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PUBLIC PREFERENCES FOR RESPONSIBILITY VERSUS PUBLIC PREFERENCES FOR REDUCING INEQUALITIES

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SUMMARY

In cost-utility analysis, the numbers of quality-adjusted life years (QALYs) gained are aggregated by placing the same weight on each QALY. Deviations from this rubric have been proposed on a number of grounds, including the degree to which persons might be deemed responsible for the illness faced, and inequality in lifetime health between groups. Most research has looked at these factors in isolation. This paper analyses public preferences about the relative importance of these factors. Over 500 members of the general public in the UK are interviewed in their homes. Where "blameworthy" groups experience a moderate drop in quality of life due to their behaviour, they appear to receive higher priority than an otherwise "trustworthy" group if they also experience poorer health prospects because the latter is weighted more heavily than the former. Copyright © 2011 John Wiley & Sons, Ltd.

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1. INTRODUCTION

Economic evaluations compare the costs and benefits of alternative actions, normally identifying the most efficient option from those considered. Within health economics, these actions typically focus on health care, although health care accounts for only a small portion of what makes us healthy or unhealthy. The determinants of health include income, social status, social support networks, education, physical environment, genetics and gender as well as the access to and use of health services (World Health Organization, 2011). Of these, it is arguable that only gender and genetics are entirely out of an individual's control, suggesting that people have some influence over—and possibly some responsibility for—their own health. At the margin, and in possibly limited circumstances, responsibility may be a potential criterion in priority setting in publicly funded health care (Buyx, 2008).

In some circumstances, past behaviour will inform the long-term prognosis after treatment. For example, alcoholics might be deemed to be less likely to benefit from a liver transplantation as continued drinking compromises survival of the replacement organ. Although we acknowledge that such individual behaviours could have a potential prognostic role when comparing individuals with similar conditions, it is not the focus of this article. Instead, we consider responsibility for one's own health as an equity criterion.

To assess responsibility for this purpose, we must compare those deemed relatively 'blameworthy' and those who are 'trustworthy'. The two groups would be identical but for their actions and the consequences flowing directly from those actions concerning their own health. In this case, the blameworthy actions of the former group would be expected to contribute to lower expected lifetime health. Unfortunately, most research eliciting

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preferences over responsibility (Nord *et al*., 1995; Kneeshaw, 1997; Neuberger *et al*., 1998; Ubel *et al*., 1999) consider blameworthiness in isolation from its effect on health inequalities.

This article uses a modified form of the extended fair innings argument, or EFIA (Williams, 1997), to allow the effect of both responsibility and health inequalities to be considered together. The EFIA suggests that reductions in health inequalities are prioritised by placing a lower weight on benefiting those who have experienced (or who are expected to experience) a greater proportion of their 'fair innings'. The EFIA is distinguished from other fair innings arguments (of which several variants exist; see Tsuchiya, 2000) by using quality-adjusted life years (QALYs) instead of simple life years. We consider the degree to which members of the public wish to account for (give less weight to) blameworthiness alongside the degree to which they wish to account for (give more weight to) inequalities in lifetime health. In addition, the study includes a preliminary exploration of the effect of explicitly naming, or labelling, a health problem instead of giving a more generic description.

The remainder of this article is structured in three parts. Section 2 provides details of the methods used, including the elicitation frame and general study design (Section 2.1), the identification and analysis of aggregate outcomes (Section 2.2) and their analysis in terms of trade-offs and the fair innings (Section 2.3). The results of this analysis are presented in Section 3, with these results interpreted in light of previous literature in Section 4.

2. METHODS

2.1. Study design

This article uses data from a study of the public that carried out face-to-face interviews at respondent's homes across 17 areas of England and Wales. Potential respondents were selected on a street-by-street basis to obtain a mixture of gender, schooling and age. The main study questionnaire had 582 respondents (559 with complete data) and took an average of 55 min to complete. The sample obtained tended to be older, more educated and less likely to be employed or belong to ethnic minorities relative to the 2001 UK population (Table I).

