

Health Utilities in Cost-Effectiveness Analyses: Whose Preferences Count, and How?

Luke Connelly, PhD

Professor of Health Economics
The University of Queensland
Australian Centre for Economic Research on Health (ACERH)
Centre of National Research on Disability and Rehabilitation Medicine (CONROD)
School of Economics and School of Medicine

27th International Congress on Applied Psychology, 2010

Hawking

Preface to *A Brief History of Time* (1988, pp.ix-x)

Apart from being unlucky enough to get ALS, or motor neurone disease, I have been fortunate in almost every other respect. The help and support I received from my wife...and my children...have made it possible for me to lead a fairly normal life and to have a successful career. I was again fortunate in that I chose theoretical physics, because that is all in the mind. So my disability has not been a serious handicap (Hawking 1988, pp.ix-x, my emphasis).

Sen

Disability and Justice (2004, p.4)

The disabled person's claim to social help should not really go away so long as significant capability deprivations remain, no matter what level of mental pleasure or happiness the person succeeds in creating for herself despite her handicap.

Introduction

- 1 Economic evaluation and utility measures
 - 1 CUA ratios and denominators
 - 2 Whose preferences and what policy implications?
 - 3 Why do results differ?
- 2 Empirical results for people with hearing loss in Australia (Australian Captioned Telephone Study)
 - 1 General measures of Health-Related Quality of Life (HRQoL)
 - 2 Hearing-specific measures of HRQoL
- 3 Conclusions.

Rationale for Economic Evaluation

- To assist in the allocation of scarce resources in such a way that maximises social welfare
 - utilitarian conception of well-being (social welfare is maximised when the sum happiness of individuals is maximised)
 - potential-Pareto or Kaldor-Hicks criterion

Cost-Utility Analysis (CUA)

- A type of cost-effectiveness analysis (CEA)
 - CEA involves monetisation of costs and non-monetised (homogenous) measures of output/outcome.
- Used to compare interventions that may affect quantity and/or quality of life
 - health sector interventions do not have homogenous effects on health-related quality of life (HRQoL)
 - CUA is an attempt to measure effects in homogenous units so that cost-effectiveness of interventions may be compared.

Outcome Measurement in CUA

- The quality-adjusted life-year (QALY) is the most commonly-used denominator in CUA
 - and the cost-effectiveness ratio (CER) that is produced is a cost per QALY
- The benefit of using a QALY-type measure is that interventions of disparate kinds, on various conditions, may be compared.

How are QALYs Generated?

- The standard gamble (SG) approach
- The time trade-off (TTO) approach
- Pre-scored multi-attribute utility measures (derived from one of the foregoing approaches)
 - e.g., AQoL, EQ-5D, HUI, SF-6D

How are QALYs Generated?

- Objective: to generate a preference-based measure of health states
 - disutility of states worse than “perfect health”, “full health”, “best health imaginable”, etc.
- Outcome measures lie on zero (death)-one (perfect health) scale
 - some approaches: -ve values for states worse (in the view of respondents) than death

How are QALYs Generated?

- Abstracting from the precise *method* used to elicit HRQoL preferences:
 - suppose we elicit a mean HRQoL value for a given (ill-)health state of 0.5
 - complete alleviation of the disutility caused by that health state would generate 0.5 QALYs per year
 - so an individual who lives for 10 years with restored health experiences a gain of 5 QALYs
 - and, if the cost of the intervention were \$220,000, the (undiscounted) CER is $\$220,000/5 = \$44,000$ per QALY

Whose Preferences?

- Washington Panel on Cost-Effectiveness in Health and Medicine (Russell et al. 2006)
 - values should be obtained from the general population
 - this recommendation is generally followed in the health economics literature
 - and has been adopted formally by a number of countries that have institutionalised CEA of health technologies
 - see, e.g. Mann, Brazier and Tsuchiya (2008)
- However: in intervention studies (e.g. RCTs) values elicited from intervention and control groups may be appropriate.

Rationale for Population-Based Measures?

