# Eliciting Stated Preferences Regarding Life Extensions Near the End of Life:

# A Pilot Study for a Refinement of the QALY

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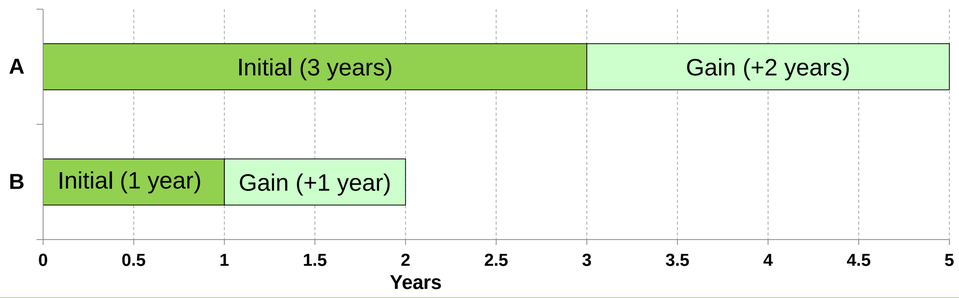
## BACKGROUND AND OBJECTIVES

In January 2009, the National Institute for Health and Care Excellence (NICE) amended its guidelines by awarding special attention to interventions near the end of life. The amendment acknowledges that life and health might be valued more highly when life is more scarce, but is treated as a binary outcome ('end of life' or not).

The amendments to NICE guidelines stated an 'end of life (EOL) criteria' for which interventions may be recommended for approval despite offering additional QALYs at a cost greater than £30,000 per QALY. NICE Committees now consider the following criteria: the patient has less than 24 months' life-expectancy, there is sufficient evidence to show that the new intervention provides at least three additional months of life-expectancy and the intervention is expected to be taken up by a small patient population (NICE, 2009). This guideline change has effectively led to a tiered cost-effectiveness threshold with evidence satisfying all criteria reportedly judged against a higher value.

The main aim of this study was to elicit public preferences at a small, pilot level regarding life extensions near the end of life to provide evidence showing survival gains to be valued either equally or differentially with proximity to the end of life.

### Figure 1: Pairwise choice in the format presented




## METHODS

Stated preference elicitation was used. Students at the University of York, UK, were presented with scenarios A and B graphically and as a text description (Figure 1). Both hypothetical scenarios entailed a number of years left to live with certainty, in a state of perfect health, and an extension obtained from some identical, instantaneous and costless treatment.

The respondents were given the task of imagining themselves as patients in scenarios A and B and choosing which treatment they felt provided a better improvement. It was made clear that the respondent should not automatically choose the option that provided the longest life after treatment without giving consideration to the respective initial life-endowments. They were therefore asked to choose which of the two *gains* they deemed to be most valuable. They could either express a preference or explicitly state indifference.

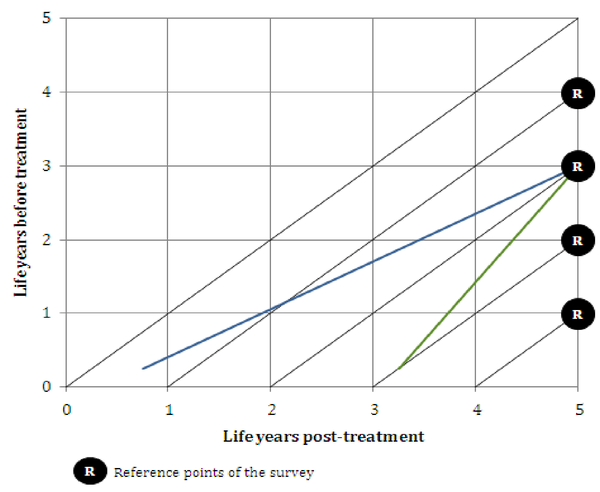
**Statistical analysis** – Since the sample size was small, the non-parametric Wilcoxon signed-ranks test was used to analyse the data. The null hypothesis is: There is no statistically significant variation between the magnitude of gain in Scenario A and that in Scenario B which provides indifference between the two, i.e. $G_B=G_A$.

