

An alternative to QALYs: the saved young life equivalent (SAVE)

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Quality adjusted life years (QALYs) are based on the concept that the effectiveness of a health care programme is greater the more significant the health improvements it provides, the longer the patients get to enjoy the improvements, and the more patients who are helped.¹⁻⁴ The concept is put into practice in the so called health status index approach: life years in different states of illness or dysfunction are assigned values on a scale of 1.0 (healthy) to 0.0 (dead). The values reflect the quality of the states and allow morbidity and mortality improvements to be combined into a single weighted measure—that is, QALYs gained. For example, if a programme improves the health of individual A from 0.5 to 0.8 for one year and extends the life of individual B for five years in a 0.6 state, then a total of 3.3 QALYs will be gained $((0.8-0.5) + (5.0 \times 0.6) = 3.3)$.

Cost per QALY gained (the so called “cost:utility ratio”) may be calculated for different programmes. When prioritising between them the standard health economist recommendation is to rank the programmes from the lowest cost per QALY value to the highest and to select from the top until available resources are exhausted.^{5,6}

This paper argues that the health status index approach and the focusing on life years as units of measurement are main causes of public resentment against QALYs.⁷⁻¹³ A more direct procedure is outlined for assessing the social value of health care. Like QALYs it allows comparisons of different health care programmes in terms of cost:utility ratios.

Basic problems with QALYs

What is essentially needed in health programme evaluation is society’s valuation of different health improvements relative to each other and relative to life saving. The core of the QALY procedure, however, is not to value health improvements but rather to value health states. The value of health improvements is defined as the differential between health state values. This indirect approach gives rise to the following three serious problems.

Firstly, it involves expressing quality of life per se in terms of numbers. Mulkay *et al* hypothesised that to most people these numbers carry little meaning as they have no experience with them in everyday life.⁹ Later empirical studies supported this hypothesis with respect to numbers elicited by letting people place different states of illness directly in a rating scale—for instance, a straight line running from zero (dead) to 100 (healthy).^{14,15} Numbers based on other valuation techniques are theoretically more meaningful¹³ but the difficulties of explaining such numbers to potential users may still be substantial.

Secondly, the health status index approach implies assigning a value to life itself according to the health state of the individual concerned. In other words, a life in a wheelchair is considered not only less healthy than a life without disability but also of less value. As noted

Cost per gained quality adjusted life year (cost per QALY) has been suggested as a criterion for prioritising between different health care programmes. The QALY procedure assigns values to life per se in different health states and focuses on life years rather than persons as the recipients of health improvements. Arguably these two features may be the main causes of public resentment against the use of QALYs in health programme evaluation. Nord outlines an alternative procedure in which society’s appreciation of one particular health care outcome—saving a young life—is suggested as a unit of value. The unit is called a SAVE. Other health care outcomes may be valued directly in terms of SAVES by means of a simple equivalence of numbers technique.

Like QALYs, SAVES allow comparisons of different health care programmes in terms of cost:utility ratios. But unlike the QALY procedure the SAVE procedure allows encapsulation of various distributional and ethical rules.

by Harris, this position is ethically highly controversial⁷ and disabled people find it repugnant.¹⁶ In an egalitarian society like Norway their reaction is shared by most of the general public.¹⁷ Similar egalitarian values probably prevail in other European countries.

Thirdly, the health status index approach places all emphasis on the size of a health improvement and disregards the starting point and end point. It disregards the fact that a small but significant improvement for a person in a bad state may be preferred by society to a more substantial improvement for a person in a less severe state (in Norway this preference is part of the official guidelines for prioritising in the national health service).¹⁸ The health status index approach also disregards the fact that if two patients are in the same state of dysfunction but differ with respect to potential for improvement society may wish to give them the same priority, on the ground that they are equally entitled to treatment. This view has been strongly advocated by Harris.⁷ There is support for it in official Norwegian guidelines¹⁸ as well as in a survey in a sample of Norwegian subjects.^{17,30}

The other problematic basic feature of the QALY procedure is its focus on quality of life in life years rather than quality of life in people. In health care policy making this is a somewhat strange and artificial perspective. The health services—as well as politicians and the general public—are concerned with providing care for living, breathing, feeling, and thinking individuals, not with maximising numbers of abstract time entities. As noted above they are also concerned with entitlement to treatment. This concept is inseparably related to living subjects. Life years as such are not subjects and therefore not entitled to anything.

