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Health priorities and public preferences: the relative importance of past health experience and future health prospects

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Abstract

We explore people's choices where the preference for those with worse future health prospects and the preference for the young over the old conflict. The empirical study used scenarios with four attributes: past years, past health, future years without treatment, and future health without treatment. One hundred respondents ranked various patient groups described in these terms. The results suggest a strong effect of past years: younger groups (40-year-olds) were always chosen over older ones (60-year-olds). Past health was significant in one question but not the other and future health and years without treatment were both non-significant.

JEL classification: I1

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1. Introduction

Cost–utility analysis (CUA) seeks to provide health care policy-makers with information on the health benefits associated with alternative allocation decisions. Since health is a

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function of both length of life and quality of life, the quality-adjusted life-year (QALY) has been developed in an attempt to combine the value of these attributes into a single index number. The QALY is a combination of the value of different states of health (represented on an interval scale, where full health is given a value of one and death a value of zero) and their duration. So, one QALY is equivalent to 1 year of life in full health. In the simplest case, with no uncertainty and no changes in health over time, an individual's health gain from treatment can be represented as $T_1Q_1 - T_0Q_0$, where T is the number of years, Q represents health state values, and the subscripts 1 and 0 represent health with and without treatment.

The crucial step in CUA is that analysts take this model and use it to represent the social value of health care interventions. For this to hold, society must be concerned only with the health gains from treatment. It has long been recognised, however, that other information about the patients' health without treatment and in the past might also be relevant (see, for example, Nord, 1993). Dolan and Olsen (2001) consider four 'streams of health' that might be policy relevant. These are: (1) future health gains from treatment; (2) the future health profile without treatment; (3) the part of the past health profile that was not due to treatment; and (4) the part of the past health profile that was due to health care. In what follows, we will not distinguish between streams three and four, and talk simply about the past stream as the sum of these two streams.

The concern for efficiency – defined here in terms of health maximisation – focuses our attention on stream one, whilst concerns for various types of equity focus on stream two and the past streams, three and four. For example, there are arguments concerned with stream two, such as giving priority to those patients whose health prospects without treatment are very poor, either due to their imminent death (Blumstein, 1997) and/or the severity of their condition (Nord, 2001). The *rule of rescue* is a special case of this, where the argument concerns "identifiable individuals in immediate peril" (McKie and Richardson, 2003). Egalitarian-based 'ageist' arguments such as the *fair innings argument* (Williams, 1997) are concerned also with the past streams, since they imply an aversion to inequality in peoples' lifetime experience of health (and not just their age).

There is empirical evidence suggesting that people are often willing to give the same priority to patients, irrespective of their remaining life expectancies (Dolan and Cookson, 2000) and that they prefer to give priority to those in severe health without treatment (Dolan, 1998; Nord, 1993; Ubel, 1999). There is also empirical evidence suggesting that, other things being equal, people prefer to give priority to younger patients (Cropper et al., 1994; Johannesson and Johansson, 1997; Tsuchiya et al., 2003). But to date there is no evidence that we are aware of that looks at how the concern for a short life expectancy or severity and the concern for the young over the old fare against each other when only one or the other can be satisfied. This short paper reports on an empirical study that sought to do precisely this.

2. Methods

2.1. The questionnaire

The survey consisted of a questionnaire that asked respondents to prioritise between groups of patients with different attributes (see Appendix A). These patient groups were of equal size, and the health gain if treated was held constant across groups. There were two questions in the study that are relevant here (and which were the first ones asked): one about priority for those facing ‘imminence of death’ versus priority for the young over the old, and one about priority for those facing ‘severity of health’ versus priority for the young over the old. The attributes used to describe the patients in each question were: past years (i.e. age), past health, future years without treatment, and future health without treatment. To limit the number of comparisons that each respondent had to make, and to facilitate analysis of the responses, there were only two levels within each attribute. To make things simpler still, future health without treatment were fixed at 100% for the ‘imminence of death’ question and future years without treatment was fixed at 10 years for the ‘severity of health’ question. The fixed health benefit to the chosen group was an additional 3 years in 100% health in the first question, and 30% improvement in health for their 10-year survival in the second question.

