ignored in the political debate, often leading to inconsistent judgments in the development of health policies." They state that both researchers and policymakers share responsibility for the inconsistent pursuit of equity in the NHS.

Why is there a failure to address the equity-efficiency trade-off? Nord (1999a:22) relates that in the seventies, it was assumed that the goodness of a health care system should be measured in terms of the amount of health that it produces. From this basic value judgment, the QALY model was developed with the assumption that *societal value*[5] is a simple, outweighed sum of individual health

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[5] During the WHO's Global Conference on Summary Measures of Population Health, Nord (1999b:2) defined *societal value* as being "Judgements by representatives of society at large of the relative goodness of different health programs (determined by objective health gains, gains in subjectively perceived quality of life and concerns for fairness and equity across individuals)".

benefits, in other words, that society disregards how a given total amount of benefits is distributed across people. While there is increasing recognition among advocates of the QALY approach that this assumption is probably not quite true, there is little realization that it could indeed be very wrong.

The consequences of this lack of equity concern are two fold. First a lack of distributional data, and second an important risk to increase health inequities.

A systematic review of the literature on health care economic evaluations published in 1987-97 showed that the studies reviewed did not provide enough information for decision makers to make their own judgments about the distributional impact of given policies. This distributional impact could have been either the characteristics of the population affected by the policy, or the policy's effectiveness and cost-effectiveness in subgroups (Sassi, Le Grand & Archard, 2001:763).

Dougherty (1994) analysed the implications of QALYs in allocation of resources for rehabilitation interventions. The study revealed that among three central ethical values in health care (freedom, happiness and fairness), QALYs may be useful in expanding patient freedom and in securing greater social happiness, but raise important problems of fairness and have a bias towards curative interventions. The WHO Task Force on Health System Research Priorities for Equity in Health (WHO, 2004:18) stresses the danger of having QALY being valued the same way no matter to whom it accrues. In fact, the evidence shows that typical public health interventions applied in the traditional (non-equity-focused) way could in some cases increase health inequalities, since high-income groups are generally better able to access and utilize services or knowledge from public health interventions. Therefore, an important task is to assist decision-makers in identifying and understanding the determinants to access to health services and information.

A typical example is the NHS policy on cervical cancer screening. The aim of this NHS cervical screening programme introduced in England in 1990 was to maximize coverage, using powerful economic incentives to general practitioners. However, the fact that women at high risk, particularly those in disadvantaged socioeconomic groups, would have a low participation to this screening programme was not addressed. Consequently, not only was there much less invasive cancer avoided because screening rates were lower in the groups at risk (the poor), but the principle of improved horizontal health equity was not fulfilled. Only the principle of equity of access was, which usually increases health inequities[6] (Sassi, Le Grand & Archard, 2001:762; Sassi, Archard & Le Grand:47-54).

Among many other equity concerns, *age* has been one of them, and at the heart of recent public debate about QALYs. In economic evaluations, older people generate less QALYs from health care than younger, other things being equal, as they do not have many more years to live in their life expectancy. This bias against the elderly occurring with the QALY methodology has been quite criticized (Robinson, 1999:16). There are three principal reasons for this bias, reported by Johri *et al.* (2004):

- The important role QALYs accords to duration of benefits: as older persons have a potential duration of benefits necessarily limited, a ceiling effect may bias results against them.

- QALYs' failure to adequately represent the often small health gains experienced by the elderly, who have limited potential for health improvement. Long term care for the elderly is likely to score badly in terms of QALYs gained when compared to more acute forms of care.

- The potential impact of methodological choices concerning the discount rate on some costs: any feature that will increase benefits and decrease costs over the years will introduce a bias against the elderly. It is the case for low value of the discount rate and the exclusion of non-

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[6] When the primary objective is health maximization, the rationing principle of *need* (versus *fairness*) implies that resources will be allocated in relation to the cost-effectiveness of competing procedures or subgroups. However, one has to keep in mind that *need* is not necessarily expressed as a *demand*, and *demand* is not necessarily followed by *utilization*. On the other hand, there can be a *demand* and *utilization* without a real underlying *need* for the particular services used (Maynard, 1999:7)

healthcare consumption during added life years.

However, it could be argued that this bias against the elderly can be justified by the fact that general public itself favours young age groups over elderly for life-saving interventions - with the exception of very young children. Consequently, the QALY approach would go along side with general public preferences – apart for very young children. In practice, we can note that NHS policy for renal transplantation do not take into account these public preferences of ranking older children over younger ones, and gives priority to the youngest children. Sassi, Le Grand & Archard (2001:762-3) argue that these age priorities are not fully supported by evidence on effectiveness and efficiency grounds, but not even on equity grounds[7].

Dispersed and isolated rural communities are also a concern in terms of equity-efficiency trade-off. The marginal cost-effectiveness of delivering health services for these communities is very unfavourable, as costs are higher than elsewhere (added cost for transport and basic services) and effectiveness of interventions is lower (lower utilization, as well as lower drug compliance). Still, on equity grounds, these communities may be among the highest priority to receive health services. In countries where dispersed, isolated communities exist, there should be a real concern to assess the trade-off between cost-effectiveness and universal coverage of health services (Bobadilla, 1998:43).

In overall, the standard of work on economic evaluation has improved in recent years and there is a growing consensus among health economists about best practice and guidelines. However, it is clear from the above that there are still shortcomings regarding the equity dimension and that priorities can no longer be decided on pure efficiency criteria. Robinson (1999:18) believes that economic evaluations are much like a half-way through technology, and as such, its main contribution is likely to be an aid to decision-makers in specific circumstances, rather than a comprehensive technique for routine application. This issue will be discussed in chapter 4 and 5.

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[7] Many authors assume implicitly that **society's concept of fairness** should be translated into **equity** concepts by decision-makers, as we will see later.

3. EQUITY

3.1 RATIONALE AND DEFINITION

Equity has been an important stated or implied goal of health policy in many countries and by international health organizations for several decades. In 1978, the "Health for All by the Year 2000" goal was launched at the well-known WHO conference in Alma Ata, making implicitly equity in health a priority. WHO launched subsequently a global initiative on Equity in Health and Health Care running between 1995 and 1998. Finally, equity concerns were also prominent in some parts of the 2000 Millennium Declaration, which gave rise to the Millennium Development Goals (MDGs).

As stated by the WHO Task Force on Health System Research Priorities for Equity in Health (2004:6-7), although impressive overall gains have been achieved in life expectancy and child survival during the second half of the 20th century, inequities in health status and in the health systems between more and less privileged groups within and between countries have persisted, and in many regions they even have begun to widen. Health equity has consequently emerged as an important theme in research and advocacy.

Equity concepts try to define *fairness* in the distribution of health and health care, reducing *inequalities* between individuals or groups of individuals. It is the fair treatment of needs, regarding both the distribution of services and allocation of resources.

Note that some health inequalities are still considered as fair by the general population, particularly when they result from biological differences[8] or risky behaviour, such as smoking for example. Consequently, equity principles are mainly concerned by reducing inequalities resulting from an unfair treatment, including the unequal distribution of social and economic determinants of health such as income, education, employment, housing and healthy environment, to list the main ones. They also reflect a concern to reduce unequal opportunities to be healthy associated with membership to marginalized or socially disadvantaged groups, such as the poor; some racial, ethnic or religious groups; women; and rural residents (ibid, 2004:6-7).

 Striving for equity in health care, which we are investigating here, is thus only one aspect of the wider concept of equity in health status, and usually implies that health care resources are allocated and received according to need -*equity in delivery*, and contributions to financing the system are made according to ability to pay - *equity in financing*. As we are exploring in this paper issues around priority-setting of health care interventions, and as this requires a previous effort of pooling funds, we will only take into consideration here equity in the delivery of health care, as opposed to equity in financing of the health system.

Note also that, whether or not equity is desirable and how, is a pure value judgement. Much of the economics principles contained in this chapter deals with *normative* economics, as they involve a value judgement, in opposition to *positive* economics that can be tested by factual evidence and contain no value judgements.

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[8] Referring to the fact that biological differences are considered as less inequitable, Dolan (2005:19) states: "It is not at all obvious that to an ethicist that would be true, but to lay people it is: if it is not what society constructed, then it is not something that society needs to worry itself with."

3.2 DIFFERENT TYPES AND PRACTICAL IMPLEMENTATION ISSUES

The equity concept needs to be spelled out, as there is not one unique definition of equity. Indeed, redistribution of resources to increase equity is an issue for which we encounter so many different positions – at least seven main ones[9] – that any institution working around equity issues should primarily agree on the relevance of those following concepts to its work. The first three concepts presented are strongly related to the degree of severity of the initial health state.

3.2.1 Allocation according to need

This concept is the most well-known. A distribution according to need implies that individuals in equal need ought to be treated in the same way and individuals in greater need should be treated more favourably than those in lesser need (Lindholm *et al.*, 1996:208).

This concept is often referred as *horizontal* and *vertical* equity. Horizontal equity is the identical treatment of identical people, i.e. those in equal need should receive the same amount of health care. *Vertical* equity is the different treatment of different people in order to reduce the consequences of these innate differences, i.e. those in greater need may be expected to receive more health care (Begg, Fischer & Dornbusch, 2000:258; Jones, Culyer & Morga, 2002:108).

One constrain that policy-makers are facing while trying to implement this concept is the one - already pointed out by Wagstaff in 1991 – that *needs* first have to be defined and established, "something that cannot be done until society has first decided what the desired health levels are of the persons concerned" (p. 32). There are different definitions of *need* in the literature. For some authors, the degree of need depends on the severity of illness (taking into account mortality, morbidity and/or socioeconomic factors, depending on the data available). However, this definition ignores what is medically possible. For others, needs exists only if a certain intervention is needed and effective to achieve a certain health outcome *and* if this outcome is endorsed by society as being worthwhile. Finally, Culyer and Wagstaff (1993) proposed an alternative definition of *need* as being the expenditure required to exhaust a patient's capacity to benefit from an intervention (in the future). Need is thus measured by the resources required for treatment and not by the patient's current level of ill-health. However, distribution according to the sole level of expenditure required to exhaust a patient's capacity to benefit may worsen the distribution of health or be considered as inequitable[10], whereas a distribution designed to reduce inequalities in health would obviously improve the distribution of health (Jones, Culyer & Morga, 2002:110). Therefore, the definition of need - which did not yet reach a clear consensus - should include the severity of initial illness, as well as the amount of health-care resources required to exhaust the individual's capacity to benefit from health care.

