HEALTH ECONOMICS
Health Econ. **7**: 307–312 (1998)

ECONOMIC EVALUATION

USING THE PERSON TRADE-OFF APPROACH TO EXAMINE DIFFERENCES BETWEEN INDIVIDUAL AND SOCIAL VALUES

PAUL DOLAN[a,*] AND COLIN GREEN[b]
[a] *Department of Economics, University of Newcastle, UK*
[b] *School of Health and Related Research, University of Sheffield, UK*

SUMMARY

Health state valuations, elicited by methods such as the standard gamble and the time trade-off, give an indication of the value that an individual attaches to particular health states. As measures of *individual* values, it has been argued that such valuations serve as poor proxies for *social* preferences, which, it is suggested, are a function of other factors, such as the initial severity of the patient's health state. The person trade-off (PTO) method has been proposed as a technique which takes account of many of these other factors. This paper reports on a study using the PTO to investigate whether an individual's preferences over treatments *for themselves* differ from their preferences when they are asked to think about the treatment of *other people*. The results suggest that there is indeed a difference, although qualitative data suggests that health gain is an important determinant of social value. This latter finding runs counter to those of a number of other studies which suggest that concerns about pre-treatment severity are as, if not more, important. Possible explanations for the differences are put forward.

KEY WORDS — quality-adjusted life-years; person trade-off; health gain; social value

INTRODUCTION

Given that no country can afford to provide all the health care that might conceivably be of some benefit, it is necessary to establish priorities. Although there is no consensus as to how this priority-setting should be done, there is general agreement that the benefits of the alternative uses of scarce resources should be taken into account. A number of researchers suggest that the benefits from different interventions should be expressed in terms of the number of quality-adjusted life-years (QALYs) they generate [1]. This approach attempts to combine the value of quality-of-life with the value of length of life into a single index number. Although QALYs can be used to measure the benefit derived from different health care interventions by an individual patient, they are often treated as a measure of social value in which they represent society's preferences over different health care outcomes [2].

For QALYs to be interpreted in this way, it must be assumed that social preferences over different allocations of the health care budget can be represented by a lexicographic ordering in which health gain is the dominant argument in the health-related social welfare function. In this way, it is possible to say that, all else equal, moving one person, Ms A, from a health state valued at 0.6 to one valued at 0.9 is strictly preferred to moving another person, Ms B, from a health state

* Correspondence to: Department of Economics, Claremont Tower, University of Newcastle, Newcastle-upon-Tyne NE1 7RU, UK.

CCC 1057–9230/98/040307–06$17.50

Received 19 December 1996
Accepted 10 November 1997

valued at 0.2 to one valued at 0.4. However, it is likely that people would want decision-makers, when choosing between alternatives, to be concerned not only with the number of QALYs gained but also with how those QALYs are distributed. Thus, it could be argued that Ms B is more deserving of treatment than Ms A because, although her capacity to benefit is less, she is initially in a more severe health state. A number of authors have addressed this possibility in terms of an efficiency-equity trade-off [3,4].

More fundamentally, Nord [5] argues that 'weights for life years in the QALY procedure should not be derived by asking individuals to value health states *for themselves* . . . [but] . . . should ultimately reflect responses to person trade-off questions asked in a resource allocation context' (p. 202). The person trade-off (PTO) approach involves asking respondents how many outcomes of one kind they consider equivalent in terms of social value to X outcomes of another kind. The method was originally developed by Patrick *et al*. [6] who called it the equivalence of numbers procedure but Nord's terminology is used in this paper. It is Nord's contention that PTO responses capture concerns that are relevant to social decision-making, such as considerations about the initial severity of illness, whilst measures of individual health state value, are measures of efficiency, and therefore do not take account of such considerations [7].

This paper reports on a pilot study which was designed to assess whether two treatments that are of equal value to the individual are considered, by that individual, also to be of equal value to society (as measured by responses to PTO questions). This is a unique approach because to our knowledge it is the first time that the two options in a PTO question have been chosen only after it has first been established that they are of equal value to the individual respondent. Hitherto, studies have used health states descriptions to generate PTO scenarios that are assumed to yield the same benefit for each successive move between levels of severity [8].