This article reports on findings from part of the study, with the full report available elsewhere (Dolan *et al*., 2008; Edlin *et al*., 2009). The analysis here uses data concerning seven *choice sets* involving five states of affairs or 'states'. These states involve two equal-sized groups of people, whose lifetime health prospects are described in terms of durations spent in poor (25%) or full (100%) health. Four of these five states are called *reference states* and are common across all seven choice sets addressed in this article. These reference states are designed so that assuming (i) that more health is preferred to less health and (ii) less inequality is preferred to more inequality, there is a dominant ordering for them. Following convention, we calculated the aggregate amount of expected lifetime health for each group in terms of QALYs—in this case as the number of years in full health plus one quarter of the number of years in poor health. This implicitly assumes that society weights all

Table I. Background of the sample

Sample size		Survey sample (%)	2001 Census (%)
Gender	Female	55	52
Age (years)	40–59	32	33
	60+	32	27
Ethnicity	White	95	92[a]
Employment status	Self-employed	7	8
	Other employed	39	52
	Retired	29	14
Education	School only	47	78[a]
	HE/FE	53	22[a]
House ownership	Owned/mortgage	71	71[b]

[a]Ages 16–74 years only.
[b]Data from the Office of National Statistics, 2000.

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QALYs equally. (The consequences of relaxing this assumption are discussed in Section 4.) Table II illustrates the four reference states used in terms of both their descriptions and the numbers of QALYs these represent.

The additional, fifth state is called the *study state*, which has two variants, A and B (Table III). Neither fits directly into the dominant ordering of the reference states.

The objective of each choice set is to compare one of these study states against the preordered relationship of the reference states. Group 1 in state A is better off than in any of the four reference states unlike group 2, which is better off in none of the reference states. Furthermore, note that inequality (as the difference in health) between the groups is much larger in state A than in any of the four reference states. So taking the two groups overall into consideration, is the study state (state A) as preferable as the first reference state (state P)? Or is it less preferable than the second reference state (state Q) but more preferable than the third (state R)? In the interview, this judgement is achieved by comparing the study state with each of the reference states one by one in a series of four pairwise choices. Then, the exercise moves on to the second study state (state B), which has both higher total health than state A but also more inequality. Of the seven choice sets, four compare state A against the four reference states, whereas the remainder compare state B against the same four reference states. Each choice set includes either 'A' or 'B' in its abbreviation to indicate the study state used.

Choice sets A1 and B1 only involve states of the world in terms of health. However, the remaining choice sets include further information regarding the nature of ill health. Choice sets A2 and B2 involve error caused by the healthcare system, in this case by the National Health Service (NHS) for group 1 and a condition cause, which was 'a combination of factors including poverty, genetics, pollution and *patients' lifestyles*' for group 2 (emphasis added). Choice sets A3 and B3 again involve NHS error for group 1 and a condition cause, which was 'a combination of factors including poverty, genetics and pollution, but is *not caused by patients' lifestyles or by NHS error*' (emphasis added). Choice set A2S is a more specific version of A2 and names 'MRSA ("superbug") infections' and 'obesity' as examples of the health problems. Not all MRSA cases are caused

Table II. The reference states P, Q, R and S

	Group 1 health	Group 2 health
Reference state P	62 years full health 16 years poor health 66 QALYs	60 years full health 8 years poor health 62 QALYs
Reference state Q	60 years full health 8 years poor health 62 QALYs	56 years full health 8 years poor health 58 QALYs
Reference state R	59 years full health 4 years poor health 60 QALYs	54 years full health 8 years poor health 56 QALYs
Reference state S	58 years full health 58 QALYs	52 years full health 8 years poor health 54 QALYs

Table III. Study states A and B

	Group 1 health	Group 2 health
Study state A	66 years full health 8 years poor health 68 QALYs	50 years full health 16 years poor health 54 QALYs
Study state B	72 years full health 16 years poor health 76 QALYs	48 years full health 16 years poor health 52 QALYs

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by NHS error, and not all obesity cases have the same combinations of causes, so this should be seen as an exploratory exercise. Table IV summarises the different causes given in each choice set.

So, to summarise, there are seven choice sets, where each choice set involves questions about five states using four pairwise choices. Pairwise choices are between one of the four reference states and one of the two study states. All states involve two equal-sized groups of people, where the lifetime health prospects of each group are described in terms of years in poor health (25%) and years in full health (100%). In choice sets A1 and B1, no further information is given. In choice sets A2, B2, A3 and B3, different causes of ill health for the groups are given in a relatively abstract manner. In choice set A2S, more specific causes of ill health are named.

2.2. Identification of aggregate outcomes

Aggregate preferences were captured for each pairwise choice in terms of the proportion of respondents choosing one or the other of the paired states, counting indifference as a vote split between both states. These aggregate preferences were used to construct the Thurstone scores (Thurstone, 1927a, 1927b) as an estimate of the social welfare for all five states in a given choice set (the four reference states and the study state).