Policy-makers are facing another constrain when trying to implement the horizontal aspect of this concept of equity. Equal treatment for equal needs goes beyond equal access, and requires somehow that those who have an equal need for health care make equal *use* of health care. This is in fact not the case for different reasons. Ethically acceptable reasons would be individual preferences,

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[9]   As provided by Hauck, Smith & Goddard (2003:22-35)

[10]   An example is given by Hauck, Smith & Goddard (2003:26): a person A would need a comparably inexpensive treatment to avert sure death and live her life in good health and person B needs a comparably expensive continuous treatment to improve quality of life. Person A has greater need for health care, although she requires less expenditure. *Need* as being *the expenditure required* can therefore be considered as inequitable.

such as differences in lifestyle preferences or levels of risk aversion. Unacceptable reasons for differential use of health care would be a lack of information, for example. Consequently, this approach requires not only some more proactive efforts by policy-makers to overcome these unacceptable reasons for differential use of health care, but also that acceptable reasons would be overridden. This is why many policy-makers usually prefer the principle of equal access to health care for those in equal need (Oliver & Mossialos, 2004:656).

In practice, allocation according to need often means simply allocating resources consistently on the basis of relative levels of expenditure on different types of people, often depending on geographical location. However, this distribution may perpetuate inefficiencies, as pointed out by Kaplan and Merson (2002). They report the example of the United States, where prevention resources from the federal government to the states flow is in proportion to newly reported AIDS cases. Perversely, under this type of proportional allocation, state health departments who are successful in reducing HIV infections – and, ultimately, in AIDS case – would lose funds, while health departments with ineffective programs that lead to the continued spread of HIV and AIDS would gain resources. Therefore, the authors argue for a middle ground that promotes both equity and efficiency, which would be allocating part of the prevention resources according to need, i.e. newly reported AIDS cases, and part according to new HIV infections prevented.

Finally, Nord (1999) proposes an approach called "cost-value analysis", which incorporates equity concept into cost-utility analysis. This method is based on severity of illness and gives priority to the worst-off, as we will see in chapter 4.2.

3.2.2 Rawl's *Maximin* principle

John Rawls argued in 1971 that a just social contract is that which we would agree upon if we did not know in advance our financial situation, race, religion, or state of health. Operating under this "veil of ignorance" (to use Rawls' phrase) we can discern the form of a truly just society, since our judgment would not be clouded by knowledge of our own personal interests. Under this condition, rational and risk-averse individuals would choose a situation where the position or the well-being of the worst-off is maximized: that is, maximize the minimum, which resulted in the *maximin* principle.

Regarding implementation issues, this principle is often taken as a justification for basing the resource allocation on the degree of severity of illnesses, supplemented by a criterion saying that the treatment should improve health. Different government-appointed commissions in several countries – Holland, Norway, New Zealand and Sweden – have adopted the position that severity of illness should continue to be the most important criterion for prioritizating between patients (Nord, 1999a:32).

3.2.3 The rule of rescue

This equity principle takes place at the individual level. It states that society and each individual have an ethical duty to do everything possible to help those in immediate life-threatening distress. Irrespective of the costs of treatment, it implies that the patient with the most serious condition is treated first.

In terms of implementation, the rule of rescue (life-saving) principle is often the prevailing allocation principle in clinical practice, even when expected health gains are low (Hauck, Smith & Goddard, 2003:26-7). This may strongly diverge with other priority setting decisions, especially with those based on efficiency criteria, except if an effective triage and rationing is operated.

3.2.4 Egalitarism

Egalitarianism implies that everybody should have identical health status, and therefore an equitable allocation of health care is one that gives rise to equality in health. Culyer and Wagstaff (1993) explored four definitions of equity in health care (equality of utilization, distribution according to need, equality of access, and equality in health) and concluded their analyzes by arguing that equality of health should be the dominant principle.

This principle has many implication issues. The first one is that health care is not the only determinant of health, and for some groups it may even be a minor one in comparison with other proximal determinants of health such as nutrition, housing and working conditions, etc. Equality in health can thus not be reached only through allocation of health care. A second implication issue is that a distribution of resources designed only at reducing inequalities in health may not be considered as fair by the society, as it would not take into consideration other important values and concerns, such as number of people treated, age, social responsibilities (Nord, 1999a:73). In addition, it may overlook societal concern for allowing people to realize their potential for health, also called *fair innings*, as we will see in chapter 4.1.2.

A third concern is that it would require too many restrictions on the ways in which people may choose to live their lives, addressing individual responsibilities for the differences in health such as self-inflicted deprivations in health.

Finally, this concept would imply that a situation of two people living in bad health is better than one person in bad health and one person in good health. With a given budget, this would require a levelling-down in health of healthy individuals towards the health of most unhealthy individual, which is not acceptable.

A solution to the limitation of this principle is offered by the social welfare function, which will be described in chapter 4.1.1.

3.2.5 Equality of access

This equity principle is very close to the horizontal equity principle seen above in "allocation according to need", i.e. equal access for equal need. A clear definition of *access* and *need* is still necessary. Unfortunately, there is not yet a generally accepted definition on both concepts. Goddard and Smith (2001:1151) have defined *access* as "the ability to secure a specified range of services, at a specified level of quality, subject to a specified maximum level of personal inconvenience and cost, whilst in possession of a specified level of information". Nevertheless, equality of access needs to be considered as an equal opportunity given to individuals to use health services without regard to other characteristics such as their income, ability to pay, ethnicity, or area of residence. Hence, to guarantee equality of access, health care costs - and also the time cost for traveling to the health care provider and waiting for treatment - would have to be reduced for low-income individuals until the product of price of health care and marginal utility is the same as it is for high-income individuals (Hauck, Smith & Goddard, 2003:27-8).

In practical, equality of access remains the central objective of many health care systems and is often defined as provided through universal health insurance coverage or the absence of user charges. However, it is in reality difficult for policy-makers to fully operationalize this concept, as travel costs, opportunity costs of time, awareness of availability and efficacy of services – because of information skills, etc, vary considerably between individuals (Goddard and Smith, 2001:1151). In addition, it does not address ethically unacceptable reasons for differential access, such as lack of information, etc. Nevertheless, this approach is easier to operationalize and is more acceptable than a pure egalitarian one, as it respects the preferences of consumers and is consistent with welfare economics (Oliver & Mossialos, 2004:656; Lindholm *et al.*, 1996:208).

3.2.6 Decent minimum and essential packages

This is an access principle that establishes a portfolio of interventions for conditions and/or patient groups, agreeing on what should be or not be included.

In order to implement an essential package of health care services, social judgement needs to be taken into account and not only efficiency criteria. Some propositions of an essential package have been made by the WHO Commission on Macroeconomics and Health, the World Bank or the Oregon list and will be addressed in chapter 4.3.6.

3.2.7 Libertarianism

Libertarianism promotes the equity concept that can be considered as the less equitable. For libertarians, the state has no right to intervene in the distribution of goods, wealth or health care. Its main task must be to enforce property rights. An individual is entitled to his or her possessions if acquired justly, through earnings or inheritance, for example. Consequently, differences in health status are not regarded as unfair, even if they are due to differences in housing conditions, income or lack of health care (Hauck, Smith & Goddard, 2003:31).

Libertarianism has been applied so far only in selective groups of population or selected services. Certain interventions are regarded as non essential or not cost-effective, and are consequently excluded from an essential package of health care services covered by health insurance or from government-financed services.

3.3 MEASURES OF INEQUITY

Most of the work done by health economists in the measurement of equity in the delivery of health care has concentrated on the measurement of horizontal inequity, i.e. on whether different individuals in equal need consume different amounts of health care. This can be calculated using a concentration index, where the population is ranked by income and the proportion of health care used by particular income groups is compared to the proportion of illness that they experience. A positive value of this index means that high incomes use more health care than would be predicted by their level of need, suggesting that the delivery of health care favours the rich. (Jones, Culyer & Morga, 2002:113,117).

The fact that there has been little analysis of vertical equity in the use of health care is not surprising and can be explained by the fact that we would need to use *need variables*. As Morris, Sutton and Gravelle (2005:1251-2) stress it out, the model would require value judgments about which variables are the *need variables*, as well as value judgments about the way in which use is supposed to vary among individuals with different needs.

3.4 WHICH PRINCIPLE(S) SHOULD PREVAIL?

As seen earlier, the understanding of equity is pure value judgment. Le Grand (1996:152) shed an interesting light on this tension, when he states that, for a rationing of health care to be assessed as equitable, it should not yield outcomes that offend against moral intuitions concerning what is equitable, fair or just – all terms being synonymous. Even though this seems, on methodological grounds, to be an unscientific procedure for evaluating principles, any decision-making regarded as seriously inequitable would not be sustainable in the long term.

As stated by WHO in its World Health Report 2005 (141-143), it is important that stakeholders from civil society are represented in the priority-setting process, in order for less popular and politically sensitive aspects – and in particular within maternal, newborn and child health – not to be forgotten. This will also give a chance that social determinants like gender inequality, poverty and exclusion are tackled in the health sector policies and included in universal coverage systems.

Therefore, decision makers often attempt to seek public views of what is considered as a fair distribution of health and health care, on the basis of researchers' work. The attempts to elicit equity concepts from the general public are numerous[11] and empirical data is clear: societal values give strong priority to treating severely ill patients even when less cost-effective (Kapiriri, Arnesen and Norheim, 2004), younger age groups for life-saving interventions and infertility treatment (Johri *et al.*, 2004). In addition, there is a consensus for the idea that we should discriminate in favour of those with dependants (Dolan *et al.*, 2005:205) and redirect considerable resources towards people of low social class or with adverse health prospects, at the expense of other national health system activity (Hauck, Smith & Goddard, 2003:33).

Translating these preferences into policy is quite challenging for policy-makers. Indeed, as argued by Hauck, Smith & Goddard (2003:34), decision makers at different level of the health care system may follow different equity concepts from those just described. In particular, politicians working at national or regional administrative level and clinicians at the individual level work in different environments and are subject to different incentives. In any case, decisions at the clinical level are crucial for the implementation of a chosen equity concept, and therefore policy-makers at national or regional level would have to set up incentive structures and guidelines, as well as introduce audit procedures in order to implement successfully chosen equity concept(s).

