

Eliciting Visual Analogue Scale (VAS) valuations: Instructor guide. **Nancy Devlin, City University**

This exercise is suitable for a one-hour class, and can provide a very effective 'hands on' introduction to the VAS valuation of generic health states, suitable for students at both under- and post-graduate level.

For this exercise, you need photocopies of the 'Health Questionnaire' (attached) for each student.

Note: This questionnaire is provided for the purposes of this exercise only – although it seeks valuations for EQ-5D states, and has been used in a general public survey, it is not an official EuroQol Group instrument, and should not be distributed or used for research purposes.

Instructions:

- Distribute the 'Health Questionnaire'. Without further preamble, ask the students to complete the questionnaire on their own. Emphasise that their responses are anonymous – but ask each to write a 4-digit code at the top of the front page that they can use to identify their own response (but which protects their anonymity).
- When all the questionnaires are completed, the instructor collects them, shuffles them, and hands one to each of the students. Each student will therefore have in front of them one completed VAS valuation questionnaire which is not their own.
- The remainder of the class is devoted to a structured discussion/examination of the VAS valuation exercise (see instructor questions/guide below) where the student is asked to reflect on their own experience in completing the VAS valuations, and to consider the steps involved in analysing the data they have in front of them, and from the entire class. Following the class, the instructor collects all the completed questionnaires, and enters the data into an excel spreadsheet. These data can then be provided to students (eg. via WebCT) to conduct further analyses on eg. as part of a coursework exercise.
- A considerable number of published VAS data sets exist, which students can use as a basis for comparing their class results with those for various samples of the general public.

Structured class discussion

Notes for the instructors for some of the questions are provided in italics.

1. What challenges did you yourself encounter in completing the questionnaire?
2. The questionnaire asked you to provide VAS valuations for a series of health states described in generic terms. Looking at the completed questionnaire you have been handed,
 - i. How many dimensions are there in this descriptive system? (Do you know what this particular generic health state classification system is called?)

5 dimensions. The questionnaire seeks values for the EQ-5D, one of the most widely used generic health state descriptive systems. See: www.euroqol.org

- ii. How many levels are there in each dimension? 3
- iii. How many health states are described by this system?
243 plus unconscious (which is undefined within the descriptive system itself)
- iv. 'Code' each state on p.5 and 6 by writing it next to the box eg. 11211; 11111; 21232; etc. What meaning/purpose do these codes have?

They are simply a convenient way of summarising or describing each health profile. The levels (1, 2 and 3) within each dimension only have an ordinal (ranking) property – they have no cardinal interpretation, and cannot be added or summed up across dimensions.

- v. The states on p.5 and 6 don't seem to appear in any particular order of severity – that is, they are not ranked from best to worst as displayed on the page. Why might the questionnaire have been designed like this?

To avoid 'leading' (biasing) the participant's responses. Also, there is no 'correct' prior ranking of EQ-5D states. For some there is an a priori logical ordering we would expect to see reflected in the values (eg. 11111 is better than 22222) – but for others, how they are ranked depends purely on the participant's preferences (eg. 21111 vs. 11112).

- 3. Can you think of any means by which we could judge the quality of the valuation data you have in front of you?
 - i. Are there many missing values? (health states on p. 5 and 6 which have not been valued)
 - ii. Has a value for 'dead' been provided on both p. 5 and 6?

Missing values for dead are a common and important problem with the use of this questionnaire. It is not unusual for a third of respondents' valuations using questionnaire such as this one to be 'wasted' because they have omitted to value dead. Valuations without 'dead' cannot be used, since they cannot be rescaled to the anchors of 11111 = 1 and dead = 0. More recent research has focussed on alternative ways of dealing with dead in visual analogue scale-type valuations, and appear to overcome this problem (Devlin et al 2005).

- iii. Two of the states (11111 and 33333) appear on both pages 5 and 6. How might this be used to check for consistency?
- iv. Is 11111 = 100? If not, how might this be interpreted?
- v. Logical consistency: looking at the EQ-5D profiles, between which of these is there an a priori logical ranking of states? How might these provide a basis for testing the quality of the valuation data?
- vi. Any other means by which we could judge the quality of these data? To what extent can we be confident that these values are a good representation of the underlying preferences of participants?