The construction of the Thurstone scores requires data on the likelihood that each of these five states would be preferred against every *state* including itself—that is, 25 combinations. First, every state is assumed to have a 50% likelihood of being selected against itself. Second, we have the observed data, which provide data for the study state against the four reference states and the reference states against the study states. As $P > Q > R > S$, it is inferred also that $P \succ Q \succ R \succ S$, and this provides the remaining for all possible comparisons of nonidentical states. These values are censored to fall within a permitted range (Guilford, 1954); we used a range of 2% to 98% in the analysis.

Each aggregate preference is first converted into the corresponding z score from the cumulative standard normal distribution. For example, a 75% preference for one state over another becomes a z of 0.67. All the z scores corresponding to a particular state (e.g. A vs A, A vs P, A vs Q, A vs R and A vs S) are then averaged to find the Thurstone scores. These Thurstone scores are consistent with nonscaled utility estimates with a random utility model and allow the measurement of social welfare. In doing so, the social welfare associated with the study states is made comparable with that of the reference states.

A further state called the *equivalent state* is now identified using these social welfare measurements for the each study states, for Q and for R. Suppose that the social welfare of the study state measured in terms of the Thurstone score was halfway those of state Q and state R, then the equivalent state would be placed halfway between the two reference states (Q and R). Thus, in the equivalent state, group 1 would live for 59.5 years in full health, followed by 6 years in poor health, and group 2 would live for 55 years in full heath, followed by 8 years in poor health.

Table IV. The causes of ill health given in each choice set

	Description of group 1	Description of group 2
A1 B1	No information given on cause of ill health	
A2 B2	Those in group 1 experience an illness that is not the result of their lifestyles but is instead caused by errors within the NHS	Those in group 2 experience an illness that is caused by a combination of factors including poverty, genetics, pollution and patients' lifestyles
A3 B3	Those in group 1 experience an illness that is not the result of their lifestyles but is instead caused by errors within the NHS	Those in group 2 experience an illness that is caused by a combination of factors including poverty, genetics and pollution but is not caused by patients' lifestyles or by NHS error
A2S	Those in group 1 experience an illness that is due to MRSA ('superbug') infections picked up after NHS operations	Those in group 2 experience an illness that is caused by obesity

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Comparing these equivalent states across choice sets will reveal information about the importance of cause/responsibility and of naming the different health problems. To provide an estimate of uncertainty, we used bootstrapping to generate 5000 alternative and equally sized samples from our data set. Significance tests for parameters are based on t tests with a significance level of 0.05.

2.3. Analysis of aggregate trade-offs and the fair innings

By design, the study state and the equivalent state of each choice set are deemed to yield equivalent levels of social welfare. If group 1 is better off in the study state than in the equivalent state, then group 2 needs to be worse off in the study state than in the equivalent state to provide indifference between them: this corresponds to the average gradient along a social welfare contour. Thus, we defined the 'trade-off' as the number of QALYs to group 1 that is equivalent to 1 QALY to group 2 under each choice set.

These trade-offs indicate whether people appear to be sensitive to responsibility information but may also be determined by the aggregate difference in health between groups. That is, concerns for both inequality and responsibility inform the trade-offs. However, because the health differences between the groups do not correspond directly to the effect of blameworthy behaviour, we cannot treat this trade-off as providing a comparison between two groups with the same health but for their behaviour.

Instead, we analysed a responsibility effect within a generalised constant elasticity of substitution-form social welfare function (Wagstaff, 1994). Here, social welfare W is given as

$$W = \left[\alpha v_1^{-r} + (1-\alpha)v_2^{-r}\right]^{-\frac{1}{r}} \quad r \in [-1, \infty) \setminus 0$$

where v_i are lifetime QALYs for group i, and r reflects the overall strength of inequality aversion. Here, the weighting parameter α is used to reflect an overall difference in concern over the health to each group and defines the marginal rate of social substitution (MRSS) between two groups in cases where both groups have the same health, that is, along a 45° line through the origin. The weighting parameter can be used to describe preferences other than inequality aversion, and here, it is used to represent preferences over the patients' own responsibility. Generally,

$$\text{MRSS} = -\frac{\alpha}{1-\alpha}\left(\frac{v_z}{v_1}\right)^{1+r}$$

where the health of both groups is equal, $\text{MRSS} = -\alpha/(1-\alpha)$ and the greater is α, the more willing people are to trade-off the health of group 2 to obtain a health improvement for group 1. For example, where $\alpha = 0.75$, society is willing to sacrifice three times (0.75/0.25) as much of group 2's health to aid group 1 (for marginal changes) where both groups have the same lifetime health. See Figure 1, where the axes represent lifetime health of two groups.

