

# OVERVIEW of the EQ-5D

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Norman R, Cronin P, Viney R, King M, Street D, Brazier J & Ratcliffe J  
Valuing EQ-5D health states: A review and analysis, *CHERE Working Paper 2007/9*,  
[http://www.chere.uts.edu.au/pdf/wp2007\\_9.pdf](http://www.chere.uts.edu.au/pdf/wp2007_9.pdf)

# Multi-attribute utility instruments (MAUIs)

**Generic Quality of life Instruments  
(SF-6D, EQ-5D, HUI, SF-36)  
General population sample**

Preference based measurement  
(SG, TTO, DCE)

**Health state scores**

Model and data analysis  
Scoring 'algorithm' developed

**QALY weights for each health  
state**

# EQ-5D

- Developed by the EuroQoL group
- Aim: “a standardized non disease specific instrument for describing and valuing health-related quality of life”
- Standard version comprises:
  - descriptive system questionnaire
  - visual analogue scale
- Most commonly used scoring algorithm is the UK “tariff”
- Others algorithms have been developed

# EQ-5D descriptive system

- Five dimensions
  - mobility; self-care; usual activities; pain/discomfort; anxiety/depression
- Three levels per dimension
  - ‘No Problems’, ‘Some Problems’ and ‘Severe Problems’.
- EQ-5D space:  $3^5 = 243$  health states
- Easy to use but “lumpy”
  - Some problems covers a lot of territory
  - Not sensitive to clinically meaningful changes?

# The EQ-5D

## Mobility

- I have no problems in walking about
- I have some problems in walking about
- I am confined to bed



## Self-care

- I have no problems with self-care
- I have some problems washing and dressing myself
- I am unable to wash and dress myself



## Usual activities (eg. work, study, housework, family or leisure activities)

- I have no problems with performing my usual activities
- I have some problems with performing my usual activities
- I am unable to perform my usual activities



## Pain/discomfort

- I have no pain or discomfort
- I have moderate pain or discomfort
- I have extreme pain or discomfort



## Anxiety/depression

- I am not anxious or depressed
- I am moderately anxious or depressed
- I am extremely anxious or depressed



# Development of a MAUI algorithm

- Preference elicitation task
- Sampling from the health states
- Sample frame and sampling method
- Choice of functional form
- Statistical analysis
- Note – relationship between these steps

# EQ-5D: preference elicitation task

- All HS in the task (including immediate death) ranked and rated on a VAS
- Time trade-off valuation task
  - Ten year duration
- States better than death
  - $x$  years in FH vs 10 years in  $HS_i$  ( $v_{HS_i} = x/10$ )
- States worse than death
  - Immediate death vs  $x$  years in FH, then  $(10-x)$  yrs in  $HS_i$  ( $v_{HS_i} = -(10-x)/x$ ),
  - “transformed” to  $[(x/10)-1]$  (bounded at -1)

# Which health states are directly valued?

States used by Tsuchiya et al, 2002	States used by Dolan et al, 1996			
Selection (all respondents value all)	Very Mild (2 of 5)	Mild (3 of 12)	Moderate (3 of 12)	Severe (3 of 12)
11112	11112	11122	13212	33232
11113	11121	11131	32331	23232
11121	11211	11113	13311	23321
11131	12111	21133	22122	13332
11133	21111	21222	12222	22233
11211		21312	21323	22323
11312		12211	32211	32223
12111		11133	12223	32232
13311		22121	22331	33321
21111		12121	21232	33323
22222		22112	32313	23313
23232		11312	22222	33212
32211				
32223				
32313				
33323				

\*In addition, all value 11111 and 33333.

# Not all health states are plausible

- Example:
  - Confined to bed
  - No problems with self care
  - No problems with usual activities
  - Moderate pain/discomfort
  - Not anxious/depressed
- Dolan et al excluded any combination of UA1 with M3 or SC3

# Selection of health states matters

- May pre-determine functional forms
  - which interactions can be tested empirically
- In the 43 or 17 health states approach
  - Focus on obtaining precise estimates of a selection of health states and interpolating between these
  - Pairs of attributes missing
  - Not all interactions can be estimated
  - Focus on relatively better health states
  - Greater precision at one end of the scale
- In the EQ-5D all 243 health states could be valued

# Determining the algorithm

- Functional form – what are the options?
  - Additive: no interactions
  - Multiplicative: interactions the same across all attributes
  - Multi-linear: interactions can vary across different attributes
- GLS (RE) models estimated
  - Tested for first order interactions
- Preferred model for EQ-5D
  - Main effects additive model
  - Includes a constant (interpret as a dummy for any shift away from FH)
  - Includes “N3” term (dummy for any dimension at level 3)
  - Other interactions not significant and/or “introduced inconsistencies in the estimated values”

# EQ-5D algorithm (UK)

	Full Health	1
	Constant	-0.081
Mobility	M2	-0.069
	M3	-0.314
Self-care	SC2	-0.104
	SC3	-0.214
Usual activities	UA2	-0.036
	UA3	-0.094
Pain/Discomfort	PD2	-0.123
	PD3	-0.386
Anxiety/Depression	AD2	-0.071
	AD3	-0.236
Any level 3	N3	-0.269

- Examples:
 