Past years were set at 40 and 60 to represent two distinct stages of life. Past health was represented in terms of percentages, and set at 100% and 50%. Participants were told that 100% health was full health and 50% was a health state that was half way as good or bad between full health and being dead. Thus, when 60 years is combined with 50%, this amounts to 30 undiscounted QALYs, which is less than the 40 undiscounted QALYs from 40 years at 100% health. Furthermore, discounted QALYs for 60 years in 50% health will always be smaller than that for 40 years in 100%, provided a shared and positive discount rate is used. Future years without treatment were set at one and six, and future health without treatment was set at 10% and 60%. Whilst some respondents might have problems interpreting health in terms of percentages, we consider this to be a better approach than presenting respondents with health state descriptions, which raises interpersonal comparability problems in relation to how people interpret those descriptions and with how they think about people adjusting to them. Of the eight possible combinations of two levels across the three attributes, the two that contained 40 past years with 50% past health were dropped, as these did not contribute to the issue of whether the priority for the young over the old was applicable to life years or quality-adjusted life years. Thus, the empirical study used six groups described in the attributes above.

If a respondent’s preference is not affected by past years but is affected negatively by future years without treatment in question 1 (or future health without treatment in question 2), then this implies support for the concern for short life expectancy (or severity), over concern for the young over the old. Alternatively, if a respondent’s preference is affected negatively by past years, this provides support for the concern for the young over the old, over the concern for short life expectancy (or severity). Further, by looking at the ranking between 60-year-olds in 50% and 40-year-olds in full health, we are able to see whether the concern for the young over the old is being applied to QALYs in general or life years in particular.

The questionnaire was self-completed by respondents in groups of 6–8, after the questions had been explained to them, and any points of clarification dealt with. The questionnaire presented the six groups in a random order, as shown in Appendix A. Respondents were told that there are not enough resources to treat all of these six groups and initially asked to choose *one* group to treat. They were then asked to imagine that more resources were made available and to rank the remaining groups in order of preference from the second to the sixth. No ties in the rankings were allowed. Respondents were prompted by the facilitator to check whether they understood the issues and the descriptions of the patient groups. Because people's preferences regarding the issues considered here are not readily accessible to them, respondents were given sufficient time and opportunity to reflect upon their responses.

2.2. The analysis

The results are reported in terms of the distribution of respondents who rank a given group at a given ordering, and Borda scores are used to represent the aggregate ranks of the groups. These are calculated simply as 7 minus the rank, so a high score means a high rank. The obvious assumption behind the Borda scores is that rank scores can be treated as if they were cardinal numbers.

Rank ordered logit regression analysis is used to quantify the effect of the different attributes (STATA ver. 8). Three dummies indicating the main effect variables (i.e. past years, past quality of life, and either future years or future quality of life) are used. This procedure takes into account that a given set of ranking comes from a single respondent, i.e. that the individual observations are not independent. A series of interaction terms with the main effects variables and dichotomous background variables listed in Table 1 are also entered. Interaction terms are used, since the rank ordered logit regression procedure does not accept background characteristics themselves as explanatory variables. Further, insignificant interactions are removed by hand to reach a reduced model, since the rank ordered logit regression procedure does not allow for stepwise estimations. A significance level of 5% is used throughout.

Table 1
Respondent characteristics ($n = 100$)

Characteristic	Sample (%)	Yorkshire and Humberside %[a]
Sex		
Male	42	49
Female	58	51
Age group		
16–44	38	49
45+	62	51
Employment status		
Employed	42	56
Retired	35	23
Other	23	21
Degree or equivalent		
Yes	38	13
No	62	87
Smoker		
Yes	19	29
No	81	71

[a] The data for Yorkshire and Humberside are taken from *Regional Trends 37*, National Statistics for the year 2000.