Because of the properties of the SWF form (homotheticity), every straight line drawn through the origin has the same MRSS. The MRSS function is continuous, equals zero along the horizontal axis and tends to negative infinity along the vertical axis. By using the intermediate value theorem, one ray drawn through the origin must have $\text{MRSS} = -1$. On this line, society is indifferent to which of the groups would receive a marginal increase in health. We defined the relative fair innings—as a situation giving equal priority to both groups—using this line. Rearranging $\text{MRSS} = -1$, we found that this line can be given as

$$v_1 = \beta v_2$$

where $\beta = (a/(1-\alpha))^{\frac{1}{1+r}}$ is referred to in this article as the 'relative fair innings parameter'. This parameter is a function of both the MRSS along the 45° line and the level of inequality aversion r. Here, $\beta > 1$ would suggest that equality relative to the fair innings would involve group 1 having greater lifetime health than group 2. As an illustration, if $\beta = 1.25$, then 60 QALYs to group 1 and 75 QALYs to group 2 would satisfy equality relative to fair innings but 60 QALYs to each group (equal health achievement) would not.

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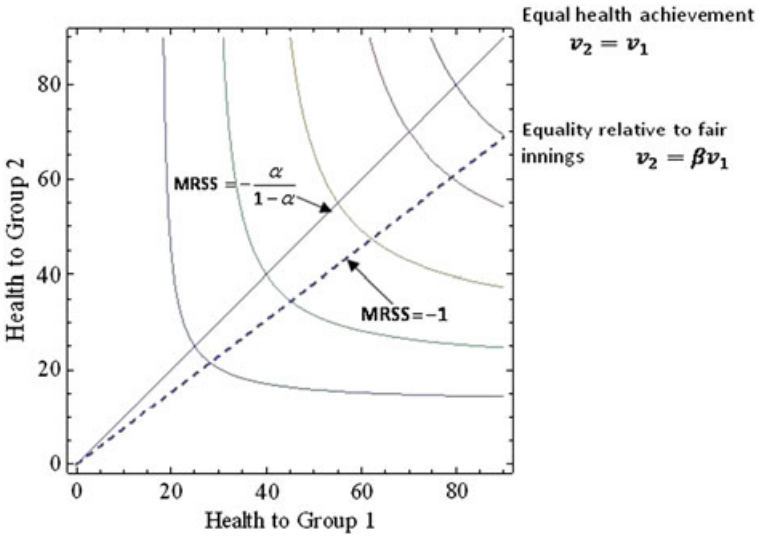

Figure 1. The iso-welfare curves

Values for α are found as follows. In those choice sets that included no responsibility information (A1 and B1), α is set to 0.5 as no differential preference is expected between these groups were they to be in the same expected health. For these cases, the expressed preferences are entirely attributable to the inequality aversion parameter, r. For the remaining choice sets (A2, A3, B2, B3 and A2S), equality in social welfare between the study state and the equivalent state is achieved by varying α using the value for the inequality aversion parameter obtained from A1 or B1. The MRSS along the 45° line is then calculated for each case, as is β. This process is repeated for 5000 cases that resample our initial population with replacement. This builds distributions for the inequality aversion parameters used across choice sets ($r_A r_B$) for the weighting parameters (α_{A2}, α_{A3}, α_{B2}, α_{B3}). To analyse the effect of labelling (i.e. for A2S vs A2), we considered the ratio of QALY trade-offs between them.

Values for the relative fair innings parameters (β_A, β_B) are found by comparing expected MRSS results across choice sets (i.e. as A2 vs A3, or B2 vs B3) for cases where there is no health difference. For example, the ratio of MRSS values based on study state *A* is as follows:

$$\beta_A = \left(\frac{\alpha_A}{1-\alpha_A}\right)^{1/1+r_A}$$

where

$$\frac{\alpha_A}{1-\alpha_A} = \frac{\frac{\alpha_{A3}}{1-\alpha_{A3}}}{\frac{\alpha_{A2}}{1-\alpha_{A2}}}$$

The definition for β_B is entirely similar. Although it is not possible to make definitive statements that people judge outcomes consistent with the form of SWF we used here, the relative fair innings parameter would correspond to the differences between these choice sets were they to definitively do so.