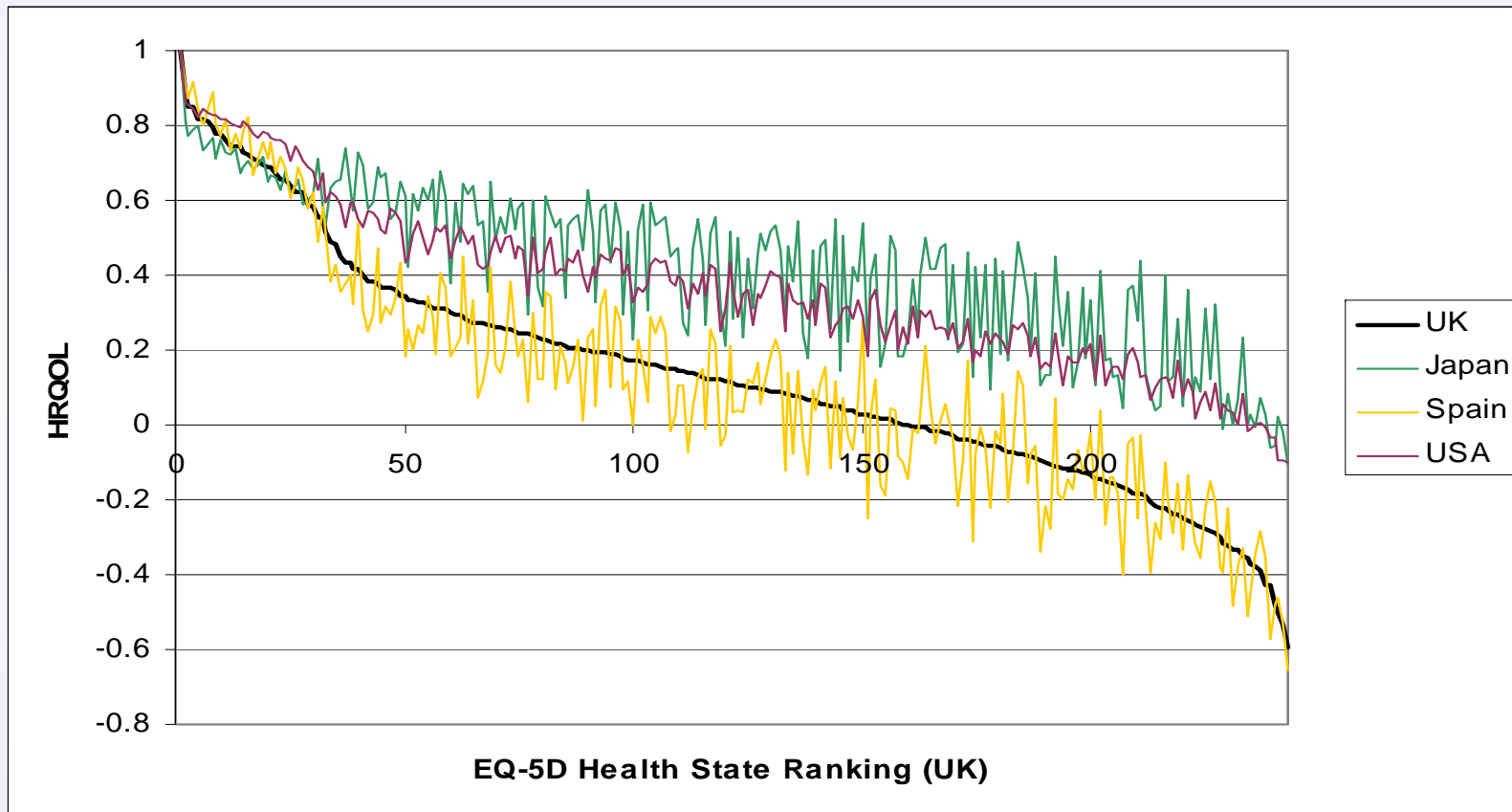
11111	1
22222	0.516
33333	-0.594
11211	0.883
21311	0.487
33121	-0.01
- 84/243 HS are “worse than death”
- No health states with values between 0.883 and 1.0
- Shifts between states can have large impacts on utility

# International Comparisons

	Con	MO2	SC2	UA2	PD2	AD2	MO3	SC3	UA3	PD3	AD3	N1
UK	0.081	0.069	0.104	0.036	0.123	0.071	0.314	0.214	0.094	0.386	0.236	0.269
Spain	0.024	0.106	0.134	0.071	0.089	0.062	0.430	0.309	0.195	0.261	0.144	0.291
Japan	0.148	0.078	0.053	0.040	0.083	0.062	0.418	0.101	0.128	0.189	0.108	0.014
Germany	0.071	0.082	0.063	0.010	0.104	0.017	0.303	0.176	0.058	0.289	0.095	0.285
Holland	0.071	0.036	0.082	0.032	0.086	0.124	0.161	0.152	0.057	0.329	0.325	0.234
Denmark	0.088	0.055	0.066	0.022	0.076	0.059	0.405	0.179	0.055	0.345	0.319	0.159

How do these different values affect the HRQoL of each of the 243 states?

# Some international comparisons:



# Issues for discussion

- Trade-off between simplicity and lack of sensitivity
- To what extent is the existing algorithm a product of the dominant methodology
  - Time trade-off task
  - Experimental design
  - Statistical analysis
- Australian weights?
- Options to build an improved EQ-5D