As seen earlier, the experience shows that in clinical practice, the prevailing equity principle remains the *rule of rescue*. At national and regional level, policy-makers tend to favour *allocation according to need* and *equality of access*[12]. This choice still often result in defining an essential package of health care services covered by health insurance or from government-financed services, as it is the easier approach to operationalize these concepts and is more acceptable than a pure egalitarian one. This, however, does not solve the problem of differential access (due to awareness of availability and efficacy of services – because of information skills, travel costs, opportunity costs of time, etc.) which remains ethically unacceptable reasons for restricted access to health care. In addition, it does not automatically translate into societal preferences such as age, severity, disadvantaged populations or individuals with dependants.

We will not address in this paper the practical constraints – such as majority rule voting,

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[11] For example, a broad national survey on public preferences for prioritization in organ transplant is currently being conducted in Switzerland, including questions on preferences about the potential beneficiary's age, social responsibilities, etc. [from personal experience as being part of the sample surveyed].

[12] By instance, seven Ministers of Health (Chile, Germany, Greece, New Zealand, Slovenia, Sweden and the United Kingdom) agreed in 2003 that the most appropriate principle of equity for the health-care policy-maker to pursue was the horizontal equity one, i.e. equal access to health care for those in equal need, as it does not discriminate between people who are already ill on the basis of non-health factors such as income or education, and as it respects differences in lifestyle preferences and levels of risk aversion for differential health-care utilization (Oliver and Mossialos, 2004:655-6).

lobbying, donor constraints, bureaucratic issues, etc. – that policy-makers are facing when trying to implement these concepts in allocation policies, as this is an equally broad concern. What we need to review and assess are methodologies and tools for incorporating equity concepts into (a) cost-utility analysis and (b) other priority-setting tools which include efficiency criteria. We will as well consider what still needs to be done for it to become operational. Nevertheless, practical constraints faced by policy-makers and emerging from donor conditionality, rule voting, etc remain a major issue that deserve more scrutiny.

4. PRIORITY SETTING AND EQUITY CONCERNS

In this chapter, we will review the three main trends arising in the health economic literature and concerning the necessity to incorporate equity concerns in the priority setting process. The first trend is to add equity weights to utility measures of health interventions such as QALYs. The second is a person trade-off technique for valuing outcomes from a societal perspective that was designed by the researcher Erik Nord and called cost-value analysis. Finally, the third one is a set of priority setting tools that take into account incentives and constraints directly faced by policy-makers.

4.1 EQUITY WEIGHTED UTILITY GAINS

In the traditional equally-weighted QALY seen in the second chapter, a QALY accruing to any individual is considered as of equal worth, whatever the personal characteristics of that individual. This, however, does not capture correctly the societal values of equity seen in chapter 3. Could then health utility measures such as QALY be made more valid by using more appropriate weights?

There are two tendencies among economists when seeking greater quantification of the equity-efficiency trade-offs. The first one is theoretical, through the use of a social welfare function. The second one is more empirical, through the use of questionnaire methods that will allow them to subsequently assign equity weights. The latter will then be used to allocate resources in such a way as to favour certain populations or conditions, such as young people against old people (age-weighting), or severe conditions as against those with less severe ones (severity-weighting), etc. Note that it is broadly accepted through the literature that the public should decide on the equity weights, as the latter are subject to value judgments.

Before we see in more details some theoretical grounds and some practical application of different equity weights, we shall acknowledge the fact that among non-health factors, age – and to a certain extend (dis)ability – are often the only factors which are receiving attention in the literature on equity weighting. Whether social exclusion occurring from other factors such as gender, ethnicity/racial, social class or geographical location (urban/rural) should be weighted still needs to be considered. It could be argued that socially and/or geographically excluded individuals tend to experience higher severity health status and would thus be compensated through the severity-weighting process. This concern deserves further research.

4.1.1 The social welfare function and health care needs

Some health economists (Wagstaff, 1991; Williams & Cookson, 2000; Folland, Goodman & Stano, 2001) have used the social welfare function (SWF) to express the equity-efficiency trade-off. Instead of having the SWF defined over utility levels – and thus the two axis representing utilities – the function uses the QALYs that remain in the life expectancy of the community as a measure of health[13]. As we will see first graphically and then in the function itself, the SWF reflects the society's aversion to inequality, but still allows some trade-off between total health equality and health

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[13] Note that it is a typical extra-welfarist approach, as opposed to the classical welfare economics. For extra-welfarists, health – and not utility – is the crucial outcome of health policy.

maximization in the society.

Figure 2 (Wagstaff, 1991:37) shows a social welfare function and a health frontier. A and B are two individuals or groups of individuals with some similarities. The point m represents the same number of QALYs that A and B would enjoy without treatment. The health frontier represents the maximum amount of health outcome that can be produced with the resources available and thus points on the frontier are said to be *Pareto efficient*, i.e. it is impossible to improve the level of welfare of one party (A or B) without hurting the welfare level of the other party. Its shape depends on the health care costs to society, but also shows different potential between individuals or groups of individuals. Here B can be treated at lower cost than A and/or has a better capacity to benefit from that health care than A[14]. So both point p and q are technically efficient, but point p represents the level where the community's health is maximized[15] and q where health is equally distributed, as it crosses the 45° line from the origin (same health outcomes). Finally, point s is located somewhere in-between the health maximization point and the equity maximization point.

Figure 4.1: Health frontier and social welfare maximization
Source: Wagstaff A, 1991:37
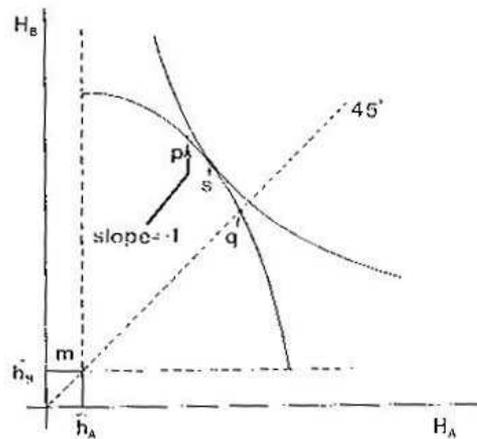
We will now describe how to decide on the localization of point s. This point is precisely at the tangency between the health frontier and the social welfare function, i.e. where the social welfare is maximized. Wagstaff (1991:35) defines the isoelastic social welfare function as such:

$$W = (\tau-1)^{-1}[(\alpha h_A)^{1-\tau}+(\beta h_B)^{1-\tau}], \quad \tau \neq 1$$

where W is the level of social welfare associated with the health distribution $[h_A,h_B]$ after intervention. The parameters α and β are the weights to be attached to respectively A's and B's health. The health of worse-off individuals or groups would receive a higher weight in the function, which would change the social welfare contour **gradient**. The parameter τ is the degree aversion to inequality in health outcomes. The greater the community's aversion to inequalities between A and B, the stronger will be the **curvature** of each social welfare contour.

If $\tau >0$ and $\tau \to \infty$, the contour becomes L-shapes with its corner on the 45° line. It would then concern only the health of the least healthy person (cf. *Rawlsian* equity in chapter 3.2.2). At the contrary, in the case where $\tau = 0$ and $\alpha=\beta=1$ (no aversion to inequality in health and no weight), we are back to point p health maximization that is considered in the traditional QALY approach.

In his article on intergenerational equity, Williams (1997) gives an example and provides a table

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[14] This could be for different reasons, such as age, education impacting on compliance, income impacting on nutrition status, etc.

[15] At this point, the slope is – 1, i.e. the marginal cost of one QALY is the same for A and B.

of equity weights, which depend on the discrepancy size and the inequality aversion τ.

4.1.2 Societal concern for age

As we saw earlier, cost-utility analysis may introduce a bias against the elderly, as older people generate less QALYs from health care than younger and have less years to leave in their life expectancy. This bias has been widely criticized.

However, the general public show a preference towards the younger individuals in term of life-saving treatment, which would somehow reflect the bias produced by the QALY methodology. Studies conducted in Wales, Sweden, Holland and Japan have shown that society tend to accord priority to treatments favouring children and young adults over elderly people. Another study done in Australia found that higher preference to projects directed at younger patients where given for both life-extending and health improving treatments. However, the existing evidence does not give a clear answer whether society values treating the young more highly than treating the elderly for different reasons than the difference in life expectancy (Nord, 1999a: 57-61).

A study conducted over 721 individuals in Cardiff City chose to treat the younger patients for a life-threatening condition: 94% preferred to treat a 5 year-old rather than a 70 year-old (1% the opposite and 5% unanswered) and 80% preferred to treat a 35 year-old rather than a 60 year-old (7% the opposite and 13% unanswered). However, when choosing between a 2 year-old and a 8 year-old, the choice was for the older by a ratio of 5:3, with 46% unanswered (Lewis & Charny, 1989:29). The same kind of preference was found in a study conducted in the Netherlands among 30 students and 35 elderly people about transplantation for end-stage renal disease. Respondents found health in the early periods of life to be twice as important as in the last decade of life, except for the 5 year-old children. Health at age 35 had a utility somewhere between these two extremes. The fact that the responses of the elderly people showed remarkable resemblance to the students' responses suggests that the results reflect a general ethical standard (Busschbach, Hessing & de Charro, 1993).

Nevertheless, preferences can be differentiated according to the treatment type. Johri *et al.* (2004) investigated among the general US public whether the perceived importance of age (35 versus 65) in resource allocation decisions differs among intervention-types. For this, they used six types of interventions. They found out that the general public favoured young age groups for life-saving interventions as well as infertility treatment or organ transplantation, but showed no age preference for the palliative care. The difference between the scenarios was statistically significant. The intervention showing the least concern on age preference was in treating depression and for pain relief, i.e. the same importance in priority setting should be given to young and old when treating depression or pain.

Therefore, we could imagine that for interventions such as treating depression or relieving from pain, QALYs could be weighted inversely by age in such a way as to offset the age effect seen above.

Nevertheless, two tendencies go in the exact opposite direction and advocate for even greater discrimination against the elderly than what would be dictated by efficiency objectives, and thus would assign age-weights that would increase the QALY bias already described.