- General population typically represents the “society” whose welfare is to be maximised
 - i.e., these economic approaches are designed to help allocate scarce resources in a way that maximise social welfare
- Concern: will health state valuations by the general population be *biased*?
 - the question of what “bias” means in this context turns out to be critical

Other Possibilities for Health State Valuations

- Ask panels of professionals (“experts”)
- Ask individuals who have the condition (“consumers”, “patients”)
 - and/or individuals (e.g., parents, carers) who are in close contact with the group with the condition of interest

How Would the Results Differ?

- In general, not in the way that advocacy groups seem to expect
 - or, at least, not in a way that would benefit their causes
- More often than not, utility-type measures of health are *higher* when elicited from consumers than the general population.

How Would this Affect CUA Results?

- For a given intervention that raises HRQoL, (higher) consumer-elicited utilities would *increase* CERs (i.e., *lower* CE)
- For example
 - the hypothetical intervention with cost of \$220,000 and utility weight of 0.5, CER was \$44,000
 - if the consumer-elicited utility were, say, 0.7
 - QALYs saved over 10 years=3 and the CER is $\$220,000/3=\$73,333$

How Might this Affect Policy?

- Assume a CE threshold of AU\$60,000 is enforced
 - interventions that cost \leq \$60,000 are subsidised (and *vice versa*)
- The population values would lead to subsidisation of the intervention
- The consumer values would lead to rejection of a subsidy for it.

Empirical Evidence

- de Wit et al. (2000) review of 38 separate studies
 - 27 produced differences between population and consumer groups
 - 22 produced higher consumer than population ratings
 - 2 produced lower consumer values
 - 3 produced contradictory results

Reasons?

- Consumers and population may interpret health states differently because (Ubel et al. 2003), e.g.
 - of different assumptions about recency of onset and comorbidities
 - consumers may adapt to their health state and the public may not anticipate adjustment
 - response shift
 - e.g., HRQoL in the pre-morbid state is revised in the light of the health state see, e.g. Joore et al. (2002)

Reasons? (cont'd)

- focusing illusions
 - neglect “obvious” aspects of unfamiliar health states
- contrast effects
 - where negative life events make people less bothered by less severe negative life events
- different vantage points
 - e.g., consumers focus on HRQoL gains and the public focuses on HRQoL loss

Reasons

...decision utilities will always reflect the focus of the respondent's attention at the time of the assessment, rather than what they will attend to while experiencing a particular health state.

*Patients' decision utilities may be free of some of the biases associated with public values but they **do not take due account of any losses associated with adaptation that may have already taken place.***

*Whilst the public may overestimate the losses associated with a given state of health, **patients may underestimate such losses** and, importantly in a policy context, the relative ranking of different health states may well vary from one another (Dolan and Khanemann 2008, p.217)*

Hearing Loss

- Some people who are “capital-D Deaf” (pre-lingually deaf and communicate by signing) do not regard their hearing deficit as a disability
 - a “cultural-linguistic experience” (Access Economics 2006)?
 - Pre-lingually deaf US couple: sought an IVF donor with 5 generations of deafness in his family to maximise chance that their baby would be born deaf (Savulescu 2002)
- By contrast Smith-Olinde et al. (2008) found that carers of children with mild-profound deafness suggested very substantial HRQoL losses, attributable to hearing disability.

Hearing Loss

WHO-QoL Scale	A: hearing (general population) (<i>n</i> =2048–2055)	B: people with an acquired hearing loss (<i>n</i> =369–371)	C: signing deaf people (<i>n</i> =228–232)
Physical	76.92 (17.68)	71.68 ^α (18.49)	68.13 ^α (14.38)
Psychological	74.02 (15.68)	63.83 ^α (18.60)	64.16 ^α (17.17)
Social	71.83 (18.52)	62.15 ^α (23.47)	70.19 (18.06)
Environment	70.38 (14.17)	68.09 ^α (16.29)	67.68 ^α (14.51)

Source: Fellingner et al. (2007)

