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Debate

Castigating QALYs

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Author's abstract

The ethical problem of how to apportion limited resources amongst the needy has been forced on us by arbitrary limitation of health expenditure. Its solution would not be required if health expenditure were higher. Distribution of resources according to best value for money, assessed as Quality Adjusted Life Years (QALYs) per unit cost, has been suggested as a possible solution, but leads to absurd anomalies. In the calculation of QALYs the implied value of life is no more than the absence of suffering. The use of QALYs for the comparison of treatments that are symptomatic or life-saving therefore leads to serious undervaluation of life and treatments that prolong it.

Moreover, distribution of resources by best value for money, however assessed, is inequitable since for a given degree of suffering those whose illnesses happen to be cheaper to treat will be treated in preference to those whose treatments are more expensive.

The past few years have seen a remarkable flourishing of health economics. At a time when the National Health Service (NHS) has been retrenching, departments of health economics have sprung up across the country, and the writings of health economists are now frequently found in medical journals. What is the justification for the mushroom growth of this new specialty, which is indirectly competing with the NHS for resources?

It is argued that since health care resources are finite and demands upon them are infinite, consideration of value for money in treating different conditions would be a better way of distributing limited resources than the present arbitrary method based on shroud-waving and emotive rhetoric (1). Health economists are therefore endeavouring to develop a unified scale of values for life and health, and death and disability, which may then be used to measure the outcome of health care (2).

One method of assessing outcome of health care, and hence, value for money, is by the use of QALYs (Quality Adjusted Life Years). Tables have been published showing the cost per QALY for various approaches to illness, ranging from advice from a general practitioner about smoking, to hip replacement and cardiac transplantation (3). The results are presented with a clear invitation to NHS managers to direct resources to the treatment of those conditions, and with those methods, that offer the lowest price per QALY. The arguments are plausible, the methodology is technical and the proponents are voluble, so it is tempting for clinicians to acquiesce and collaborate with the process of apportioning resources between various dissimilar claimants, using economic arguments such as those embodied in QALYs. However, it should be recognised that the underlying philosophy is contrary to the ideology of the NHS and diametrically opposed to that apparently adopted by many clinicians in their day-to-day work, even if their philosophical position is not well articulated or dignified with an 'ism' (4).

I want therefore to examine the premises, the implicit assumptions and the uses to which the new economic arguments may be put, and to discuss their implications for clinicians in their day-to-day work.

Resources are finite

Although it is self-evident that resources for health care are finite, and ultimately limited by the gross national product, it is not obvious why resources have to be rigidly fixed at the present inadequate level, for which there is no electoral mandate or popular support. International comparisons show that the per capita expenditure on health care in the UK is amongst the lowest in Europe. In Denmark, Germany, France and Sweden the percentage expenditure on health care compared with the UK is 136, 163, 184 and 229 per cent respectively; most European countries spend a much higher proportion of their Gross Domestic Product on health care than we do (1). Within the UK the per capita expenditure on health care in Scotland is 15 per cent higher than in England (1).

Increasing the total resources available to the NHS would greatly simplify the decisions about how the money should be spent. The time and energy devoted to developing methods of distributing limited resources might have been much better spent on

Key words

QALY; value of life; equality; value for money.

making the case for raising the limits on those resources.

Demands are infinite

Although it is repeatedly said that the demand for health care is infinite (1), the inevitable result of a zero-priced service, a moment's reflection indicates the opposite (5). Infinite demand is no more true for the NHS than it is for a free public lavatory. At each stage of life, from birth to death, the incidence of disease, the nature and cost of its treatment, the requirements for preventive measures, and the loss of life from various causes are all known with a high degree of precision. For example, the number of childbirths is much the same from year to year and the level of medical and midwifery provision to provide an acceptable standard of care is well known. The community need for pacemakers, coronary artery bypass grafts, hip replacements, or long-stay psychiatric beds may all be accurately estimated. Take hip replacement, for which there are long waiting lists. It might be suggested that those who are on the waiting list are just the tip of an iceberg, and that there are many more people with osteoarthritis in the community who would benefit from hip replacement. Yet if they were sought out and offered surgery it is doubtful if many would take up the offer, preferring a degree of discomfort to the inconvenience, risk and pain of surgery. Thus the demand for hip replacement, or any other variety of health care, though it may not be fully met is certainly not infinite. In many cases the demand could be completely satisfied with just a modest increase in resources.