The first one is Williams, who has raised an interesting debate with his famous and controversial article in 1997 about the concept of a 'fair innings'. This concept reflects an equity concern which is society's aversion to lifetime health inequalities. His feeling is that everyone is entitled to some 'normal' span of health and that "anyone failing to achieve this has been cheated, whilst anyone getting more than this is 'living on borrowed time'". In short, he advocates that somebody like himself who had a "fair innings", i.e. had a good quality of life for a long time, "should not expect to have as much spent on a health improvement for them as would be spent to generate the same benefit for someone who is unlikely ever to attain what we have already enjoyed". This would – Williams argues – generate more intergenerational equity. Nord (2004:2) considers that this would

be a fair proposal only with respect to interventions aimed at gaining life years. He states that giving priority to young people over old people when it comes to functional improvements and symptom relief for non-fatal conditions would run "counter to both moral intuitions and official government guidelines in Norway and Sweden" (Ibid, 2005:262).

The second proposition on age-weighting comes from Murray and Lopez (1996) with the well-known Global Burden of Disease (GBD) assessment, in which individuals were receiving weights according to their expected economic, social and family (such as caring for children) contribution. The 20 to 50 years old individuals were receiving highest weights in their study, while the elderly and very young children were receiving the lowest weights. Le Grand (1996: 158) remarks that if those with dependents are given priority for treatment, other things being equal, the welfare of the community as a whole is likely to be raised. A review of 64 studies that report empirical data showed that there is a consensus for the idea that we should discriminate in favour of those with dependants (Dolan *et al.*, 2005:205). Even though these highest weights for 20 to 50 years old individuals were used only in a summary measure of the population health (the GBD) at that time, many authors criticized this approach, stating that it does not reflect societal concern for disadvantaged members of society. This approach was not used subsequently in the "development of WHO guidelines on generalized cost-effectiveness analysis" by Murray et al (2000) for reasons of transferability, as well as in any other equity weighting.

However, in view of what has been described earlier in Johri's *et al.* work (2004), both Williams and Murray & Lopez approaches would not reflect societal values, at least for some interventions such as treatment of depression or health interventions relieving from pain.

In general, different studies (Richardson, 1999; Johri *et al.*, 2004) conclude by stating that the application of age weights to utility measures such as QALY is premature and that ethical and empirical enquiry be conducted. *Deliberative weights* – as opposed to *spontaneous weights* – should be used, i.e. "weights that are constructed from the responses of people who have been encouraged to deliberate upon the issues and their implications" (Richardson, 1999:11).

4.1.3 Societal concern for severity and rule of rescue

A strong ethical concern not reflected within economic evaluations is that of severity and rule of rescue. As seen earlier, society tends to value more gains in favour of worse off people, i.e. patients having the lower without-intervention-initial-condition or life-threatening conditions. This is also reflected in the vertical equity (including the first three equity concepts seen earlier), i.e. those in greater need may be expected to receive more health care. In cost-utility analysis, the cost per QALY ratio obtained in treating a patient in life-threatening distress is relatively high (costly), as benefits are likely to be low – often deaths cannot be averted despite all efforts – and costs are comparably high. Consequently, severity and rule of rescue concerns are most of the time incompatible with the objective of health maximization and efficiency.

Hoel (2001:9-10) shows theoretically that the rule of cost-effectiveness is optimal only if people are risk neutral with respect to the number of live years they live. With risk aversion, the optimal allocation of health expenditures changes and:

- More resources should be allocated to health cases for which the expected outcomes – even after treatment – are worse than average.

- Under constant risk aversion, more resources should be allocated to cases for which the health outcome is more uncertain than average, unless the treatment increases this uncertainty.

Stolk *et al.* (2004) are using the concept of *proportional shortfall* in order to adjust valuations of QALYs with equity concern of severity and the 'fair innings' approach. They measured inequality through the ratio of QALYs that patients would loose without the intervention over the QALYs

that would remain in absence of the disease, considering their life expectancy. The application of this concept would result in the expansion of the resources for treatment of the worse-off patients. The authors note that this concept would still need some refinements - such as age weights, etc - in order to better reflect social preferences for the distribution of health care resources.

Conventional QALYs not measuring social value is due to the fact that their weights represent an aggregation of preferences and trade-offs that individuals hold for their own health. "That is, they [QALYs] represent the trade-offs among various living states and between living states and death that the individuals would want for themselves. In aggregating, all persons preferences are considered equal (…) and so the resulting QALY is equity neutral" (Drummond, 1997: 182). However, researchers have found that an approach using person trade-offs (PTO) and asking the general public how many patients of type A should be cured to be equivalent in social value to curing 10 patients of type B, the results do not match conventional QALYs, but reflect equity considerations such as *help the sicker people first*.

Nord (1999:32-38) and other authors conducted numerous studies in order to measure PTO for different degree of severity of illness. In order to simplify the questions, four classes of outcomes were set:

A. **Life saving**: saving a person's life and restoring him/her to a healthy one. In QALY, this would correspond to a value from 0 (death) to 1 (full health).

B. **Severe**: Curing a person with a severe problem, for instance, a person who has to sit in a wheelchair, has pain most of the time, and is unable to work.

C. **Considerable**: Curing a person with a considerable problem, for instance, a person who must use crutches to walk, has light pain intermittently, and is unable to work.

D. **Moderate**: Curing a person with a moderate problem, for instance, a person who has difficulty moving about outdoors and slight discomfort, but is able to do some work and has only minor difficulties at home.

Results by Nord (1999:38) from a PTO enquiries in Australia, England, Norway, Spain and the United States about future treatment capacity showed that the society would value curing 3 to 6 person in a B state for one person in a A state, i.e. were willing save one life at the price of three to six severely ill person not cured. The societal appreciation of life-saving (A) was also 10 to 15 times as high as that of class C outcomes, and 50 to 200 times as high as that of class D outcomes. Consequently, the general public would value curing a person in a moderate state of health (D) 1/50 to 1/200 of the value of saving person's life. The state D could then be assigned a societal utility gain of curing this person of 0.02 (=1/50) to 0.005 (=1/200) versus 1 for a life saving utility. From a rule of thumb, health state of a person with a moderate problem could then be roughly assigned a value of 0.98-0.995 (1 being in perfect health). Here below is a table of suggested values per degree of severity, compared to utilities that would be given to each of theses states through the York EuroQol TTO:

Degree of severity	Societal value	EuroQol TTO
Moderate problem	0.99	0.80
Considerable problem	0.92	0.45
Severe problem	0.75	0.20
Life-threatening condition	0.00	0.00

We can derive from this the QALY gain per year obtained by curing a person for each degree of severity through a simple (1-x) calculation:

Degree of severity	Societal value of QALYs	Standard value of QALYs
Moderate problem	0.01	0.20
Considerable problem	0.08	0.55
Severe problem	0.25	0.80
Life-threatening condition	1.00	1.00

We can conclude from the two types of utility above that societal values (first column) are far from the standard QALY gains (second column), which are calculated – as seen before – on the basis of individual utilities. However, standard QALYs would become roughly right if they were multiplied by fractions (weights) that would somehow reflect societal value of severity, which Nord did:

Degree of severity	Standard value of QALYs	x	Severity weights	=	Weighted QALYs
Moderate problem	0.20	x	1/20	=	0.01
Considerable problem	0.55	x	1/7	=	0.08
Severe problem	0.80	x	1/3	=	0.27
Life-threatening condition	1.00	x	1	=	1.00

We can see from above that it is technically possible to weight the standard QALY to obtain an outcome that would fit societal preferences for resource allocation. However, two problems would remain. First, this severity-weighting is not taking other equity concerns into consideration. Second, standard cost-utility analysis is somehow already complex, and to weight the standard value of QALYs would further complicate them. This would discourage even more policy-makers from using this technique in prioritizing interventions.

4.1.4 Societal concern for *capacity to benefit* or *potentials for health*

In cost-utility analysis, QALYs are being used as measures of capacity to benefit from health care and thus reflect all differences in that capacity among individuals. From a positive point of view, the QALY approach makes the problems of equity even more transparent and addressable, through emphasizing the differences in capacity to benefit. From the negative side, the QALY approach implies overly strong discrimination between patient groups in favour of those with the greater capacity to benefit.

The QALY approach – valuing health outcomes in terms of individual utilities – assumes that the societal value of an intervention is proportional to the size of the health improvement (utilitarian view). The ethical theory suggests that society gives equal priority to groups with different capacity to benefit or potential for health, meaning that disabled and chronically ill people should have the same opportunities and resource allocation (egalitarian view).

The results from a study in 1973 in New York City showed that graduate students and health leaders were considering saving the life of a no disabled person approximately equivalent to saving the lives of three people in wheelchairs unable to work. Recent studies fortunately suggest that the egalitarian-ethical views tend to be now the majority, particularly among women, older people,

those with less than college-level education, and members of parties to the left. Even, public opinion surveys in a number of industrialized countries show that – as long as the benefits are substantial – society does not wish to give strong priority to those with great capacity to benefit over those with a lesser capacity for the same severity of illness (Nord, 1999a:38-42).

A salient ethical problem has been identified in the literature concerning both QALYs and DALYs. Different authors (Nord, 1999b; Arnesen and Nord, 1999; Rock, 2000: 412-3) stress the fact that when gains in life years are concerned, the value of life extension in chronically ill or disabled people is smaller than the value of life extension in otherwise perfectly able-bodied person. It is in most people's eyes unethical and offensive, and in conflict with the idea of everybody having the same right to have their life protected. A proposed solution is to count each lost or *gained* life year as 1 irrespective of disability as long as life is preferred to being dead by the person concerned. This is already the case in the calculation of burden of disease and value of health outcomes in terms of DALYs/QALYs *lost*.