Hearing Loss

- Australian Captioned Telephone Study (ACTS)
 - convenience sample of people who expressed interest in trial of captioned telephone services
 - sample frame $n=176$; respondents $n=133$ (RR 76%)
 - complete responses to Assessment of Quality of Life (AQoL) instrument (Hawthorne et al. 1999) $n=109$

Results and Comparison

Authors	Participants	Mean	95% CI
[Osborne et al., 2003]	Influenza	0.72	0.66-0.78
[Hawthorne et al., 2003]	Other Depression	0.71	0.67-0.73
[Hawthorne et al., 2004]	Cochlear implant users	0.64	0.56-0.72
[Hawthorne et al., 2001]	Hospital outpatients	0.63	0.60-0.63
[Hawthorne et al., 2003]	Major Depression	0.54	0.50-0.58
[Herrman et al., 2002]	Psychosis	0.50	0.45-0.55
[Connelly 2010]	ACTS	0.49	0.45-0.53

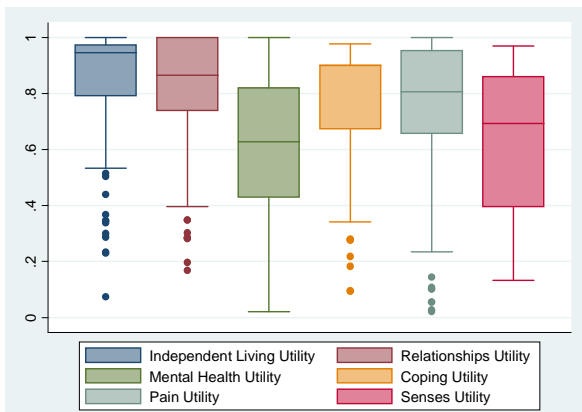
Source: [Hawthorne and Osborne, 2005], except data in blue.

Results and Comparison

Authors	Participants	Mean	95% CI
[Connelly 2010]	ACTS	0.49	0.45-0.53
[Hawthorne et al., 2001]	Hospital inpatients	0.47	0.43-0.51
[Goldney et al., 2001]	Suicidal ideation	0.45	0.38-0.52
[Sturm et al., 2002]	Stroke	0.40	0.33-0.47
[Osborne et al., 2003]	Older adults with chronic conditions	0.33	0.32-0.35

Results: Breakdown by AQoL Subscale

Figure: Dimension Utilities from the Assessing Quality of Life (AQoL) Instrument



Hearing-Specific Measures

- Hearing Handicap Inventory for Adults (HHIA) (Newman et al. 1990, 1991), based on HHIE (Ventry and Weinstein 1982)
 - 25 Items and 2 subscales (Emotional, Social/Situational)
 - e.g., “Does a hearing problem cause you to use the phone less often than you would like?”
 - e.g., “Does a hearing problem cause you to visit friends, relatives, or neighbors less often than you would like?”
- Responses “Yes” (4), “Sometimes” (2), “No” (0)

HHIA

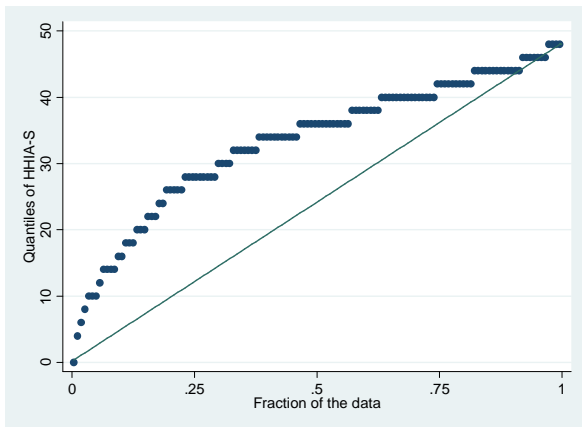
- HHIA takes values from zero (best) to 100 (worst)
- Subscales
 - HHIA-E: 0-52
 - HHIA-S: 0-48
- HHIA-S scores >14 associated with “Marked” hearing loss