STUDY DESIGN

Health states were defined in terms of the EuroQol descriptive system, which describes health status in five dimensions (mobility, self-care, usual activities, pain/discomfort, anxiety/depression) with no disease specificity [9]. Each dimension can be experienced at one of three levels: 1) no problems; 2) some problems; and 3) extreme problems. Respondents were presented with 15 cards, representing 14 EuroQol states (chosen to give a spread in terms of severity) plus 'Immediate Death' and were told that each state (except Immediate Death) would last for 10 years without any change after which they would die. They were asked to sort and rank the cards so that the one they thought best was at the top and the one they thought worst was at the bottom, and to place any they felt were the same alongside each other.

Respondents were then asked to imagine that they were in state 22323 and that a treatment (referred to as T1) was available which would move them to state 12223, thus offering improved mobility and improved ability to perform usual activities. They were then asked to imagine instead that they were in state 22222 and another treatment (referred to as T2) was available which would move them to a state which they had ranked above 22222. These states were chosen for the two treatments to reflect plausible treatment possibilities. The aim of what followed was to identify the state that when moved to from 22222 yields the same benefit as the move in T1 from 22323 to 12223. Initially T2 was defined as the move from 22222 to the state ranked 4th by the respondent. If they found this equally as good as T1, this card was taken as the 'interval' state. If T2 was found to be better (worse) than T1, an iterative process was conducted using lower (higher) ranked cards until an interval state was identified. Where the respondent was unable to identify an interval state two states were identified: one referred to as BIS (a 'better than' interval state), which when moved to from 22222 was considered to yield more benefit than T1; and one referred to as WIS (a 'worse than' interval state), which when moved to from 22222 was considered to yield less benefit than T1.

Respondents were then asked to rate a subset of states using the visual analogue scale (VAS) and time trade-off (TTO) methods but the protocols and results are not reported here since the focus of this paper is to compare the results from the comparison of treatments with those from the PTO. In the PTO exercise, which followed the VAS and TTO tasks, respondents were asked to imagine that there were 10 people who would

spend 10 years in state 22323 (the initial state for T1), after which they would die, and that there were another ten people who would spend 10 years in state 22222 (the initial state for T2), after which they would die. They were asked to imagine that the two groups were the same in every way they considered relevant. Using a specially designed board, respondents were then presented with two possible treatments. Treatment 1 would move the ten people in state 22323 to state 12223 for 10 years after which they would die. Treatment 2 would move the ten people in state 22222 to the interval state for 10 years after which they would die. In the absence of an interval state, the WIS was used.

Respondents were told that only one of the treatments could be provided and were asked if they would choose treatment 1, treatment 2 or whether they would not mind which one was chosen. If the respondent chose treatment 1, further questions were asked in which the number who would benefit from treatment 2 remained unchanged but the number who would benefit from treatment 1 was changed; initially to 5 and then, by an iterative process using smaller or greater numbers of people, until a point of indifference with treatment 2 was reached. Similarly, if the respondent chose treatment 2, the number who would benefit from treatment 1 remained unchanged but the number who would benefit from treatment 2 was changed until a point of indifference with treatment 1 was reached. At decision points in the PTO exercise, respondents were asked to articulate why they made the choices they did. Specifically, they were asked 'Could you please tell me why you made this choice?' At the end of the interview socio-economic data were collected.

Interviews were conducted over a 2-week period in late July/early August 1995. The sample was a convenience sample drawn from secretarial, administrative and academic staff of various departments at The University of Newcastle-Upon-Tyne. Each respondent was paid £10 for participating. All interviews, with the consent of the respondents, were tape-recorded.

RESULTS

Descriptive analysis

In total, 28 interviews were conducted. As expected, the sample was more qualified (61% had a degree) and younger (the mean age was 33) than a representative sample of the general public would have been. The mean interview time was 42 min with a range of 30–55 min.