3. RESULTS

Table V reproduces the study states and presents the equivalent state for choice sets A1 and B1. In comparison to the study state A, its equivalent state involves less total health (117 QALYs vs 122 QALYs) and lower

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Table V. Study and equivalent states, choice sets A1 and B1

	Group 1	Group 2	Trade-off
Study state A	66 years in 100% health 8 years in 25% health 68 QALYs	50 years in 100% health 16 years in 25% health 54 QALYs	
Equivalent state	59.23 years in 100% health 4.92 years in 25% health 60.46 QALYs	54.46 years in 100% health 8 years in 25% health 56.46 QALYs	
QALY difference	−7.54 QALYs	+2.46 QALYs	3.07
Study state B	72 years full health 16 years poor health 76 QALYs	48 years full health 16 years poor health 52 QALYs	
Equivalent state	59.23 years in 100% health 4.91 years in 25% health 60.46 QALYs	54.45 years in 100% health 8 years in 25% health 56.46 QALYs	
QALY difference	−15.55 QALYs	+4.45 QALYs	3.49

inequality (4 vs 14 QALYs). Comparing the two states, group 1 is 7.54 QALYs worse off in the equivalent state, whereas group 2 is 2.46 QALYs better off here. As these differences offset each other, the marginal health of group 2 (the less healthy group) appears to be worth around 3.07 (7.54/2.46) times as much as the marginal health of group 1 (the healthier group), as is indicated in the level of trade-offs in the last column. The equivalent states corresponding to study states A and B are very similar; the greater inequality in study state B is consistent with the higher trade-off observed (3.49 = 15.55 / 4.45).

Table VI reports mean trade-offs and their 95% CIs for choice sets A1–A3 and B1–B3. Within A2 and A3, the healthier group 1 has an illness caused by the NHS but the cause for less healthy group 2 differs. In A2, group 2 could be deemed blameworthy, but in A3 they are trustworthy regarding their own health. If responsibility matters to our respondents, then we would expect more willingness to trade-off the health of group 1 to obtain health improvements for group 2 in A3 than in A2. We observed this, with the average trade-off across the estimated cases rising from 2.33 to 2.53.

Table VI also includes the effect of responsibility for own health in terms of the average trade-offs. On average, those deemed to be blameworthy appear to receive less priority than those deemed trustworthy. When comparing A2 and A3, this drop appears to be approximately 8% in magnitude (i.e. from 1.000 to 0.921 using the ratio of trade-offs in each case) and is statistically significant; when comparing B2 and B3, the figure is smaller at 4% (i.e. from 1.000 to 0.962) and is not statistically significant.

There is also some evidence that labelling matters. Comparing the cases where MRSA and obesity labels are used (A2S) to the cases with more abstract labels (A2), the trade-off in marginal health between groups 1 and 2 is lower at 2.01 (A2S; 95% CI = 1.85–2.16) rather than 2.33 (A2). Here, people are willing to place less emphasis on treating obese people's illnesses (vs patients with an MRSA infection) than they place on treating those

Table VI. Effect of responsibility on average trade-offs

		QALY trade-offs (95% CI)
Baseline cases (no lifestyle information)	A1	3.07 (2.78–3.35)
	B1	3.49 (3.29–3.69)
NHS cause vs partial lifestyle	A2	2.33 (2.15–2.51)
	B2	3.08 (2.91–3.26)
NHS cause vs other non-lifestyle	A3	2.53 (2.31–2.75)
	B3	2.97 (2.81–3.12)
Ratio of trade-offs: non-lifestyle vs partial lifestyle	A2/A3	0.921 (0.849–0.993)
	B2/B3	0.962 (0.924–1.001)

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Table VII. Effect of responsibility on fair innings