HHIA-S

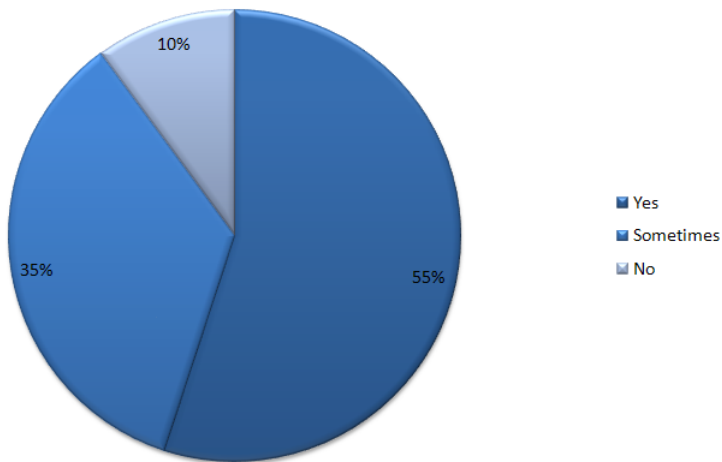
- Blue Mountains Hearing Study (BMHS) (Sindhusake et al. 2001)
 - HHIE and PTA
 - hearing losses measured at levels >25 , >40 and >60 decibels hearing level (dBHL)
 - indicate mild, moderate and marked hearing impairment, for pure-tone averages (PTA) of responses to 500, 1000, 2000 and 4000 Hz.
 - HHIE-S cut-points classified as mild, moderate and marked using the following ranges: mild ($6 \leq \text{HHIA-S} < 8$), moderate ($8 \leq \text{HHIAS} < 14$) and marked ($\text{HHIAS} \geq 14$), respectively

Hearing Handicap Inventory for Adults (HHIA)

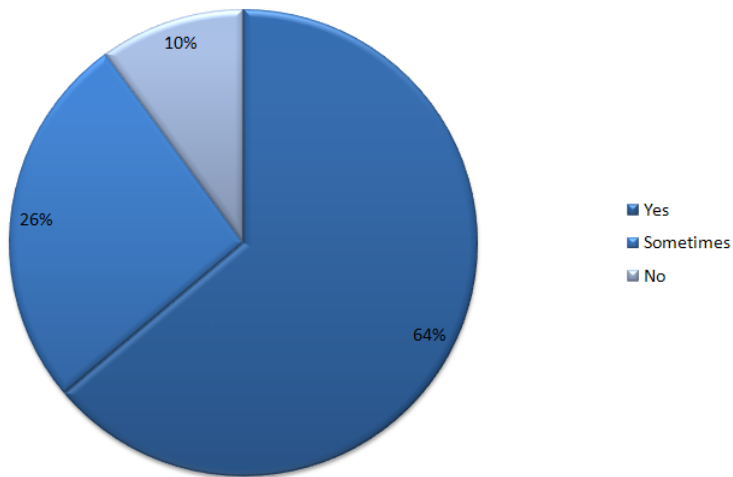
Social/Situational Subscale (HHIA-S) (Quantiles) ACTS



“Do you feel 'Handicapped' by a hearing problem?”



“Do you feel that any difficulty with your hearing limits or hampers your personal or social life?”



- Effects of ill-health and disability differ depending upon who is asked
- When used for economic evaluation, these differences may affect cost-effectiveness estimates
 - asking consumers tends, on average, to reduce estimated cost-effectiveness
 - interventions assessed in this way will hence appear less attractive to policy-makers, *ceteris paribus*
- Estimates from consumers may, nevertheless, be particularly useful when adaptation/adjustment is difficult (e.g., late onset hearing loss).

Acknowledgements

- Funding from the Australian Communication Exchange (ACE) for the Australian Captioned Telephone Study is gratefully acknowledged. ACE also provided contact lists for samples used in the ACTS.
- Helpful suggestions and comments from Tony Bennetts, Zöe Boyd, Tegan Jones and Sandy Gilliland are also acknowledged.



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