Perceived drawbacks with QALYs

- Quality of life per se expressed in terms of numbers
- Value assigned to life varies with health state of person
- All emphasis placed on size of health improvement, ignoring starting point
- Focus on quality of life in life years rather than on quality of life in people

Saved young life equivalent (SAVE)

The problems described above may to some extent be tackled by regarding QALYs gained strictly as an indicator of the amount of health produced. Distributional and ethical considerations could then be added to determine the total social value of a health care programme.¹⁹⁻²³

Although this possibility is worthy of further research, there is a simpler and more straightforward solution that deserves attention. Before outlining this I reiterate that what is essentially needed in health programme evaluation is society's valuation of different health care outcomes relative to each other. Why not, then, simply choose one particular health care outcome as the unit of measurement and let people compare other outcomes directly with this unit?

To see how this could work consider the following outcome: saving the life of a young person and restoring him or her to full health. This particular outcome is suggested as the unit of measurement on the ground that most people will probably regard it as the maximum benefit that a single individual can obtain. Let us call the value assigned by society to this outcome a saved young life equivalent, or one SAVE for short.

Now consider an intervention that typically yields an outcome X—described in terms of severity of condition before intervention, improvement in health and quality of life due to intervention, risk related to intervention, and patient's age and other variables considered relevant in prioritising. To determine the social value of outcome X relative to a young life being saved we may apply the equivalence of numbers technique.²⁴⁻²⁷ This consists in asking people to compare two equally costly programmes. One is expected (statistically) to save one young life each year (rendering a value of 1 SAVE). The other is expected to produce N outcomes of type X per year. In neither case is it known in advance which specific persons would benefit by the services in question. The crucial question is: what would the expected number of outcomes of type X have to be for the latter programme to be considered as valuable as the one expected to yield a SAVE? If we assume that a representative group of people answers 10, then the social value of one outcome of type X is one tenth of a SAVE. This would imply that in allocating scarce resources to different areas of health care interventions with an expected outcome of 1 SAVE should have priority over interventions with an expected outcome of type X unless they cost more than 10 times as much (when the latter should have priority).

Other interventions and outcomes could be valued in terms of SAVES in a similar way. For each intervention a cost per SAVE ratio could be calculated, and a tentative priority ranking list could be established on the basis of these ratios.

Discussion

The SAVE procedure is suggested as an aid to decision making. As other workers have pointed out in

connection with QALYs, numerical estimates of value should not replace critical thought and responsible discussion.^{8,28}

Plainly the SAVE procedure is a much more direct way of estimating the social value of health care interventions than calculating QALYs. Hence it is probably easier for ordinary people to understand. At the same time it yields value assessments in terms of numbers just as QALYs do and—just like the QALY procedure—allows comparison of different interventions in terms of cost:utility ratios.

COMPREHENSIVENESS

The SAVE procedure is more comprehensive than the QALY procedure: it allows judges to take account not only of the amount of health produced by each intervention but also of any distributional or ethical consideration they might find relevant. For example, consider three states, A, B, and C, that score 0.3, 0.5, and 0.9, respectively, on a health status index. In terms of QALYs an improvement from B to C would carry greater value than an improvement from A to B (0.4 v 0.2), but as noted above, on the ground that severity is an argument in itself people may very well consider it more important to help a person progress from state A to state B than help another person progress from state B to state C.

In the SAVE procedure people could express this by selecting a lower equivalence number (relative to saving a young life) for improvements from A to B than for improvements from B to C. Similarly, taking one kind of patient from A to C carries more value in terms of QALYs than taking another kind of patient from A to B (0.6 v 0.2). But society may very well find that the two kinds of patients should have equal priority on the grounds that both would be significantly helped and both are equally entitled to treatment. In the SAVE procedure people could express this by choosing the same equivalence number for the two kinds of improvement.