This is an issue not just for VAS, but for all stated preference approaches to health state valuation such as TTO and SG. For a discussion of other sorts of data quality problems that can emerge with VAS valuation, see Devlin et al (2004).

4. Re-scaling to 0 = dead

Using a calculator, use the equation:

$(H_i - d)/(11111 - d)$ to re-scale values to 1 = 11111 and 0 = dead.

where

H_i = the VAS rating for any given health state

11111 = the VAS rating for full health

d = the VAS rating for dead

to re-scale the valuations in the questionnaire you have been given. How does this re-scaling effect the valuations? Check that your calculations make intuitive sense.

5. What do you think the purpose might be of p 1-2 of this questionnaire?

p. 1-2 is generally thought of as a warm-up exercise for the valuation task, as it helps familiarise participants with the idea of describing health in generic terms, and the use of the VAS to rate an overall state (their own).

6. How might the 'background information' on p. 8-10 be used by the analyst?

(i) To check whether the sample is representative of the general population in socio-demographic terms. (ii) To facilitate analyses of the extent to which there are important differences between sub-groups in terms of their health state valuations.

7. At the end of this class, I will collect all the questionnaires, and enter the data onto excel. Outline the steps that you would take for the statistical analysis of these data.

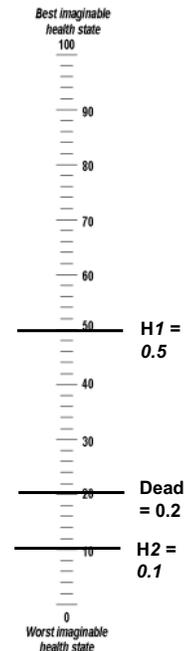
- *Consider where data quality issues justify excluding some participants' responses (for standard exclusion criteria see Devlin et al 2003).*
- *Re-scale remaining data*
- *Examine the mean and standard deviation of values for each state.*
- *Compare your results with those from other VAS studies (both nationally and internationally) to check for any interesting or unusual characteristics of the valuations. (see Szende et al 2007).*
- *Check the extent to which the sample is representative of the general population it is intended to represent.*
- *Using regression analysis, use the elicited values to model the values for all 243 states. (see Dolan 1997).*

8. VAS valuations are often asserted to be an inferior means of eliciting health state values compared to the other principal methods (eg. TTO, SG). What are alleged advantages and disadvantages of each method?

There is a considerable literature on this. Drummond et al (2005) provides a useful starting point. A widely held view among health economists is that the VAS is inferior to 'choice based' methods such as TTO and SG, and that it is not appropriate to use VAS valuations in cost utility analysis. Parkin and Devlin (2006) question whether that view is justified.

Visual analogue scales

- ❑ Valuations for reference states 'full health' and 'dead' are required.
- ❑ Rescaling: $(H_i - \text{dead}) / (1 - \text{dead})$
- ❑ States worse than dead have a negative score after rescaling.
- ❑ Issues with bounding valuations >1 and <1
- ❑ rescaled $H1 = (0.5 - 0.2) / (1 - 0.2) = 0.375$



[excerpt from lecture slides]

References:

Devlin, N., Hansen, P., Herbison, P., Macran, S. (2005) A 'new and improved' EQ-5D valuation questionnaire? Results from a pilot study. *European Journal of Health Economics* 6(1): 73-82.

Parkin, D., Devlin, N. (2006) Is there a case for using visual analogue scale valuations in Cost utility Analysis? *Health Economics* 15:653-664.

Devlin, N., Hansen, P., Selai, C. (2004) Understanding health state valuations: a qualitative analysis of respondents' comments. *Quality of Life Research* 13(7) 1265-77.

Devlin, N., Hansen, P., Kind, P., Williams, A. (2003) Logical inconsistencies in survey respondents' health state valuations – a methodological challenge for estimating social tariffs. *Health Economics* 12(7): 529-544.

Dolan P (1997) Modelling valuations for EuroQol health states. *Medical care* 35(11) 1095-1108.

Drummond M, Sculpher M, Torrance G, O'Brien B, Stoddart G. (2005) *Methods for the economic evaluation of health care programmes*. Oxford University Press.

Szende A, Oppe M, Devlin N. (2007) *EQ-5D value sets: Inventory, comparative review and user guide*. Springer.