**Life expectancy matrix (LEM)** – Using a 'life-years before treatment' vs. 'life-years after treatment' framework provides an indifference set, a line upon which no point is any more or less preferred to the other.

The 45° lines on the LEM can be viewed as indifference curves abiding by the assumption that "a QALY is a QALY is a QALY" (Figure 2). Having one year to live before treatment, on the *y*-axis, and one year after treatment on the *x*-axis, provides no gain for the recipient.

The rightmost points of the 45° lines are the reference points of the survey to which the four indifference curves will be connected. If these indifference curves were observed to 'fan out' from a 45° angle by getting closer to the zero-gain 45° line as the initial life endowment falls, this would represent a preference for accepting smaller extensions with less remaining life (blue line). If instead they closely resemble the 45° lines, then participant's preferences indicate that a QALY gained is always valued the same, regardless of how close to the end of one's life it is obtained. Indifference curves falling to the south-east of their reference point's 45° line – and so fanning away from the central zero-gain line – would be deemed not to favour EOL care (green line), instead requiring larger gains at smaller initial life-endowments.

### Figure 2: Illustrative life-expectancy matrix

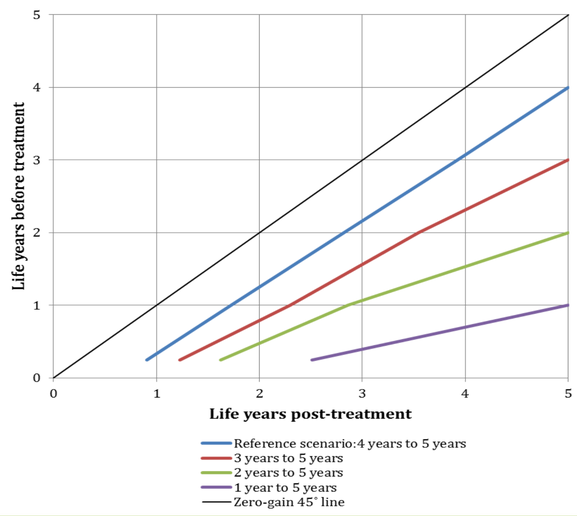



## RESULTS

Thirty-one valid sets of data were obtained. For all ten questions the mean gain in B generating indifference with A is smaller than the gain in A. These results are indicative of a preference for accepting EOL treatments that provide smaller life extensions, compared with treatments when death is more distant. A one-tailed Wilcoxon signed-ranks test showed that the result was significant for all questions (eight questions: $p<0.001$, two questions: $p<0.05$). This suggests that the median extension required in B *is* smaller than that in A, resulting in the rejection of the null hypothesis. Figure 3 shows the mean average indifference curves across all individuals. The indifference curves are all observed to have a slope shallower than 45°, getting closer to the central zero-gain line as pre-treatment life-years are reduced**.**

A QALY 'weighting factor' was calculated by taking the gain in Scenario B as a proportion of the gain in Scenario A, then the ratios were averaged for each question to give a mean ratio. The inverse of the ratios provides a 'weighting factor'. Weights decrease as initial life-years approach 4 years where they are assumed to take a value of 1 (initial life endowment 0.25, 1, 2, 3, respective weighting factors 1.846, 1.5, 1.54, 1.075). As such, adjusting a QALY gained by its corresponding weight would increase its value relative to a QALY gained beyond an initial endowment of 4 years.

### Figure 3: Whole sample life-expectancy matrix




## CONCLUSIONS

The results suggest a more refined recognition of EOL care than current NICE practice. The QALY weights provide no need to place a variable monetary value on QALYs instead, the QALY is adjusted to take into account how close the patient is to EOL. Based upon these results, a patient with one year left to live would have all potential QALY gains increased by a factor of 1.500. A gain of two months, which would be rejected for special consideration by NICE's current EOL criteria, would be increased to an effective three months, improving its cost-effectiveness ratio. This new measure – the *quality and remaining-life adjusted year*, or QARLY – offers a more refined sliding scale, 'stepping' down towards one at higher initial life-years.

***References*:** NICE. Appraising life-extending, end of life treatments. 2009

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