Because the elderly, who are greater consumers of health care than younger people, are an increasing proportion of the total population, the cost to the NHS is estimated to increase at the rate of 1 per cent per year. Technological advances, leading to demands for new diagnostic equipment or new drugs, are said to require a growth of 0.5 per cent, and new objectives such as better community care need a further 0.5 per cent per year. Thus, apart from inflation, the NHS needs additional funding of 2.0 per cent per year just to keep pace with demographic, technological and policy changes (6). This estimate may be substantially wrong, yet it will still be modest, and a long way short of infinity.

The calculation of QALYs

Illness causes disability and it causes distress, but to what extent are we prepared to trade one for the other? If we can determine the exchange rate then disability and distress can be considered in a common currency, the quality of life. This has been quantified by Rosser and Kind (7). They recognised eight grades of disability ranging from no disability (I), to being totally dependent and unconscious (VIII). Distress was graded as none (A), mild (B), moderate (C) or severe (D). Thus all combinations of disability and distress may be represented by one of 32 cells in a two-way matrix (Table 1). Seventy people were asked to score each of the cells in the matrix on a scale of −1 to +1, 0 representing death, +1 representing healthy life, and −1 a state worse than death.

The average scores from the 70 respondents showed that distress was tolerated better than disability, with scores of above 0.95 for all degrees of distress without disability. On the other hand, absence of distress but being confined to chair (VI) or bed (VII) scored less than 0.9. The most severe level of disability, unconsciousness (VIII), even though not associated with distress, scored worse than death at −1. Being confined to a chair with severe distress, or being confined to bed with moderate distress were each as bad as being dead and scored 0.

By means of this matrix it is possible to score the quality of life associated with various conditions, and adjust the expectation of life for impairment in the quality of life below a value of 1 (Figure 1 – upper). For example, a patient with severe arthritis of the hip who

Table 1.

Rosser and Kind's valuation matrix (7) indicating the quality of life score for 4 degrees of distress and 8 degrees of disability (⋆ – not applicable).

		Distress rating			
		A	B	C	D
Disability rating	I	1.00	0.995	0.990	0.967
	II	0.990	0.986	0.973	0.932
	III	0.980	0.972	0.956	0.912
	IV	0.964	0.956	0.942	0.870
	V	0.946	0.935	0.900	0.700
	VI	0.875	0.845	0.680	0.000
	VII	0.677	0.564	0.000	−1.486
	VIII	−1.028	⋆	⋆	⋆

is unable to work and is in severe distress scores a quality of life of 0.7. His expectation of life of 10 years is reduced to seven quality adjusted life years. Successful hip replacement, by eliminating disability and distress, restores 3 QALYs to his total, at an average cost of £750 per QALY (3).

Another example is a patient with renal failure undergoing renal dialysis twice a week in hospital for a year. He is unable to work and suffers moderate distress with a quality of life of 0.9. However, haemodialysis is life-saving, so every year of life adds 0.9 to the number of QALYs he would otherwise