It should be noted that since the logit regression is based on an unobserved latent variable underlying the observed dependent variable, and the regression coefficients are in units of this unobserved variable, there are no straightforward quantitative interpretations of the raw regression coefficients. However, the predictions from a rank ordered logit regression will give the probability that a given group is ranked first. The performance of the model is measured in two ways: first, by comparing the rank ordering of the predicted probabilities with the rank ordering of the actual choices as represented by the Borda scores; and second, by looking at the product moment correlation between the predicted probabilities and the Borda scores.

2.3. The respondents

The study was carried out in Sheffield in summer 2002. The nature of the questionnaire meant that it was not really amenable to a postal survey. Since face-to-face interviews in respondents' homes are very resource intensive, we decided to ask respondents to attend small group meetings where they would have the questionnaire introduced to them and then they would complete it on an individual basis. Letters of invitation were sent out to 2000 people on the electoral register in two wards in Sheffield inviting them to participate in the study. In total, 257 people (13.2%) agreed to participate. Because of limited resources and to try and get a sample that bore some relationship to the age and sex structure of the general population, 192 respondents were selected, based on information on their age and sex obtained from their reply slips. Of these, 128 (66.7%) people attended a total of 24 groups, with 5–8 people in each group.

Because the study was administered in the dynamics of a group setting, there was no fixed detailed protocol for how the questionnaire was introduced. However, there was a general structure for the facilitator to follow during the discussion groups, and the same researcher introduced it to ensure some consistency across the groups. Since this was not intended to be a qualitative study, the actual discussions were not recorded.

The questions reported here went through a few revisions, and so data are reported for only 19 of the 24 groups. The characteristics of these participants, and how they compare with the local general population, are shown in Table 1. It can be seen that the sample were older and better educated than would have been the case had the sample been representative of the wider population. Six respondents did not complete the ranking task, and in most cases indicated only their most preferred group, so these have been excluded from subsequent analysis, leaving 100 usable responses.

3. Results

Table 2(a) and (b) shows how the respondents ranked the six options in question 1 on imminence of death versus the concern for the young, and question 2 on severity of health versus the concern for the young. The scenarios are in descending order of the Borda scores (i.e. from the highest ranked to the lowest ranked). It is clear that, across the two questions the most important attribute is age: 40-year-olds always get a higher ranking than 60-year-olds. After age, those with the better future prospects without treatment will be ranked

Table 2
Ranking results for questions 1 and 2

Past years (age)	Past health	Future years without treatment	Rank 1 (%)	Rank 2 (%)	Rank 3 (%)	Rank 4 (%)	Rank 5 (%)	Rank 6 (%)	Borda score	Predicted probability of first rank
(a) Ranking results for question 1: ‘imminence of death’ vs. the concern for the young[a]										
40	**100**	**6**	26	**39**	12	11	10	2	4.54	0.40
40	**100**	**1**	**30**	29	10	21	13	7	4.11	0.19
60	**50**	**6**	13	12	20	**34**	13	8	3.54	0.13
60	**100**	**6**	21	11	24	7	12	**25**	3.47	0.15
60	**50**	**1**	7	12	24	10	16	**31**	2.91	0.06
60	**100**	**1**	3	7	10	17	**36**	27	2.47	0.07
Past years (age)	Past health	Future health without treatment	Rank 1 (%)	Rank 2 (%)	Rank 3 (%)	Rank 4 (%)	Rank 5 (%)	Rank 6 (%)	Borda score	Predicted probability of first rank
(b) Ranking results for question 2: ‘severity of health’ vs. the concern for the young[b]										
40	**100**	**60**	31	**32**	15	8	10	4	4.54	0.37
40	**100**	**10**	**39**	17	12	13	15	4	4.40	0.23
60	**100**	**60**	13	20	21	6	12	**28**	3.32	0.12
60	**50**	**60**	7	13	**23**	21	22	14	3.20	0.12
60	**50**	**10**	5	14	15	19	15	**31**	2.79	0.08
60	**100**	**10**	5	4	14	**33**	26	18	2.75	0.08

The mode is in bold.