Table 1 shows the state that was used in the PTO exercise for each respondent. The most frequently chosen states are 21222, which is chosen nine times and 11122 which is chosen 7 times. Given that each respondent's ranking of the health states was central to the identification of an interval state, the ranking data were checked for any obvious patterns of response. For example, it was checked whether one particular ranking was chosen most frequently as the interval state and whether the difference in rankings between the two states in T1 influenced the choice of the interval state in T2. Somewhat reassuringly, no obvious patterns were apparent from this analysis.

Table 1. Results from the PTO exercise

Respondent no.	State used in PTO as endpoint of T2	T2/T1
7	11122[a]	1.00
17	21222[a]	1.00
18	21222[a]	1.00
6	11121[a]	2.86
14	11122[b]	2.50
22	21222[a]	2.50
24	11112[a]	2.50
28	21222[b]	2.00
3	11131[b]	1.43
29	21222[b]	1.05
9	11131[a]	0.05
12	21222[a]	0.05
2	22112[b]	0.30
19	22122[b]	0.35
5	11122[a]	0.40
8	22112[a]	0.45
20	11121[a]	0.45
26	21222[b]	0.45
10	11122[b]	0.50
25	11121[b]	0.50
4	11122[b]	0.60
21	22112[a]	0.70
23	22112[a]	0.75
27	21222[b]	0.75
15	11122[a]	0.80
11	11122[a]	0.90
16	21222[b]	0.95
13	Non-response	Non-response

Geometric mean of T2/T1 = 0.694.
[a] Interval state used in PTO.
[b] 'Worse than' interval state used in PTO.

Comparing individual preferences with PTO responses

In the comparison of treatments exercise, each respondent identified two treatments (T1 and T2) that for them yielded the same benefit. Therefore, if an individual feels the same about the treatment of other people as they do about their own treatment, then their PTO response should be that they are indifferent between 10 people receiving T1 and 10 people receiving T2. In this case, the ratio of the number of people receiving T2 that is considered equivalent to the number of people receiving T1 would be 1. A ratio > 1 implies that, in the treatment of other people, the respondent prefers T1 to T2, whilst a ratio < 1 implies that the respondent prefers T2 to T1.

The PTO ratios for each respondent are shown in Table 1. It can be seen that only three respondents consider that ten people receiving T1 yields the same social value as ten people receiving T2. Of the remaining 24 respondents who answered the PTO question (the one non-response is discussed below), seven prefer T1 to T2 whilst 17 prefer T2 to T1. The proportion preferring T2 is statistically significantly different from the proportion preferring T1 ($p < 0.01$). In aggregate, the preference for T2 is reflected by a geometric mean of 0.7 which suggests that, on average, ten people receiving T1 yields the same social value as 7 people receiving T2.

Qualitative responses from the PTO exercise

Of the seven respondents who preferred T1, five commented on the fact that they would prefer to help those who were worse-off; for example, No. 24 said '*The group which needs treatment 1 is the group suffering the most*'. The other two respondents who preferred T1 stated that they felt T1 gave a greater improvement in health. Of the 17 respondents who preferred T2, 12 commented that T1 did not offer a great deal of benefit to those receiving it; for example, No. 15 commented '*I'm thinking about quality of life . . . I would say that treatment 2 was a definite improvement . . . in treatment 1 the difference isn't so great*'.

In thinking about their PTO response, three respondents (all of whom preferred T2) mentioned that they were considering the implications of their choice for society as a whole (for example, the costs of keeping people in a particular health state). There was one non-response to the PTO question (No. 13). This respondent refused to take part in the exercise on the grounds that a decision about which patients should be given priority was one that the public should not be asked to make. Instead, those with more knowledge and experience in making such decisions should decide.