Figure 1

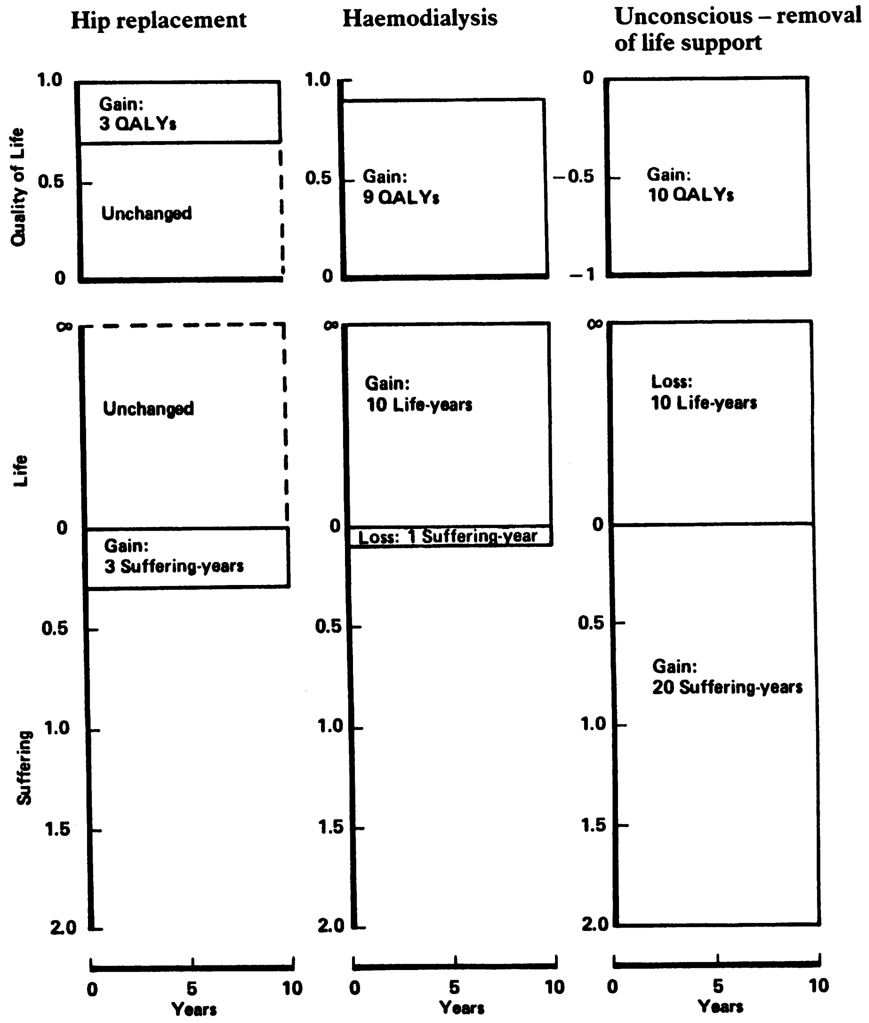

Figure 1

Upper. The gains in Quality Adjusted Life Years (QALYs) are shown following hip replacement, haemodialysis and withdrawal of life support from an unconscious patient.

Lower. The gains and losses of life (above) and suffering (below) are shown for treatment of the same three conditions.

enjoy, at a cost of £14000 per QALY (3).

It is clear that calculated in this way hip replacement represents much better value for money than hospital haemodialysis. But the best value for money of all is offered by turning off the life-support machine of an unconscious patient, enhancing his quality of life by 1, at a saving of hundreds of pounds per day.

The value of life is not the same as the absence of suffering

Although we have followed the arguments above, we may, with good reason, be uneasy about the conclusions. By sleight of hand a crucial qualitative distinction between haemodialysis and hip replacement seems to have been obscured. The difference is, of course, that haemodialysis is life-saving but hip replacement is not. However, no additional measure has accrued to the haemodialysis patient on account of his increased survival. Similarly, the unconscious patient has apparently gained quality of life by dying, and loss of life is not acknowledged.

This absurdity arises because although the matrix merely demonstrates the equivalence of disability and distress as forms of suffering that detract from the quality of life, it is used to put a valuation on life itself.

At two points the matrix appears to indicate equivalence between quality of life and valuation of life – when the quality of life score is 0 and when it is 1. The former case indicates the degree of suffering which leads healthy respondents to believe that they would wish themselves dead if they were to experience it. This degree of suffering renders existence worthless, but throws no light on the value of life in the absence of suffering.

A quality of life score of +1 indicates absence of suffering. But to equate the value of life with absence of disability or distress is to undervalue existence very greatly indeed. Life is valued for infinitely more reasons than absence of suffering.

Life and years may not be equivalent

Let us imagine that a new treatment extends everybody's life by one year. Treatment of ten people will yield ten extra life-years. Another treatment restores life to the one in ten of people who die ten years prematurely. Which treatment is preferable if the costs are identical? The second treatment would probably be preferred by most people on the grounds that it helps to redress the inequitable distribution of misfortune in an unfair world. Thus, life and years may not be completely interchangeable in our calculations (4,8).