[a] Future quality of life without treatment is 100% across all groups. If treated, all patient groups will get an additional 3 years of life in 100% health.

[b] Future number of years without treatment is 10 years across all groups. If treated, all patient groups will get a 30% improvement in quality of life for their remaining 10 years.

Table 3
The results of the rank ordered logit regressions

	Q1		Q2	
	Model 1	Model 2	Model 3	Model 4
pt	**−1.518**	**−1.119**	**−0.736**	**−0.986**
pq	**−1.003**	**−0.735**	0.094	0.044
ft	−0.032	−0.141		
fq			0.066	0.230
pt × gen	**−0.791**	**−0.617**	−0.127	
pt × age	**0.737**	**0.688**	0.304	
pt × econ	−0.385		−0.399	
pt × dgr	0.471		0.241	
pt × smk	0.493		−0.383	
pq × gen	−0.153		−0.257	
pq × age	**0.628**	**0.552**	0.265	
pq × econ	−0.361		−0.340	
pq × dgr	**0.586**	0.327	0.311	
pq × smk	0.441		−0.079	
ft × gen	−0.373			
ft × age	**0.803**	**0.865**		
ft × econ	**−0.476**	−0.461		
ft × dgr	**0.620**	**0.593**		
ft × smk	0.174			
fq × gen			0.301	
fq × age			**0.719**	**0.589**
fq × econ			**−0.688**	**−0.627**
fq × dgr			**0.817**	**0.775**
fq × smk			**−0.759**	**−0.635**
LR chi^2	**139.8**	**129.9**	**118.3**	**109.2**

The table presents the β coefficients. Coefficients with $p<0.05$ are in bold. Q1, question 1 on "imminence of death" vs. the concern for the young; Q2, question 2 on "severity of health" vs. the concern for the young; pt, past years (age): 40 years = 0; 60 years = 1; pq, past QOL: 50% = 0; 100% = 1; ft, future years without treatment: 1 year = 0; 6 years = 1; fq, future QOL without treatment: 10% = 0; 60% = 1; gen, gender: male = 0; female = 1; age: 18–44 = 0; 45 or above = 1; econ, in employment = 0; other = 1; dgr, have degree or equivalent = 0; other = 1; smk, smoker = 0; non-smoker = 1.

consistently higher across the two questions. The effect of past health is different across questions: in question 1, other things being equal, those with poorer past health have higher Borda scores, but in question 2, this is not always the case.

The results of the rank ordered logit regressions are summarised in Table 3. The first and third columns are full models, where all interaction terms are included. The second and fourth columns drop all interactions that are not significant in the full specification. Regarding the main effects variables, the sign and the significance are robust across the two estimations within each question. For the first question on imminence of death versus the concern for the young, past years and past health are found to have significant effects, while for the second question on severity of health versus the concern for the young, only past years is significant. The coefficients for past years is negative in both questions, indicating that 40-year-olds are more likely to be chosen than 60-year-olds, which is what would be expected. The coefficient for past health in the first question is also negative, suggesting that those who with past health 50% are more likely to be chosen than those with past health 100%, which is in agreement with the concern for severity. However, this variable is not significant in the second question. Future health in the first question and future years in the second question are also not significant.

Regarding the interaction terms, in the first question, there are seven significant interactions out of the 15. Smoking is the only background characteristic that seems to have no effect. Whereas future years (ft) as a main effects variable is not significant, it does affect the choices made by those aged 45+, those not in employment, and those without degrees or equivalent. In the second question, four interactions are significant, and they all concern future health, which is not significant on its own as a main effects variable. Gender is the only background characteristic that seems to have no effect. Whereas future health as a main effects variable is not significant, it does affect the choices of those aged 45+, those not in employment, those without degrees or equivalent, and those who do not smoke. Past health has no significant effect.