4.1.5 Practical difficulties

Dowie (2001) considers that there is no arithmetic difficulty in adapting the QALY concept to another system where QALYs would be weighted differently according to the potential beneficiaries' characteristics, such as age, sex, race, severity of disease, or even how many QALYs they have already enjoyed during their lifetime. However, as individuals have multiple characteristics, "the practical difficulty of achieving a coherent overall allocation will increase exponentially with the number of characteristics on which such differential weighting is sought and in the end these practical difficulties may rule out anything other than equal weights." (p. 7)

Another difficulty raised by Williams & Cookson (2000) is that individuals do not subscribe to just one *pure* theory of equity that would be applicable in all circumstances. They rather mix different concepts of equity as well as vary the chosen equity concept from one context to another. In addition to that, respondents are not used to these highly focused person trade-off (PTO) questions that economists tend to ask (such as *how many patients of type A should be cured to be equivalent in social value to curing 10 patients of type B*). Consequently, they may interpret the PTO questions in unpredicted ways and bring wider considerations that the economist wanted to set aside. "The great challenge is to bridge the gap between the economic requirement to estimate precisely targeted equity-efficiency trade-offs, and the psychological capabilities of respondents to think about equity and efficiency in such a tightly defined manner." (p. 1905). More recommendations for research to overcome this difficulty will be given in chapter 5.

4.2 COST-VALUE ANALYSIS

In order to overcome the lack of societal concern about fairness encountered in the QALY approach, Nord *et al.* (1999) proposed a model that they would call "cost-value analysis". In a separate publication, Nord (1999) specifies that this model was primarily designed "as an aid to reflection about setting priorities across a wide range of health interventions that compete for scarce resources in public and private health insurance plans" (p. 141).

This points again to the rough table seen earlier, where the first column shows societal valuations modelled from international studies using person trade-off (PTO). The second column still shows utilities assigned through the York EuroQol TTO tariff for each degree of severity.

Degree of severity	Societal value of QALYs	Standard value of QALYs
Moderate problem	0.01	0.20
Considerable problem	0.08	0.55
Severe problem	0.25	0.80
Life-threatening condition	1.00	1.00

Nord et al's new proposal is thus to compress mild and moderate states of illness to the upper end of the 0-1 value scale. As we can see, this proposal differs considerably from the traditional QALYs.

The table 4.1 shows in a more detailed way *values* – which are not *utilities* – representing societal preferences. The purpose is that *severity* of illness receives much greater weight, and at the same time groups with lesser *potentials for health* would be significantly less discriminated.

This model also allows chronically-ill and disabled people to receive the same number of QALYs that healthy people would receive for any life-extending program, as seen earlier about *potential for health*.

Table 4.1: Values for different levels of severity of illness, adapted from Nord (1999:119)

Level	Examples	Value
1. Healthy		1.00
2. Slight problem	Can move about anywhere but has difficulties walking more than a kilometre	0.9999
3. Moderate problem	Can move about without difficulties at home but has difficulties on stairs and outdoors	0.99
4. Considerable problem	Moves about with difficulty at home; needs assistance on stairs and outdoors	0.92
5. Severe problem	Can sit. Needs help to move about – both at home and outdoors	0.80
6. Very severe problem	To some degree bedridden; can sit in a chair part of the day if helped by others	0.65
7. Completely disabled	Permanently bedridden	0.40
8. Dead		0.00

In order to encapsulate these two concerns for fairness (*severity* and *potential for health*) and to better the difference between utility and value, Nord *et al.* (1999:32-3) propose a simple multiplicative model:

SV = dU x SW x PW

where SV stands for societal value, dU represents the utility gain ($U_2 - U_1$, i.e. after – before treatment utilities), SW is a weight determined by the severity of the initial condition and PW is a weight determined by the potential for health.

We will not go through all tables and calculations proposed for the two weights. However, this model might help us to understand better how this model defers from the traditional QALY one. The first step is very similar to the QALY approach, as it consists of measuring the severity of different health states in terms of utility (U_1 and U_2) that will allow us to estimate the utility gains (dU) associated with different health interventions. One difference is – as Nord (1999) states – that: "these data should be elicited from patients who actually are – or were – in those states rather than by asking samples of the general population to imagine themselves in different states of illness". The second step is to assign weights to these different utility gains, such as described before. The difference here with the traditional QALY approach, is that *person trade-off* is used to measure *distributive* preferences in the general population to estimate *societal* value.

There are a number of problems with the cost-value approach. However, cost-value analysis could effectively help decision makers in their priority setting process after more empirical research is conducted, resulting in the production of a more sophisticated table of value than the one proposed by Nord *et al.* (see table 4.1), but still including a strong upper end compression. This table of value can be considered as the main input from Nord *et al.*, and is an important step forward comparing to the earlier propositions under the "equity weighted utility gains" review in the previous section 4.1.

In 2003, Østerdal pointed out some difficulties in this cost-value analysis approach. He stated that using the societal value proposed would give unappealing and less intuitive social orderings of health care allocations. In addition to that, he felt that the combined effects of the severity- and potential weights are difficult to see through (pp. 248-9). In reply to this, Nord *et al.* (2003:252) conceded that it may be seen as unfortunate to try to encapsulate several different determinants of value in one single set of numbers. It might be preferable to make the nature and the extent of the efficiency-equity trade-off explicit by adopting a decomposed approach, in which separate equity weights (here severity- and potential weights) are introduced for distributive concerns. The authors concluded by stating:

> "Models are also simplifications. The interesting question is not whether proposed new valuation models are flawless, but whether they: (a) are improvements over existing models; and (b) sufficiently accurate to be perceived as useful by people engaged in discourse and decisions about resource allocation. We feel confident that the various approaches outlined above to incorporating concerns for fairness in economic evaluation are significant improvements over the conventional QALY model. But we agree with Østerdal that more research into cost-value analysis, including its usefulness to decision makers, is desirable" (ibid, 2003:253)

Finally, we can say that the *cost-value analysis* approach is not perfect and much work remains to be done to refine this model. The authors admit it and in fact list eight concerns to be addressed in future research in the discussion part of their article (Nord et al, 1999). But the authors hope that decision makers will find the model – as the work progresses – each time more useful, and that it will allow them to guide their reflection in their priority setting activities.

4.3 FRAMEWORKS FOR EQUITABLE ALLOCATION DECISIONS

Seven tools or frameworks which incorporate equity criteria when setting priorities are described or listed below.

4.3.1 Decision tree for public resource allocation to health care

The first tool, from Musgrove (1999), is a decision tree to guide policy-makers in the choice of health services to spend public money on. The author reviews nine different criteria based on:

- Economic efficiency (public goods, externalities, catastrophic cost, cost-effectiveness)
- Ethical reasons (poverty, horizontal and vertical equity, rule of rescue)
- Political considerations (demands by the populace)

The first three ethical reasons are not included in the decision tree below, as they involve explicit comparisons among people and among services (see also chapter 3.2.1. and 3.2.3.). Each remaining criterion has to be treated in the appropriate sequence as follows:

Figure 4.2: Decision tree for public resource allocation to health care
Source: Musgrove (1999), p. 220
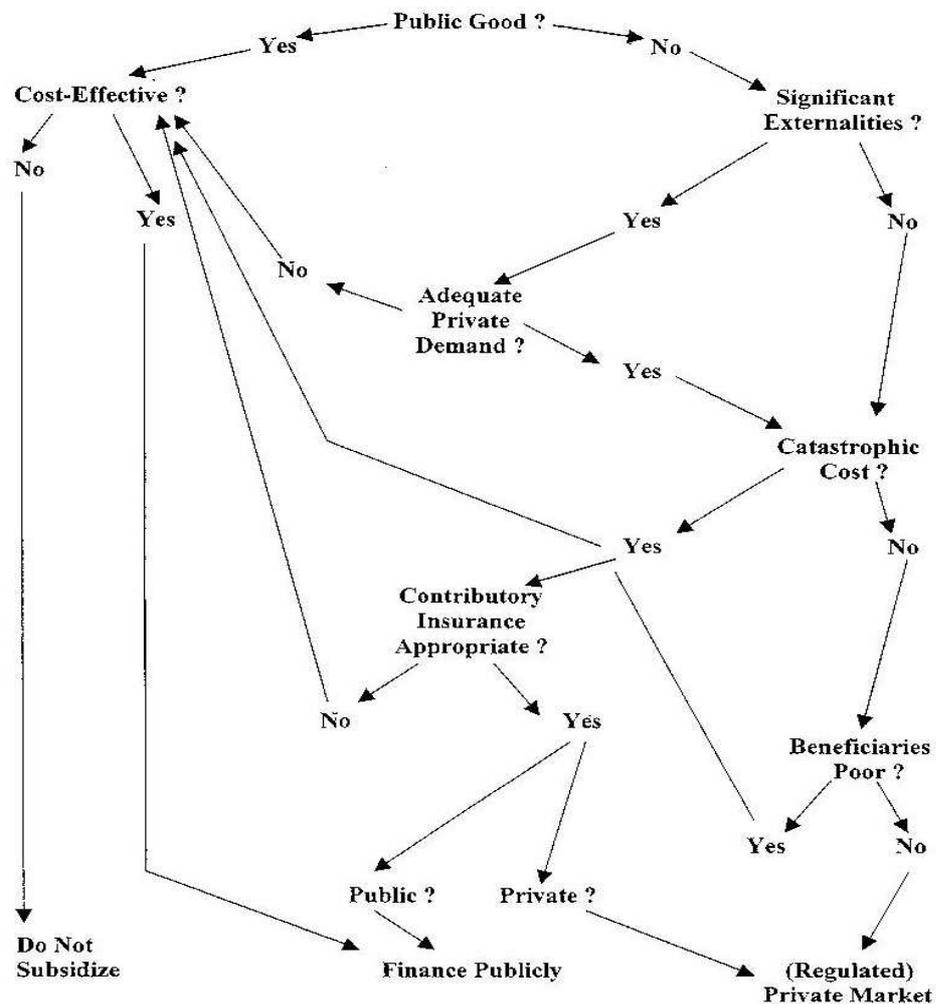
Therefore, when deciding which health services to spend public money on, cost-effectiveness is the decisive criteria in only one case; when the health service can be considered as a public or semi-public good. When this is not the case, all nine criteria have to be considered and treated in the proper sequence, taking into account whether they are consistent or in conflict. The other scenarios justifying public spending are: when there are significant externalities, inadequate demand and the intervention is cost-effective; for catastrophically costly care, when contributory insurance will not work effectively or there are good reasons to finance insurance publicly; and for cost-effective interventions which disproportionately benefit the poor. The author concludes by stating that "interventions which do not pass these tests either are not worth paying for at all, or they can be left to regulated private markets to finance because the costs are bearable without insurance, or private contributory insurance is feasible" (p. 222).