The SAVE procedure is suggested as an aid to decisions concerning allocation of scarce resources to different health care programmes. It presupposes that decision makers do not know whom the programmes will benefit. The procedure may also prove useful as a guide in decisions concerning distribution of resources between known patients. However, other ethical rules will often apply in this context—in particular the obligation to save human life almost regardless of cost (the "rule of rescue"²⁹).

The reliability of responses to equivalence of numbers questions needs to be studied. The technique has been used only occasionally in health care evaluation studies,^{3,15,17,30} and in these few cases no reliability tests have been performed. With the proposed procedure there is certainly a danger of overloading subjects with information. At the individual level this could lead to equivalence numbers being given somewhat randomly. The mean or median response in a large group may nevertheless have satisfactory reliability.³¹

QALYs SUPERFLUOUS?

Would SAVES make QALYs superfluous? The answer is no. SAVES measure social value. This concept includes distributional and ethical considerations. Analysts and decision makers may also be interested in "the amount of health" produced by different health services or different therapies. For this the QALY may be a useful concept.

The SAVE procedure raises a practical problem. The number of different interventions and outcomes in health care is very large. It would take an enormous amount of fieldwork to evaluate each of these interventions and outcomes directly in terms of equivalence of numbers.



Saving the life of a young person is probably the maximum benefit that a single individual can obtain

A parallel problem occurs in the QALY procedure in assigning values to states of illness. To facilitate this valuation task various researchers have constructed models that allow analysts to estimate the value of health states on the basis of their specific attributes. An example is the McMaster health classification system.³² This has four dimensions—physical function, role function, social-emotional function, and health problem—each subdivided into a number of levels. Each level has a weight between unity and zero. Any health state may be scaled by entering weights for levels fitting that state into a multiplicative formula. The quality of well being scale³³ and a 12 dimensional approach suggested by Sintonen³⁴ are other examples of generalised mathematical models for estimating health state values.

MODELLING

Health planners wishing to adopt the SAVE procedure in decision making would certainly need the support of a similar kind of mathematical model to be able to estimate values for a vast number of outcomes that have not been valued directly by the public. Development of such a model is in progress at the National Institute of Public Health in Oslo. Like the QALY model the SAVE model will express the social value of any medical outcome as a product of several weights. However, unlike the QALY model the SAVE model will include severity of illness as an independent explanatory factor.

Testing of a first version of the model on a set of hypothetical health care outcomes has shown that it has high discriminant capacity and ranks outcomes in a way that seem to fit well with official guidelines for prioritising in Norwegian health care.¹⁸ However, the real test of validity of the model is to see whether the equivalence numbers it predicts for different outcomes correspond with the equivalence numbers that people would suggest if asked directly.^{15,27} If correspondence between implied and directly elicited equivalence numbers turns out to be unsatisfactory the model will need to be modified. Through an iterative process of checking for correspondence and subsequent modification a model may be established which yields a satisfactory goodness of fit with direct judgments. This empirical work remains to be conducted.

Conclusion

The SAVE procedure is suggested as an alternative to the QALY procedure in health programme evaluation. It yields social values for health gains for individuals in a more direct manner incorporating various distributional rules and using an easily understandable unit of measurement—namely, the value of saving a young life. This may altogether be a more meaningful and valid procedure than valuing health states as such and using the values to weight life years, as is the case with QALYs.

An empirically based mathematical model for estimating outcome values in terms of SAVES is being developed at the National Institute of Public Health in Oslo. Detailed results of this work will be published

in due time. The model will aim at encapsulating prevailing social values in Norway. There is evidence that perceptions of health related quality of life are much the same in Norway as in other northern European countries.^{35,36} On the other hand, attitudes towards distribution may differ, and so may health perceptions outside the northern European region. Other countries interested in adopting the SAVE procedure will therefore probably need to develop estimation models of their own.

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Main advantages with SAVES

- Yield social values for health gains for individuals in more direct manner
- Incorporate various distributional rules
- Use easily understandable unit of measurement—namely, value of saving a young life