DISCUSSION

The principal aim of this study was to test whether two treatments that are considered equivalent by an individual are also considered equivalent when the same individual has to make choices about the treatment of other people. When asked to compare two treatments using the PTO method all except three respondents strictly prefer one treatment to the other, despite the fact that the two treatments are considered to be of equal value (according to the comparison of treatments exercise) for respondents themselves. This suggests that social choices are indeed considered differently from individual ones. Specifically, the results presented here suggest that, for the majority of respondents, when faced with a choice, it is better to give treatment to someone who is in a *less* severe health state to start off with. This finding runs counter to results obtained by Nord [8] which suggest that (for a Norwegian population) pre-treatment severity is a more important explanatory variable in PTO responses than treatment effect.

This discussion is premised on the notions that, in the comparison of treatments exercise, respondents were able to identify treatments that genuinely were of equal benefit to them, and that indifference between T1 and T2 is maintained throughout the interview. Whilst it is impossible to know for certain that we can infer something meaningful about underlying preferences from responses to quite complex questions, there was nothing in the qualitative or quantitative data to suggest that the cognitive burden placed upon respondents was too great. For example, there was no evidence of respondents using simplifying strategies when comparing T1 and T2.

Relatedly, it is possible, as respondents proceed through the interview and become more familiar with the health states, that their preferences may become more refined. In this study, the interval state was determined before PTO valuations were elicited so that respondent burden in the PTO task could be minimised. However, that 14 respondents (two who preferred T1 and 12 who preferred T2) indicated that their choice was based on the fact that one treatment yielded more (or less) benefit than the other, might indicate that preferences did indeed change as the interview progressed. Whilst this possibility cannot be discounted, it is puzzling why so many more respondents should state (in the PTO exercise) that T1 does not confer as much benefit as T2. Indeed the opposite might have been expected, since the move in T2 for eight of these 12 respondents is to a state (21222 or 22112) that, at least in terms of the logical structure of the EuroQol, might be considered to be very close to the initial state (22222).

Whilst undoubtedly there are difficulties associated with comparing PTO responses with the results from the comparison of treatments exercise, the qualitative data do give some more general indications about the degree to which subjects emphasise benefit of treatment relative to initial severity of illness. T1 does confer *some* benefit on those receiving it (they can move from 22323 to 12223) and it would appear that more respondents in this study focused on the benefits from the two treatments (whether they were considered to yield the same benefit or not) than on the severity of the pre-treatment health state, which all respondents considered to be worse in T1 than in T2.

That T2 was preferred by more respondents than T1 in the PTO exercise might suggest that the health state that people are in *after* treatment is also an important consideration. Even after a beneficial treatment, people who receive T1 are still considered to be in a relatively severe health state; they are still extremely anxious or depressed, for example. It may be that unless somebody in a severe state can benefit more substantially from treatment, respondents would rather give a benefit of a similar magnitude to someone who is in a less severe pre-treatment state. It is difficult to tell from the qualitative data the extent to which such considerations were taken into account by respondents but it is another way (in addition to considerations about health gain) in which comments to the effect of 'T1 doesn't do much good' could be interpreted.

CONCLUSION

The use of a convenience sample of 28 respondents does not enable firm conclusions to be drawn from this pilot study and a much larger study is clearly required. Furthermore, it is unclear to what extent the results of this study are a function of the way in which the questions were constructed. For example, would similar results have been obtained if different pre- and post-treatment EuroQol states had been chosen? Despite these considerations, analysis of the quantitative and qualitative data collected in this study suggests that respondents are concerned more about the health gain associated with different treatments, and perhaps also with the health states that people end up in after treatment, than they are about the severity of pre-treatment health states. The results suggest that considerations about individual health gain may not fully reflect social value, but that they do pick up one of the most important decision variables. If this suggestion were to be supported through further research in this area, then individual values could be seen as at least an acceptable proxy for social value.

ACKNOWLEDGEMENTS

The authors would like to thank Richard Cookson, Judith Covey, Mike Jones-Lee, Graham Loomes, Angela Robinson and Anne Spencer for their help in designing this study and Brenda Munoz and Damian Thomas for their help in recruiting respondents. The authors are also indebted to Erik Nord who provided detailed comments on earlier drafts of this paper. Financial support was provided by ESRC Award Number R000234987.

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