Note that the article does not provide a clear definition of public good. However, it is argued that an intervention does not qualify as a pure public good if private purchasers are willing to pay for it. As from Begg, Fischer & Dornbusch (2000), "a public good, even if consumed by one person, can still be consumed by other people. (…) In fact, for a *pure public good* we must all necessarily consume the same quantity, namely, whatever quantity is supplied in the aggregate." (pp. 281-2). We can assume that what Musgrove contends is that private purchasers would not pay for something which should be or is already provided to everybody through public funds.

4.3.2 Use of prioritization score of health interventions

The second tool is proposed by James *et al.* (2004; 2005), and consists in the use of prioritization scores assigned to different health interventions and taking into consideration different categories of criteria. It is a simple framework that combines both weighting of efficiency and equity criteria (in percentage according to the value attached to each criteria), and the score of a particular intervention to fulfil each of these criteria (ranging from 0 to 1).

The prioritization score of a health intervention A (PRS_A) is defined by:

$$PRS_A = \alpha \text{ [Equity]} + (1-\alpha) \text{ [Efficiency]}$$

where the efficiency score is ranging from 0 to 1 depending on the cost-effectiveness of the intervention and

$$\text{Equity} = \beta \text{ [severe health conditions]} + (1-\beta) \text{ [poverty reduction]}$$

where α and β are weights attached to each different scores.

The authors provide some illustrative comparisons between interventions. One of them is for example the treatment of multi-drug resistant TB. This intervention is cost-effective and thus can be assigned a score of 0.5 – in-between not cost-effective and very cost-effective. The severity score of this health condition is 1 (very severe) and the poverty reduction score is 1 (positive).

If a *pure efficiency* rating is chosen, then $\alpha = 0$ and the PRS of this intervention is **0.5**.

In comparison, a situation where *equal weights for efficiency and equity* are given and both severity and poverty criteria are also given equal weights, the efficiency criteria would be weighted 50%, severe health conditions 25% and poverty reduction 25%. Consequently, $\alpha = \beta = 0.5$ and
PRS = 0.5 [0.5 (1) + 0.5 (1)] + 0.5 (0.5) = 0.5 + 0.25 = **0.75**.

In conclusion, the treatment of multi-drug resistant TB may not be included in a basic or essential package of health services if the prioritization decision is based only on efficiency criteria (PSA = 0.5) but will more probably be included if the decision is also based on equity criteria (PSA = 0.75). [16]

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[16]   For further details and illustration, see James *et al.* (2004; 2005).

4.3.3 Log scale cost-effectiveness highlighting five equity criteria

The log scale below in figure 4.3. was proposed by James *et al.* (2003) in an earlier draft and that – as far as I know – was not published. It is a very practical visual tool for policy-makers to prioritize among interventions in an explicit manner. Each point represents a different health intervention. All points on the line drawn obliquely at the south-east extreme, i.e. the bottom line, have the same cost-effectiveness ratio, such as one international $ per DALY gained, for example. The interventions chosen below are respecting horizontal equity (targeting rural populations), vertical equity (targeting the poor), and other equity concerns.

Figure 4.3.: Log scale cost-effectiveness highlighting five equity criteria
Source: James *et al.* (2003), p. 11
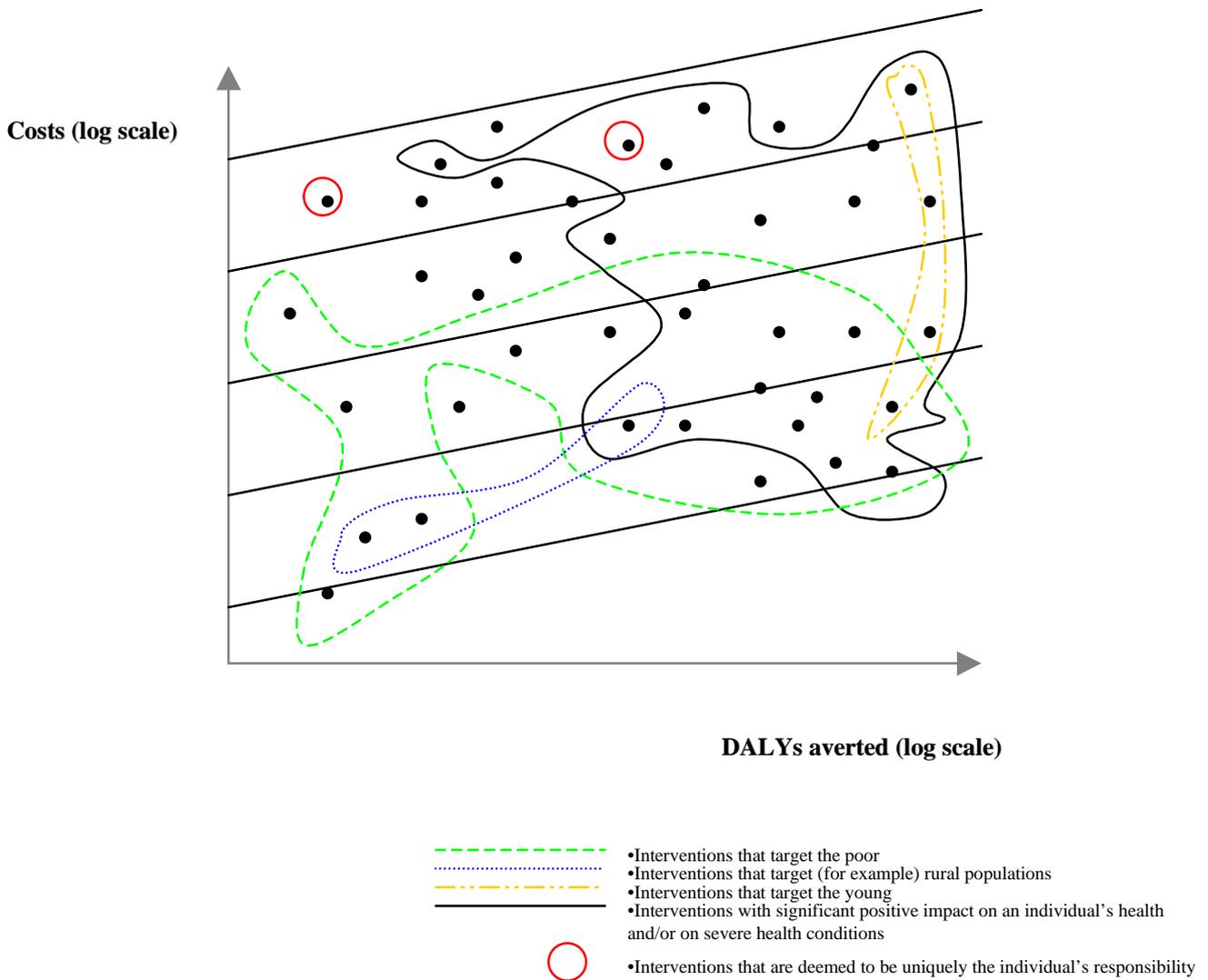
4.3.4 Programme budgeting and marginal analysis (PBMA)

A third tool that can be used in priority setting while responding to objectives related to both efficiency and equity is the **programme budgeting and marginal analysis** (PBMA), which has been used internationally in health contexts since early 1990s. It consists in an eight steps process (see box 1) that helps decision-makers to maximize the impact of health care resources on the health needs of a *local* population. The programme budgeting part of this framework consists in an appraisal of the past resource allocations in specified programmes. It may be client-group-base (e.g. the elderly, people with mental health problems, etc) or disease-group-based (e.g. cancer, cardiovascular disease, etc.). The marginal analysis part is an appraisal of incremental costs and benefits of a proposed investment, especially from shifting resources from one area to another. As Robinson states, "an essential feature of the approach is the focus on expenditures at the margin (i.e. marginal met need and marginal unmet need), with a view to determining priorities for increased and reduced expenditure." (p. 18) Consequently, it is still – such as economic evaluations of health interventions – based on underlying economic principles, but in addition to this, its practical application leads to a more pragmatic approach.

> **Box 4.1: PBMA in eight steps**
> Source: Brambleby & Fordham, 2003, p. 4
>
> 1. Choose a set of meaningful programmes.
> 2. Identify current activity and expenditure in those programmes.
> 3. Think of improvements.
> 4. Weigh up incremental costs and incremental benefits and prioritize a list.
> 5. Consult widely.
> 6. Decide on changes.
> 7. Effect the changes.
> 8. Evaluate progress.

Here are some **advantages** of this PBMA process:

- It can inform decisions in a *timely* manner (Mitton & Donaldson, 2003). Generalized cost-effectiveness analysis is often a long process that delays the availability of results.
- Instead of seeing investment on the level of a hospital or drug budget, the focus is on specific health *objectives*, such as improving indicators of child health, etc. (Brambleby & Fordham, 2003). We can safely deduct that it can be used to fulfil equity objectives.
- The emphasis is placed upon *locally* defined measures of expected health gains when determining priorities, rather than upon data extracted from cost per QALY league tables generated elsewhere (Robinson, 1999:18).
- As per Mitton & Donalson (2004), PBMA provides an *explicit* mechanism for operalizing the economic principles of opportunity cost and the *margin*,
- it helps to ensure a *transparent* priority setting process,
- it allows for *stakeholder* consultation and *public* input[17].

Nevertheless, Robinson (1999:19) notes three possible **weaknesses** in the PBMA:

- First, there can be some problem of *information overload* facing decision-makers. Even with the organizing framework offered by the PBMA, it is difficult to absorb and process the wide range of information associated with a large and diverse set of options.
- Second, data on costs and effectiveness might not always be *available*. Important additional work may be needed.
- Third, decision-makers in the public sector need to balance *multiple objectives*. Political considerations, managerial objectives, professional interests and public opinion all play an important part in the final outcomes.

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[17] Note that there is some divergence of opinion among authors regarding the consequences of public involvement in setting priorities. Robinson (1999:22) reports that as per some literature the public participation would be inherently inegalitarian. However, from other studies, the public appears to rank other criteria – such as equity – above that of allocative efficiency, and favours the "rule of rescue" and equality of lifetime opportunity for health ("fair innings") when making decisions regarding priorities, as we already saw from Nord (1999) and Williams (1997) respectively.