The last columns of Table 2(a) and (b) report the predicted probability of each group being ranked first. For example, Table 2(a) rows 1 and 4 suggest that, when past health is 100% and future years without treatment is 6 years, the probability of the 40 year old group being ranked first is 25 percentage points higher than the 60 year old group. It also shows that this difference depends on the combination of the other attributes. For the first question, the rank order correlation coefficient between the ranking of the Borda scores and the predicted rank ordering is 0.89, and the product moment correlation coefficients between the Borda scores and the predicted probabilities is also 0.89. The corresponding correlation coefficients for the second question are 0.97 and 0.94.

4. Discussion

There is evidence to suggest that people are willing to sacrifice overall health gains in order to give priority to those whose future or lifetime health prospects are poor. In the study reported here, we presented respondents with questions that were designed to contrast the concern for a short life expectancy or severity and the concern for the young. To allow us to consider whether the length of life and quality of life might be treated differently, the health streams in each question were disaggregated into their length and quality components.

The results indicate that respondents in this study are concerned about past years and give priority to the young, suggesting that the concern for the young has indirect support. Preference for past health was mixed. It had a significant effect in the context of imminence of death, but was not significant in the context of severity of health. This is a potentially important finding in that the ‘fair innings’ weights for the quality-adjustment part of the QALY might depend on the context, and be different from those for the life-years component. More generally, it suggests that there might be four streams of health in relation to life years, and another four in relation to quality of life.

If respondents genuinely felt that someone who has lived 40 years in full health has had 'less of a life' than someone else who has lived 60 years in 50% health, then this might be because they think that life has some value over and above that accounted for by the number of QALYs. So when someone dies, their loss (including their social relations, etc.) might be seen as something greater than the sum total of their loss in QALYs. In addition, respondents might have also thought about positive externalities associated with people simply being alive (or at least from being alive in a health state that the individual concerned considers to be better than dead). So the family and friends of a 40-year-olds may be seen as deriving less benefit from that person than the family and friends of a 60-year-olds, even if the former person has experienced more QALYs overall than the latter.

Of course, respondents may have focused on life years for reasons that have more to do with them not processing the information they were given in the ways that were intended. For example, respondents might have considered 50% health to be something that people would adapt to, and therefore saw this number as changing over time (whereas, strictly speaking, the health state associated with a constant 50% health might change). This is something that future research might address, since it is relevant to the calculation of QALYs more generally. In any event, given the number of attributes that we were asking respondents to consider at the same time, it might be that some respondents focused on the more salient one(s), of which past life years might have been one—it was also the first attribute described in each question.

One final caveat is that all of our results are contingent upon the levels of the attributes that were used in the study. And so, for example, we can only be confident that age matters when we compare 40- and 60-year-olds—and that it matters in the specific context of relatively short future life expectancies of up to 10 years. Future studies could certainly explore a range of different values and possibly different health conditions. But subject to this caveat, we have generated data that suggest that the concern for the young has general support—even if this support emanates from respondents focusing on age as the salient attribute in the study.

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Appendix A. The questionnaire

A.1. Question 1

With treatment all groups will get an additional 3 years in 100% health.

	Years	Health
Past health	60	100%
Future health without treatment	1	100%

	Years	Health
Past health	40	100%
Future health without treatment	6	100%

	Years	Health
Past health	60	100%
Future health without treatment	6	100%

	Years	Health
Past health	60	50%
Future health without treatment	6	100%

	Years	Health
Past health	40	100%
Future health without treatment	1	100%

	Years	Health
Past health	60	50%
Future health without treatment	1	100%

A.2. Question 2

With treatment all groups will get a 30% benefit during their remaining 10 years.

	Years	Health
Past health	60	100%
Future health without treatment	10	60%

	Years	Health
Past health	40	100%
Future health without treatment	10	10%

	Years	Health
Past health	40	100%
Future health without treatment	10	60%

	Years	Health
Past health	60	50%
Future health without treatment	10	10%

	Years	Health
Past health	60	100%
Future health without treatment	10	10%

	Years	Health
Past health	60	50%
Future health without treatment	10	60%

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