		Values (95% CI)
Baseline cases: inequality aversion (no lifestyle information)	r_A	6.63 (5.98–7.28)
	r_B	4.76 (4.48–5.04)
NHS cause vs partial lifestyle	$\alpha_{A2}/(1-\alpha_{A2})$	1.32 (1.20–1.45)
	$\alpha_{B2}/(1-\alpha_{B2})$	1.18 (1.12–1.24)
NHS cause vs other non-lifestyle	$\alpha_{A3}/(1-\alpha_{A3})$	1.22 (1.09–1.34)
	$\alpha_{B3}/(1-\alpha_{B3})$	1.13 (1.07–1.20)
Ratio of MRSS figures	For A	0.920 (0.848–0.993)
	For B	0.962 (0.922–1.001)
Relative fair innings parameters	β_A	0.989 (0.979–0.999)
	β_B	0.993 (0.986–1.000)

partially responsibility for their illness (vs where the NHS is at fault). The ratio of these QALY trade-offs is approximately 14% lower (mean ratio = 0.863), and this drop is statistically significant (95% CI = 0.794–0.933). This suggests that people may make distinctions within general descriptions of responsibility as well as between them.

Table VII presents the results in terms of the fair innings parameters alongside the MRSS and inequality aversion parameters underlying this calculation. In the questions based on study states A and B, the relative fair innings parameters are calculated to be 0.989 and 0.983. Overall, there is evidence that responsibility was deemed to matter (i.e. results in a parameter <1) in 98.5% and 96.7% of bootstrapped runs. The results based around study state A suggest that the weight placed on responsibility is significant but those based around study state B suggest it is not. As with the average trade-offs, responsibility appears to matter to people but not by much—being partly responsible for one's illness appears to reduce one's fair innings by only 0.7% to 1.1% of lifetime health.

Finally, there is also some evidence to suggest that NHS causes may be given higher priority than other non-lifestyle cases. Because we would expect both groups to be deemed trustworthy with respect to own health, this suggests that the weighting parameter captures factors other than patients' own responsibility. In A1/B1, we have no information about condition cause, and in A2/B2 both groups are trustworthy (group 1 NHS causes, group 2 non-lifestyle). In both A2 and B2, the willingness to trade-off the health of group 1 falls significantly on both measures. As an illustration, the willingness to trade-off the health of group 1 drops from 3.07 to 2.33 for A1 versus A2, suggesting that NHS causes may have greater priority than other lifestyle cases. However, because it is not at all clear that NHS actions would necessarily affect an individual's right to health care over their lifetime, these findings are not interpreted in fair innings terms.

4. DISCUSSION

Resource allocation decisions must consider issues of both efficiency and equity. Efficiency is more naturally incorporated within economic evaluation, with equity potentially requiring many criteria for comprehensibility. This article has considered equity in terms of both responsibility and lifetime health, where both are potentially relevant if a person elects not to take actions to improve or preserve their own health.

The results provided here suggest that responsibility plays a significant but not necessarily pivotal role in the public's view of priority setting. In all the choice sets considered here, the priority remained to treat those who have less lifetime health. Average trade-offs ranged from 2.33 (A2) to 3.49 (B1). If responsibility matters as a distinct criterion for decision making, it has two effects. First, the *cause* of these reduced prospects leads to lower priority, but the *fact* of poorer health prospects would lead to higher priority. Whether the former or the latter factor dominates will depend on how large the inequality in health is and how averse we are to these inequalities.

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Suppose two groups would have 70 years in full health (i.e. 70 QALYs) if they behaved in a trustworthy way with their own health. Only one group does not behave this way and as a result has less health. The social welfare function allows us to say how much less the health of the blameworthy group would need to be in order for them to be given priority over the trustworthy group. The 1.1% lower fair innings ratio found earlier in Table VII suggests that if the blameworthy group had an expected lifetime health of 69.23 QALYs, then marginal health to them would be given the same priority as marginal health to a trustworthy group with expected lifetime health of 70 QALYs. If the group with a lifestyle-related illness had fewer (more) QALYs than 69.23 QALYs, it would be given greater (lesser) priority. Even in the 'obesity'-labelled case, the effect of responsibility on the fair innings is likely to be small—if considering an 'obese' group associated with a reduction of 14% in the ratio of MRSS figures, then their health needs to be as low as 67.9 QALYs for an 'obese' group to be given the same priority as a 'trustworthy' group with 70 QALYs.

