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Trying to estimate a monetary value for the QALY

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ABSTRACT

In this paper we study the feasibility of estimating a monetary value for a QALY (MVQ). Using two different surveys of the Spanish population (total $n = 892$), we consider whether willingness to pay (WTP) is (approximately) proportional to the health gains measured in QALYs. We also explore whether subjects' responses are prone to any significant biases. We find that the estimated MVQ varies inversely with the magnitude of health gain. We also find two other (ir)regularities: the existence of ordering effects; and insensitivity of WTP to the duration of the period of payment. Taken together, these effects result in large variations in estimates of the MVQ. If we are ever to obtain consistent and stable estimates, we should try to understand better the sources of variability found in the course of this study.

1. Introduction

Much cost-effectiveness and cost-utility analysis has been undertaken to guide health care resource allocation. However, if we wish to go further and conduct cost-benefit analysis – and thereby make health care resource allocation more directly comparable with decision making in other areas of public policy – we need to find some way of attaching monetary values to health benefits. Since much of the health benefit measurement to date has been conducted in terms of quality adjusted life years (QALYs), one solution – were it to be feasible – would be to estimate the monetary value of a QALY (henceforth, the MVQ).

In the UK, the National Institute for Health and Clinical Excellence (NICE) recognised the desirability of having such an estimate and recently commissioned a study to explore its feasibility. Others, too, have recognized the potential value of such a figure: for example, Johannesson and Meltzer (1998) considered that obtaining this information "should be a research priority" (p. 4). They identified two possible strategies for deriving the willingness to pay (WTP) per QALY gained. One would be based on direct elicitation of WTP for some marginal health change(s), while the other would derive this figure from estimates of the value of statistical life (VSL) in the literature. Some work of this latter kind has been attempted,[1] but the present study focuses instead on the possibility of estimating the MVQ on the basis of eliciting people's WTP for a range of health benefits.

We acknowledge the possibility that estimating a *unique* MVQ may not be feasible. Several papers, including Bleichrodt and Quiggin (1999) and Dolan and Edlin (2002), have shown that the conditions for a unique MVQ to exist are quite restrictive and are unlikely to hold. However, our objective was to explore just how stable – or variable – such an estimate might be. Our strategy was to use changes that were small relative to those used in other studies in this area[2] in the hope that budget constraints would not cause significant non-linearities.[3]

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[1] Hirth et al. (2000); Mason et al. (2009).
[2] For example, Byrne et al. (2005), King et al. (2005) and Gyrd-Hansen (2003).
[3] It is always difficult to know how far people feel they are coming up against serious budget constraints, but by using smaller changes than previous studies, we aimed to attenuate this problem.

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Table 1
Treatment choice scenarios used in first survey.

Type	Original state	Treatment A	Treatment B
1	22223, rest of life	4 months in 22223, then move to 11111	Immediately move to 11111
2	22223, rest of life	4 months in 22223, then move to 11111	2 months in 22223, then move to 11111
3	22223, rest of life	2 months in 22223, then move to 11111	Immediately move to 11111
4	22223, rest of life	2 months in 22223, then move to 11111	2 months in 21212, then move to 11111
5	21212, rest of life	4 months in 21212, then move to 11111	Immediately move to 11111
6	21212, rest of life	4 months in 21212, then move to 11111	2 months in 21212, then move to 11111
7	21212, rest of life	2 months in 21212, then move to 11111	Immediately move to 11111
8	22223, rest of life	2 weeks in 22223, then move to 11111	Immediately move to 11111
9	21212, rest of life	2 weeks in 21212, then move to 11111	Immediately move to 11111
10	1% risk of (22223, rest of life)	Stay with original risk	Eliminate risk of (22223, rest of life)
11	1% risk of (22223, rest of life)	Stay with original risk	Reduce to 0.5% the risk of (22223, rest of life)
12	1% risk of (21212, rest of life)	Stay with original risk	Eliminate risk of (21212, rest of life)
13	1% risk of (21212, rest of life)	Stay with original risk	Reduce to 0.5% the risk of (21212, rest of life)

Abellan-Perpiñan et al. (2006) and Bleichrodt and Pinto (2005) have suggested that a non-linear QALY model may be better than the linear model. If non-linearities are important, this may result in estimates of the MVQ varying considerably according to the basis upon which they are derived. So we wished to check for the possible impact of various non-linearities with respect to severity, duration and the size of risk reduction.