4.3.5 The Health-Sector-Wide Disease-Based Model

This model was developed in 1993 and has many similarities with the PBMA technique, particularly in the fact that the research question is structured by health problem rather than health delivery setting and that a marginal perspective is adopted. It defers from PBMA in the sense that it can also be used at national level (rather than just locally) and that it ensures a focus on resource allocation between disease stages.

All interventions and its related cost-effectiveness ratios are grouped by stage of disease and population target, accordingly:

4. Primary prevention: population at risk

5. Early identification: persons with undiagnosed disease

6. Disease management/ prevention of complications: persons with established disease

7. Treatment of end stage disease, palliative care: persons with advanced disease

The advantage is that marginal costs and marginal benefits can be compared between interventions within and across different stages.

Segal & Chen (2001) state that the model provides a mechanism to incorporate equity and societal objectives into the priority setting process. This occurs first in the description of benefit, which has to incorporate equity and access to the subgroups (p. 20). Second, the process for developing recommendations for resource shifts is designed to ensure the explicit consideration of equity/distributional effects of the 'efficient solution' on population subgroups. "Where there is no agreed understanding of the communities objectives in relation to health, exploration of these matters is desirable, possibly as a separate but complementary research program" (p. 22).

4.3.6 Other tools

During the fourth Forum of National Ethics Councils in 2004, Van der Wilt (2005:27-8) shared his experience about a procedure called **participatory planning.** It consists in involving the public and trying, through focus groups, to assess the value of certain novel programs. "It is meant to be used in situations of conflicting uses, scarce resources, and conflicting interests of parties with their own ideas of how best to use those limited resources. And, what is crucial, it is aimed at discovering what is really wanted, creating new preferences that better reflect needs and values, and developing new values."

This method was for example used by his team in assessing cochlear implants for congenitally deaf children. It revealed that an important concern from parents was whether sign-language and oral communication actually compete or whether they reinforce each other. At that time, cochlear implants were evaluated by assessing to what extent children were using sign-language to a *lesser* extent. Whereas many parents of children who got an implant could tell you that upon having this implant, children would start signing more. This could be explained from experience with bilingualism, as learning one language may reinforce or facilitate learning another language. So the participatory planning showed important values that had not yet been assessed.

Another tool, presented in 2003 by Coyle, Buxton & O'Brien is the **"net benefit framework"**. This is a more theoretical method that permits consideration – among other things – of net benefit loss associated with incorporation of equity concerns. It is based on the fact that health care players often limit the reimbursement of therapies to a restrictive sub-group of patients on the basis of mere cost-effectiveness. This net benefit framework allows decision makers to focus on a more

explicit value judgment, i.e. whether the opportunity cost of equitable access is justified[18].

Finally, Schneider (2001) estimates that, even though the DALY methodology has been widely criticized, **national Burden of Disease studies** could be used to estimate the burden experienced by the poor by stratifying data.

4.3.7 Selected experiences

Examining some international experiences in priority setting of health services can be sometime illuminating. It particularly shows us how much this process can sometimes be a learning exercise in which policy-makers tried out a range of methods and approaches, adjusting course several times in the process (Ham, 1997:63). Three interesting regional or national experiences are reported below, by decreasing order of emphasis on equity concerns.

The Parliamentary Priorities Commission of **Sweden** has set out in 1995 an explicit ethical platform to inform priority setting. Three principles were identified and ranked in descending order of importance, as such (ibid.:59):

- The principle of human dignity: all people are equal in dignity, regardless of personal characteristics and functions in society.

- The principle of need and solidarity: resources should be committed to the person or activity most in need of them.

- The principle of cost-efficiency: when choosing between different fields of activity or measures, a reasonable relation between cost and effect, measured in improved health and improved quality of life, should be aimed for.

We can remark that the second point is explicitly dealing with vertical equity. In addition, the Commission rejected a principle of allocating resources where the greatest health benefit could be secured. As the ethical theory suggests that society gives equal priority to groups with different capacity to benefit, we can safely say that this goes along with equity criteria. Ham (1997:159) reports that this approach would normally not allow discrimination on age, birth weight, lifestyle or whether illnesses were self-inflicted. Only if the third (efficiency) principle was to be applied, patient characteristics could be used to determine priorities for treatment.

The state of **Oregon** developed a unique approach to determining the list of interventions available for Medicaid eligible. It first set a list of priorities using a league table of interventions but this had to be abandoned because of criticisms due mainly to inaccuracies and methodological problems. A new list was created, based on a more subjective approach including:

- Public consultation: 47 community meetings were organized by the Health Services Commission of Oregon to determine the values that are considered to be important in priority setting, such as "prevention", "equity", effectiveness of treatment", "benefits many", "personal responsibility", "community compassion", etc.

- The Commission's own judgement: the commission created 17 major categories of services and ranked these categories according to the values prioritized through public consultation.

- Research evidence: the 17 categories were ranked by their cost-effectiveness ratios. In a final step, the commission rearranged the ranking of the 17 categories according to their own values.

The top 9 categories were identified as essential services. They consist in the services that preserve life (treatment for fatal conditions), maternity care, preventive care for children and adults,

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[18] For more information, see Coyle, Buxton & O'Brien (2003), where this framework is entirely described.

reproductive services, and comfort care for the terminally ill. [19]

Note that this prioritization respects equity principles which are; allocation according to need; *maximin*; and rule of rescue. Preventive care can be associated with equity principles as well, in the sense that the major risk factors to health occur more commonly in the poor, who typically have less autonomy and fewer resources to reduce risks. Indeed, the World Health Report 2002 (WHO:165) states that reducing major risks has the potential to substantially reduce inequalities worldwide, as changes are likely to be greatest in the poor[20].

New Zealand conducted a priority-setting exercise with the aim to reducing their problem of long waiting lists for elective surgery and to making the priority-process more transparent and consistent across hospitals. Priority for surgery was generally be given to the patients who were most likely to benefit, thus following efficiency consideration. Following the exercise, several social and equity factors were incorporated in the priority criteria. The most important were the patient's age, work status, family responsibility, threat of the loss of their own independence, and time already spent on the waiting list (Hauck, Smith & Goddard, 2003:19).

Low- and middle-income countries are experiencing different patterns in setting priority criteria. James *et al.* (2004:15) point out that country specific basic or essential packages have been specified in some of those countries, but not all of them have in practice implemented such packages.

Two major institutions have come with recommendations for a basic or essential package of services. The first one is the World Bank in its World Development Report 1993, who valued basic packages for low-income countries at 26 International Dollars (I$) and for middle-income countries at 40 I$. Recommendation was given that health services with low cost-effectiveness should be excluded from this package in low-income countries. Such services include heart surgery; treatment – other than pain relief – of highly fatal cancers; intensive care for severely premature babies, expensive HIV drug therapy, etc.

The second one comes from the WHO Commission on Macroeconomics and Health (2001), with a package of about USD 34 per person per year. Each country would need to define an overall programme of 'essential interventions' to be guaranteed through universal coverage. The criteria suggested in choosing these essential interventions were (p. 10) :
(1) they should be technically efficacious and can be delivered successfully;
(2) the targeted diseases should impose a heavy burden on society, taking into account individual illness as well as social spillovers (such as epidemics and adverse economic effects);
(3) social benefits should exceed costs of the interventions (with benefits including life-years saved and spillovers such as fewer orphans or faster economic growth); and
(4) the needs of the poor should be stressed.
These criteria are mainly efficacy, efficiency and equity based on economic status. Key interventions identified by Group 5 of the Commission on Macroeconomics and Health (2002) were skilled birth attendance and focused antenatal care; vaccination services; improved case management of childhood disease; as well as interventions focusing on malaria, tuberculosis, smoking, and HIV/AIDS.

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[19] For more information, Ham (1997) and Hauck, Smith & Goddard (2003:18)

[20] As per WHO (2002:xiii), "The ten leading risk factors globally are: *underweight; unsafe sex; high blood pressure; tobacco consumption; alcohol consumption; unsafe water, sanitation and hygiene; iron deficiency; indoor smoke from solid fuels; high cholesterol* and *obesity*. Together, these account for more than one-third of all deaths worldwide.

5. RECOMMENDATIONS FOR FUTURE RESEARCH

Priorities for future research on the equity-efficiency trade-off for resource allocation in health should be set based on identification of the most important gaps in current knowledge. Recommendations emerging from the literature will be considered here, which leads us to recommend an agenda for research in the following areas: who should establish priority values; how should research be conducted (methodological concerns); the need of empirical research to define the equity criteria and equity weights to be taken into consideration; what set of tools would be the most practical for the appropriate use by policy-makers; and – last but not least – who should conduct the research recommended.

5.1 AGREE ON STAKEHOLDERS TO ESTABLISH PRIORITY VALUES

Robinson (1999:20) notes that district health authorities are faced with numerous constituencies when setting health priorities: public opinion can be seen as a "bottom-up consultation", experts and specialists are providing "professional opinions", researchers establish "research-based evidence" and central and regional governments set "top-down priorities". In the same way, when analysts try to establish weights to be assigned to each criterion, the choice of respondents (politicians, ordinary citizens, professionals) would influence the results of empirical studies (Lindholm *et al.*, 1996: 214). Ham (1997:64) states that both public and experts need to be involved for priority-setting to have legitimacy.

When valuing health gains from an intervention (in QALYs or other health outcome indicators), as well as for the valuation of the severity of health conditions – as an equity principle, results would depend on whether the condition has already been experienced or is only feared. As seen earlier in chapter 2.2.1, this is due to the fact that those who never experienced the condition at stake (e.g. paraplegia) only focus on the transitional losses and the fear associated with the change of health, ignoring the adaptation process. Consequently, health economic valuation techniques usually used (EuroQol 5D, for example) give priority to states that people fear most. Dolan (2005:13-19) moves towards the position that we should rather give greater priority to health states that people *experience* (in opposition to *fear*) as being worse, by having *patients* valuing health states. At the same time, he advises to collect more data on how the *general public* value a wide range of efficiency and equity trade-offs.

Still, there is some divergence of opinion among authors regarding the consequences of public involvement in setting priorities. Robinson (1999:22) reports that – as per some literature – the public participation would be inherently inegalitarian. However, from other studies (Nord, 1999; Williams, 1997), the public ranks some equity criteria above allocative efficiency, favouring among others the "rule of rescue" and equality of lifetime opportunity for health ("fair innings"). For the WHO Task Force on Health System Research Priorities for Equity in Health, the degree to which non-elite groups can influence political decision-making over the allocation of resources for health will impact on the possibility for equity values to be realized (WHO, 2004:8-10). In any case, more research is needed on the consequences of public involvement in priority-setting.