The approach used here is similar in many respects to a recent article (Dolan and Tsuchiya, 2009b) that used the same inequality-based SWF interpretation but did not extend this to a fair innings interpretation. They observed a lower limit for α of 0.31 for a group that has taken care of itself (Dolan and Tsuchiya, 2009a). Interpreted in fair innings terms, $\beta = 0.75$, suggesting that the marginal health to the trustworthy with expected lifetime health of 70 QALYs is equivalent to the marginal health to the blameworthy only if the latter have an expected lifetime health at or younger than 53 years. Although there is no uncertainty estimate around these figures, the effect of responsibility appears much larger than the figures reported here, and so it seems highly likely that the estimates are significantly different. This strongly suggests framing effects and emphasises the importance of recognising methodological uncertainties when interpreting data from any one study. More generally, strong results can be found when single issues such as severity in pretreatment health are considered in isolation (e.g. Nord, 1993). Because decisions must be made on the balance of ethical arguments, we would suggest that public preferences be elicited by considering ethical arguments together.

A second major caveat to the results reported here relates to the social welfare function itself. The social welfare function used earlier represents peoples' preferences over how health is distributed across population groups, implicitly assuming that the amount of health a person has can be measured in QALYs. However, people may care whether or not an individual has 4 years in poor (25%) health or 1 year in full health, although the number of QALYs is the same for that individual. Likewise, illness in early childhood, during child bearing/rearing ages and in old age might carry quite different meanings to people. Again, the SWF based on QALYs will be insensitive to these issues.

Within the same research project, we considered whether these types of factors affected preferences and whether the QALY is the appropriate measure of health to be used in an SWF. The research concluded that the severity of illness appeared to have only a slight effect but that there was some indication that illness during childhood carries special importance when assessing how much health a person has over their lifetime. Hence, the SWF could use an alternative measure of health converted to the equivalent number of years in full health as an adult. In practice, however, this does not affect our results very much as (i) severity in adulthood has a low effect, and (ii) although childhood health is important, none of the responsibility questions varied the health whilst a child. This latter element was deliberate; we judged that it did not make sense to explore responsibility as a potential cause of poor childhood health. The analysis of the present data using this Adult Healthy-Year Equivalents is available elsewhere (Edlin *et al*., 2009).

This article has considered the incorporation and potential effect of responsibility within decision making taking a lifetime health focus. The issue of temporal perspective is vital here and merits further discussion. For decision makers within health care, the objective of health policy is arguably to distribute resources (and typically health care) in a way that balances morally competing arguments. Although efficiency is prospective in the sense that it relates only to the health gains resulting from health care, equity need not be (Dolan and Olsen, 2001). In particular, equity may be thought of as including (but not necessarily limited to) a combination of several different 'health streams' that consider health to date and future health with and without specific interventions. Furthermore, as the current article concentrates on lifetime health, which is the sum of

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retrospective and prospective health, it combines several streams together in a way that may not necessarily reflect the way these are viewed by respondents.

A lifetime view, however, causes some specific difficulties where responsibility is considered. Rather than considering lifetime health as a whole, the health streams between specific time points could be analysed separately. In these cases, the way that responsibility enters a formal framework will differ. Such an analysis potentially needs to discriminate between multiple streams for each time point within life, where these include time of adulthood, time of diagnosis, when specific warnings about the consequences of actions were received, when health consequences were raised more generally and when consensus was achieved about these consequences. It may, for example, be considered less appropriate to punish smokers who became addicted to nicotine whilst children and those who became addicted before the tobacco companies acknowledged the effect of smoking on health.

Other ethical questions would need resolution before a responsibility criterion or parameter can be justified. First, the locus of control (Rotter, 1966) must be clearly defined because a person can only be held blameworthy for that which is substantively within their own control (LeGrand, 1987). If this condition is met, the ethical relevance of responsibility bears close scrutiny, and restrictions may be set regarding when responsibility applies as a criterion (Dolan and Olsen, 2001).

In practical terms, it is unlikely that this complexity can be fully incorporated into a formal framework, and so this article deals with simpler questions than those facing real-world decision makers. These caveats should be considered carefully before attempting to incorporate any values found here or elsewhere into policy. There are also important questions as to the role of these types of preferences in setting health policy. Decision makers are treated as accountable for their own decisions (Daniels and Sabin, 2008) and hence also on the degree to which they rely on preferences that may be very labile. The degree of the methodological uncertainty identified suggests that caution is merited unless decision makers are willing to defend an explicitly normative stance that they would choose to adopt. To the degree that any one article can have influence on this debate, our results suggest that although personal effort may be useful in identifying the source of inequalities, it is less clear that personal responsibility for a patient's own health substantively affects what a fair innings is or indeed what it ought to be.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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