Our empirical work involved two surveys. The first, and larger, of these was designed to investigate several issues fundamental to the robust estimation of a reasonably stable MVQ. The second survey was designed to follow-up and clarify certain issues raised by the results of the first.

2. Broad structure of the study

Before describing the particular features of each study, we set out the general framework within which we are working and according to which we shall derive the MVQ estimates.

The basic idea of a QALY is to provide a measure that facilitates comparisons across a broad spectrum of health benefits. Ideally, it allows health care decision makers to weigh the total benefit of an intervention that alleviates short-term conditions involving moderate adverse effects against other interventions addressing more severe acute conditions, or chronic conditions of varying degrees of severity, or conditions that threaten to substantially reduce life expectancy. A monetary value of a QALY should therefore be robust across such a spectrum.

So in the first survey, we were concerned to focus on the stability (or otherwise) of the MVQ with respect to:

- Variations in the *severity* of different conditions;
- Variations in the *duration* of a given condition;
- Variations in *reductions in the risk* of chronic conditions involving a substantial total loss of quality of life.

Aware that WTP studies in related areas have been found to be vulnerable to various procedural effects (for examples, see Bateman et al., 2002), we checked for any possible impact of the order in which questions were asked and the period over which the notional monetary payment was 'collected'.

In the light of questions raised about the relationship between the estimated MVQ and the magnitude of the health gain, we conducted a second smaller (but still substantial) survey to provide further information about that particular key issue.

2.1. Questions and scenarios

The studies revolved around questions which took the following general form. Respondents were asked to assume that they had been diagnosed with a particular illness that would, if untreated, put them in a specified impaired health state for the rest of their lives. They were told that there was a medicine (Treatment A) which, if taken for 1 year, would cure this illness. The cost of this medicine for the patient was zero. They were told that it took some time for the medicine to take effect: 2 months in some cases, 4 months in other cases. They were also informed that there was another medicine (Treatment B) that also cured the chronic problem but that was better than A. By "better" we meant one of several things: (a) that it worked immediately, so that the impaired health state would not be experienced at all; (b) that it reduced the duration of symptoms from 4 months to 2 months; or (c) that it reduced the severity of the symptoms but did not change the duration.

In all the above cases, the respondents were asked to consider the prognoses as certain: i.e. the diagnosis was certain and the effects of the treatments were certain. But there was also a form of question involving risk, where respondents were asked to assume that they faced a 1% chance of developing an illness which could put them in an impaired health state for the rest of their lives. They were then told that they could take a medicine that could reduce the risk, in one case from 1% to 0% and, in another case, from 1% to 0.5%.

For all scenarios, they were told that neither of the medicines had side effects and that both had to be taken for a year. However, in all cases the better treatment involved some monetary cost for them. Their willingness to pay for the extra benefits of the better treatment was then elicited.

In order to investigate the relationship between MVQ and the different factors being varied, we considered a total of 11 different scenarios, or 'Types', as set out in Table 1.

We used three Euroqol (EQ-5D) health states to represent different quality of life levels. EQ-5D is a standardised instrument widely used in the computation of QALYs. It has five dimensions, with three levels on each dimension—no problems (1), moderate problems (2) and severe problems (3). So 11111 signifies being in good health with no abnormal problems on any dimension, while 21212 represents moderate problems on some dimensions and 22223 represent moderate problems on most dimensions, with severe problems on the fifth dimension (anxiety/depression). The two impaired health states 21212 and 22223 were chosen because piloting showed that they were not so severe as to create complications with negative scores[4] but were not so mild that many respondents would refuse to accept any risk of death to avoid them.

In all cases where the prognosis and effects of treatment were certain, the duration of the health problems was short (4 months,

[4] Scores below zero signify that the respondent considers a state to be worse than being dead.