5.2 IMPROVE RESEARCH METHODOLOGIES

Different gaps in research methodologies have been stressed. The first ones concern issues arising when trying to **define societal values**:

- Research into the objectives of the health sector as defined by the community is required (Segal & Chen, 2001:17), as well as a consensus on the definition of health care *need*. As seen in chapter 3.3 on Measures of inequities, the fact that there has been little analysis of vertical equity in use of health care can be explained by the fact that we would need to use *need variables*, requiring value judgments. However, such studies are needed, as they would help policy-makers to formulate policies allowing for vertical equity. In the same way, differences in the use of health care have to be addressed only on the basis of *un*acceptable reasons, such as difference in income or information. A consensus is required in defining the reasons for acceptable variations in the use of health care (Oliver & Mossialos, 2004:657-8).

- Dolan *et al.* (2005:205) report that there seems to be a diminishing marginal social value associated with changes in quality of life and length of life. However, this needs to be controlled for the possibility that people's preference may have been contaminated by the belief that there is a decreasing marginal value to incremental health benefits, as well as a diminishing marginal utility of life years (and possibly even by positive time preference).

- In order to obtain unbiased measures of societal values with regard to equity, it is important to overcome the difficulties encountered in questionnaires and due to the limited capabilities of respondents to think about equity and efficiency in a tightly defined manner. Williams & Cookson (2000:1905) mention the need for more sophisticated methods for eliciting preferences by combining questionnaires with in-depth group discussions. This has the advantages of allowing respondents to have more time to digest and to reflect upon the questions. In addition, researchers would be able to gather qualitative evidence about how respondents have interpreted the questions. It is important to note that in developing countries, focus group discussion alone is often the most efficient method for eliciting preferences[21].

Central to research is the need to consider the characteristics of specific **subgroups** in order to assess the distributional impact of health interventions. This is rather a 'positive' approach, as opposed to a 'normative' one, i.e. one in which the analyst does not introduce his/her own norms in the analysis. Many authors state that researchers who undertake economic evaluations should systematically collect and report information on the characteristics of the populations benefiting from the health interventions appraised. This would allow them – when analysing the results – to disaggregate the information on the effects and the cost-effectiveness of the interventions into different subgroups (Sassi, Archard & Le Grand, 2001:70; Williams & Cookson, 2000:1907). This has also been referred to by Bobadilla (1998:44), who stresses the need for marginal cost-effectiveness of interventions provided at different scales and intended for delivery in different settings, such as rural communities. Culyer (2001:282) goes further, stating that research into the actual distributions of health should be performed in advance of policy initiatives and routinely performed for key groups, in order to monitor distributional changes over time and their likely determinants. However, measuring effectiveness for the same intervention in different settings is expensive and involves complex research designs, which would explain the lack of information on marginal cost-effectiveness.

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[21] Considerations based on personal discussions with Dr Guy Carrin during the defence of this thesis.

5.3 ESTABLISH A SET OF VALUES THROUGH EMPIRICAL STUDIES

Many authors conclude their work by recommending that empirical investigations should be done that would help establishing an explicit set of values to be used in priority-setting. This set of values would include the type of equity criteria to be taken into consideration, as well as the weights to be assigned to efficiency and equity criteria (Ham, 1997:64; James *et al.*, 2004: 17). For example, Nord *et al.* (1999:36-7) focused their cost-value analysis on two particular aspects of equity in addition to the efficiency criterion: the concern for severity and the concern for realization of potential. However, they noticed an aversion to inequality in health outcomes, which is one of the equity concept described above (see 3.2.4. on Egalitarism) and recommend that further research be done on the strength of aversion to inequalities in end states, in order to potentially address this factor in their modeling.

A set of value among non-health factors is also needed. We saw that age and (dis)ability are often the only factors which are receiving attention in the literature on equity weighting. Even in non-biomedical health research in general, the current focus is on individual risk factors, without much consideration of the social context that impact on risk factors. Whether social exclusion occurring from other factors such as gender, ethnicity/racial, social class, religion or geographical location (urban/rural) should be weighted still needs to be considered. In a certain way, these factors may already be taken into consideration in the severity factor, as socially excluded individuals tend to experience higher severity health status and would thus be compensated through the severity-weighting process. However, this concern deserves further research.

In addition, the fact that both age and fair innings (incorporating concerns for past suffering) have been taken into consideration in the literature on equity weighting does not mean that there is ethical theory or enough empirical evidence to suggest the strengths of such concerns. In fact, different studies (Johri *et al.*, 2004; Nord, 2005; Richardson, 1999) conclude by stating that the application of age weights to utility measures such as QALY is premature and that ethical and empirical enquiry be conducted in order to determine weights that are constructed from the responses of people who have been encouraged to deliberate upon the issues and their implications. This would involve performing some public surveys that would examine the shape of an age weighting function and this for a wide variety of interventions types.

Finally, establishing criteria for inclusion in equity concerns and weights to be assigned to each criteria would request to differentiate among attitudes between countries due to variations in political and cultural traditions. Consequently, extrapolation of results to other settings would be probably questionable (Lindholm *et al.*, 1996:214), requesting differentiated empirical studies.

5.4 MAKE PRACTICAL TOOLS AVAILABLE FOR POLICY-MAKERS

We have seen that the three main trends arising in the health economic literature and concerning the necessity to incorporate equity concerns in the priority setting process are: equity weighted utility gains; cost-value analysis; and different frameworks allowing the use of clearly specified criteria.

As Murray and Lopez (2000:79) state, an important area that will require further reflection and discourse is whether distributional/equity values should be directly incorporated into the estimation of the benefits of health interventions or be kept as a separate component of the evaluation of health interventions. Schneider (2001) recommends that DALYs should be valued higher when gained by disadvantaged groups, which would encourage measures to improve equity. Nord *et al.* (1999:37) notes that health state values with strong upper end compression – as in the cost-value

analysis model – is easier to use when calculating equity weighted QALYs.

However, modelling society's valuation in numerical terms - such as equity weighted utility gains or cost-value analysis – may not be felt as really helpful in practice by analysts, health planners and policy-makers, as these tools are much less explicit with respect to the efficiency-equity trade-off. Such numerical approaches are "inherently reductionist" and "linguistically alienating to people", especially those who do not like numbers (Nord, 1999c:6). Empirical research should examine which tool(s) would be more attractive to potential users.

5.5 MULTIDISCIPLINARY RESEARCH IS NEEDED TO SUPPORT A MULTISECTORAL POLICY APPROACH

The prioritized research agenda described above includes both theoretical and empirical work. It should be an interdisciplinary task where economists would get to grips with both philosophical concepts and social categorizations (Wiliams, 1997:128). Many constituencies should be involved in such research programmes: policy and statistical branches of government, researchers, health care providers, health care users, carers and the public at large (Culyer, 2001:282).

The practical "real-world" constraints – such as majority rule voting, lobbying, donor constraints, bureaucratic issues, etc. – which policy-makers are forced to face when trying to implement equity and efficiency trade-offs in allocation policies remain a major issue and deserve more scrutiny. Such an agenda cannot be fulfilled without multidisciplinary alliances. Robinson (1999:23-4) notes that some economists may complain that devoting greater attention to the real-world context in which priority setting decisions actually take place is not their area of expertise, but rather belong to political science and related disciplines. The author stresses that in any case health economics - outside the USA - is already a sub-discipline that has been closely involved with medical researchers and psychologists. Research on priority-setting in health would simply mean a different set of multi-disciplinary alliances, including a more general focus on the incentives and constraints governing the use of economic data. Williams & Cookson (2000:1907) add that health economists should use methods from psychology, sociology and philosophy in order to derive context-specific equity weights that could then be applied by policy analysts to efficiency data. Health economist may in the future succeed where others have failed in measuring equity-efficiency trade-offs. Therefore, not only should all partners be involved from the outset in the priority-setting process, but the economists' analysis should also be sought and taken into account.

6. CONCLUSION

This literature review has shown the decisive need of further research in order to determine a set of tools that would prove to be the most practical for an appropriate use by policy-makers, allowing policy actors to design more group-specific measures without losing too much efficiency. Not only would this promote both equity and efficiency in the allocation of scarce resources for health, but it would force policy-makers to define and use *explicit* criteria and objectives for priority-setting. Practicality of tools is thus one of the main conditions in order for research to impact on both policy and practice.

This work has reviewed methods and tools taking both equity and efficiency into consideration in the priority-setting process and reached the conclusion that more theoretical and, above all, empirical research is needed. Recommendations for further research in the area include the need for an increase involvement of the general public and health care providers in establishing priority values, both in prioritizing among different equity criteria and in assigning equity weights. In order to do so, researchers need to take into consideration some important methodological issues. These include, among others, more sophisticated methods for eliciting societal values and preferences, and the necessity to reach a consensus on the definition of health care *need*.

Note that among the tools and selected experiences reviewed, a major equity concern appeared to be the inclusion of interventions that benefit the poor. This is easily understandable, as the poor still suffer a large reducible burden, with the poor suffering more from communicable diseases and from premature mortality. As the poor also suffer from many health problems which do not have cost-effective solutions and as there is now strong evidence that the major determinant of health in poor countries is indeed poverty, policies aimed at benefiting the poor are a priority.

Therefore, further important recommendations on methodological issues are based on the need for *subgroups* to beneficiate from special consideration in research. This would enable assessing the distributional impact of health interventions. Furthermore, differentiated empirical studies are required to account for local circumstances and constraints – including political and cultural demands – that impact on priority-setting.

Nevertheless, another area of research that is of paramount importance is a thorough analysis of practical "real-world" constraints – such as majority rule voting, lobbying, donor constraints, bureaucratic issues, etc. – that policy-makers are facing when trying to implement equity and efficiency trade-offs. Such issues were not included within the objectives of this paper, but remain a key concern for allowing practical tools to be used by decision-makers.

Such findings challenge the traditional view of economists and highlight the need for multi- and cross-disciplinary alliances in research. Overall, this paper provides both researchers and policy actors with a wide and challenging research agenda for equity and efficiency in priority-setting.

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