The suffering score

Table 2 shows the quality of life matrix reversed in such a way that it shows the degree of suffering. Each suffering score is derived by subtracting the quality of life score for the corresponding cell from one. The scale now starts at zero, which corresponds to healthy life, in which there is no disability or distress as a result of illness; a score of >=1 would make the sufferer wish himself dead. Using this suffering score, we can now plot the gains and losses that result from treatment, separating the gain of life from the increase or decrease of suffering (Figure 1 – lower). Note that the scale for the existence of life is uncalibrated except in the time axis; different scales of values are used for the presence of life and the extent of suffering, the bounded areas are not additive. These plots may be used to compare the relief of suffering from different treatments or the treatment of different non-fatal conditions, but they do not allow comparison between fatal and non-fatal conditions and their treatments. We now see the additional benefit in the form of increased survival that accrues with haemodialysis compared with hip replacement, but we are unable to put a numerical value on it. The suffering of the patient undergoing haemodialysis is now seen as a loss rather than as a gain.

Table 2.

A valuation matrix indicating the suffering score for 4 degrees of distress and 8 degrees of disability, derived from Table 1 (⋆ – not applicable).

		Distress rating			
		A	B	C	D
Disability rating	I	0.000	0.005	0.010	0.033
	II	0.010	0.014	0.027	0.068
	III	0.020	0.028	0.044	0.088
	IV	0.036	0.044	0.058	0.130
	V	0.054	0.065	0.100	0.300
	VI	0.125	0.155	0.320	1.000
	VII	0.323	0.436	1.000	2.486
	VIII	2.028	⋆	⋆	⋆

To each according to his need

A surgeon may have more demands on him than he is able to meet, due to limited operating time or numbers of beds. He rations care by means of a waiting list. People with potentially fatal conditions are generally given the highest priority. Amongst the others, those who are most disabled will tend to be seen quicker than those less disabled, or those distressed but with no disability. The surgeon will therefore give priority according to the perceived degree of suffering, with overriding priority being given to those at risk of loss of life. The principle describing his actions is 'to each according to his need', where need is seen as both relief of suffering and prolongation of life. If facilities are totally inadequate he may indulge in shroud-waving, ie announcing publicly that unless resources are increased patients will suffer and die unnecessarily. His opinion may well be right. He has, after all, spent his professional life assessing his patients' distress and disability and the risk to their lives posed by disease.

To each according to his QALY for money

A flexible waiting list run along the lines described above may be seen as a means of rationing resources which has a rough and ready justice appropriate for patients' needs. Let us now imagine a surgical waiting list where priority is determined by the expected increase in QALYs per unit cost. Highest priority would be given to patients with disabling or distressing conditions compatible with a normal expectation of life that could be treated cheaply, preferably as outpatients. For a similar degree of suffering, a patient with a condition that could be treated cheaply would have prior claim over one whose treatment was expensive. A patient with a short expectation of life requiring major surgery and expected to occupy a bed for a prolonged period – for example, an octogenarian with carcinoma of the colon – would be given low priority. His priority rating would increase steeply if he could be made to wait until he was unconscious so that he could then be admitted for terminal care.

To each according to his ability to pay

The individual need for health care, unlike other essentials like food or housing, cannot be predicted. Illness strikes unexpectedly and at random and the costs of treatment may be so great that many people would be unable to afford health care when it was most needed, at a time when income falls because of inability to work. Insurance against such a catastrophe is only prudent, and is preferably organised on a national scale so that everybody contributes and everybody is eligible for benefit, irrespective of ability to pay at the time of need. Such is the NHS. An alternative is the manifestly unjust system whereby health care is purchased like any other commodity, according to the ability to pay.

The ability to pay is determined, not only by the wealth of the purchaser, but by the cost of the purchase. So even if everybody was equally wealthy some would be unable to purchase the health care they needed because they had the misfortune to be struck by an illness whose treatment was very costly. Rationing health care according to best value for money is equivalent to rationing by ability to pay after equalising individual wealth. It is unfair since some people will be denied treatment because, through no fault of their own, they have been inflicted with an illness that is expensive to treat. Others, whose suffering is no greater, would be treated because their treatment happens to be cheaper.

Conclusions

The proposed method for distributing health care according to value for money, assessing outcome as Quality Adjusted Life Years, is based on false premises, faulty reasoning and unjust principles. Application of the method leads to undervaluation of life and gross inequity.

A more equitable system of rationing health care would be based on need, need being assessed by the degree of suffering, with prolongation of life having overriding priority.

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