

# Comparing UK value sets and mapping functions for EQ-5D

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## Background

- ▶ EuroQol-5D (EQ-5D) is the instrument preferred by the National Institute for Health and Care Excellence (NICE) to measure health-related quality of life in adult populations for subsequent use in cost-utility analyses (CUA)<sup>1</sup>
- ▶ It is a concise and simple questionnaire that classifies health on five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression
- ▶ An initial version of the EQ-5D was launched in 1990, has three severity response levels (EQ-5D-3L) and therefore describes (3<sup>5</sup>=) 243 possible health states
- ▶ In an effort to improve the instrument's sensitivity and reduce ceiling effects (i.e., many respondents reporting no problems on any dimension), an alternative version including five severity response levels (EQ-5D-5L) and thus describing (5<sup>5</sup>=) 3,125 health states was introduced in 2009<sup>2</sup>
- ▶ Country-specific value sets (also referred to as "tariffs"), developed on the basis of preference studies, provide utility values for each individual EQ-5D health state
- ▶ NICE requests using the 3L UK value set<sup>3</sup> for reference-case analyses, but does not recommend using the 5L value set for England published in 2018<sup>4</sup> (due to concerns about methodology, quality and reliability of the underlying valuation study)<sup>1</sup>
- ▶ To derive utility values from EQ-5D-5L responses, 5L data should rather be "mapped" onto the 3L value set. NICE previously recommended using the van Hout crosswalk<sup>5</sup> for this purpose, but its 2022 Manual<sup>1</sup> now states that the Decision Support Unit (DSU) mapping function with the EEPRU data set<sup>6,7</sup> should be used
- ▶ Building on previous work from Mulhern and colleagues<sup>8</sup>, our aim was to compare utility values obtained with these different UK value sets and mapping methods

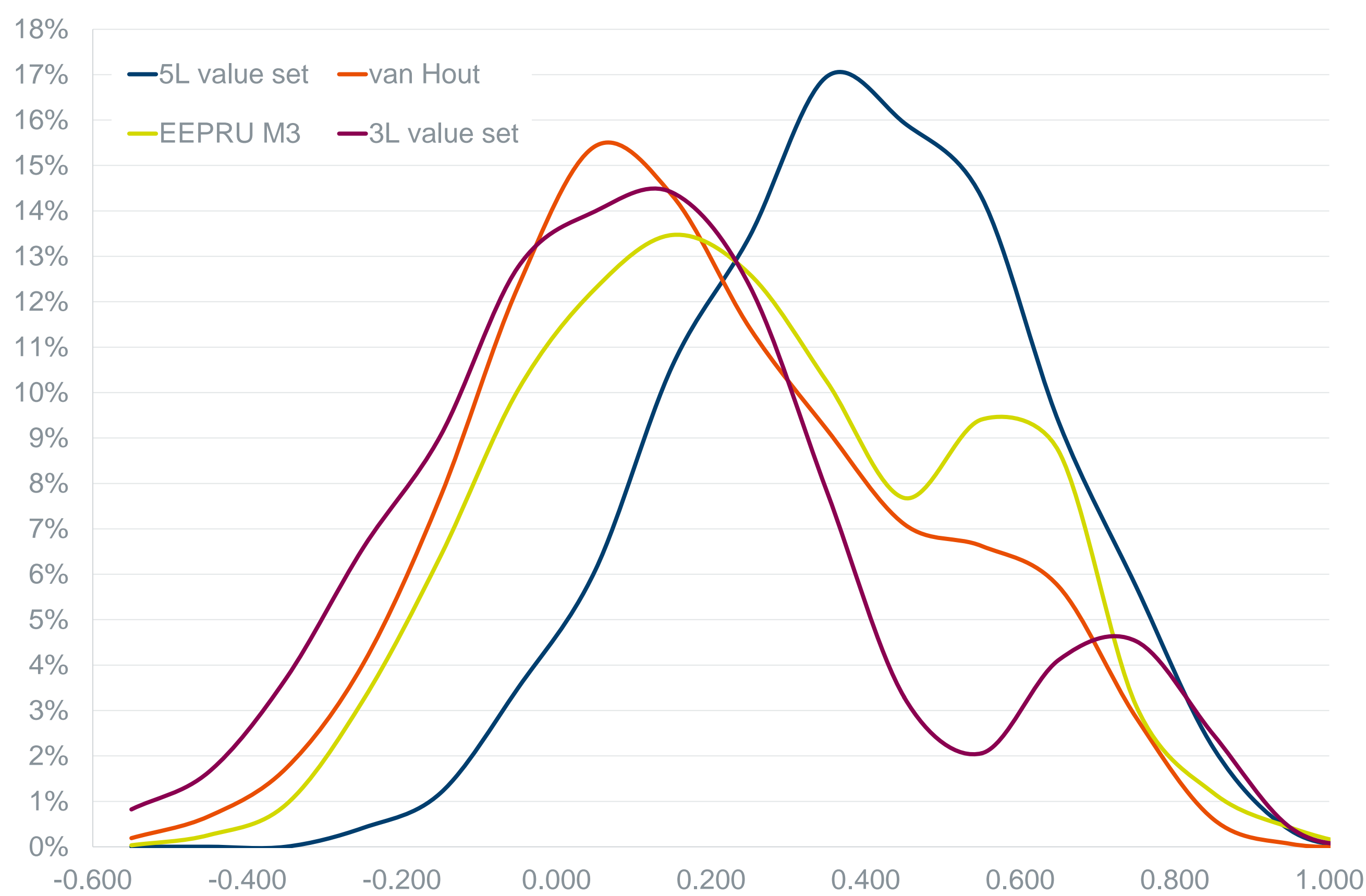
## Methods

- ▶ For each of the 3,125 possible health states in the 5L system, utility values were obtained using the 2018 5L value set for England<sup>4</sup>, the van Hout crosswalk<sup>5</sup>, and the DSU mapping function<sup>6</sup>
- ▶ In addition, utility values for the 243 possible EQ-5D-3L health states were calculated using the 3L value set for the UK<sup>3</sup>, allowing comparison between corresponding 3L and 5L states.
- ▶ Density histograms and plots comparing utility values in comparable states were generated to visualize differences

## Results

- ▶ Utility values obtained with the 5L value set were generally higher than 3L value set and crosswalk estimates (Figures 1 and 2)
- ▶ Proportions of health states worse than death (utilities below zero) were 5.1% with the 5L value set, 21.7% for the DSU mapping function, 26.7% for the van Hout crosswalk, and 34.6% for the 3L value set (Table 1)
- ▶ Whilst the van Hout crosswalk intentionally produces identical values for the 243 EQ-5D-3L health states as the 3L value set, the DSU mapping function does not. Its utility values are slightly lower in the best health states, and generally higher in moderate and the worst health states (Figure 2)
- ▶ Differences in utility values predicted with the van Hout and DSU mapping functions were larger than 0.25, 0.10 and 0.05 for 10%, 33% and 58% of individual 5L health states, respectively. Across all 3,125 states, the mean  $\pm$  SD difference was 0.10  $\pm$  0.11 with a maximum of 0.61 (for health state 51111, i.e., patients that are unable to walk about and have no problem on other dimensions)

**Figure 1. Density function**  
Percentage of EQ-5D health states (Y-axis) associated with utility values (x-axis)



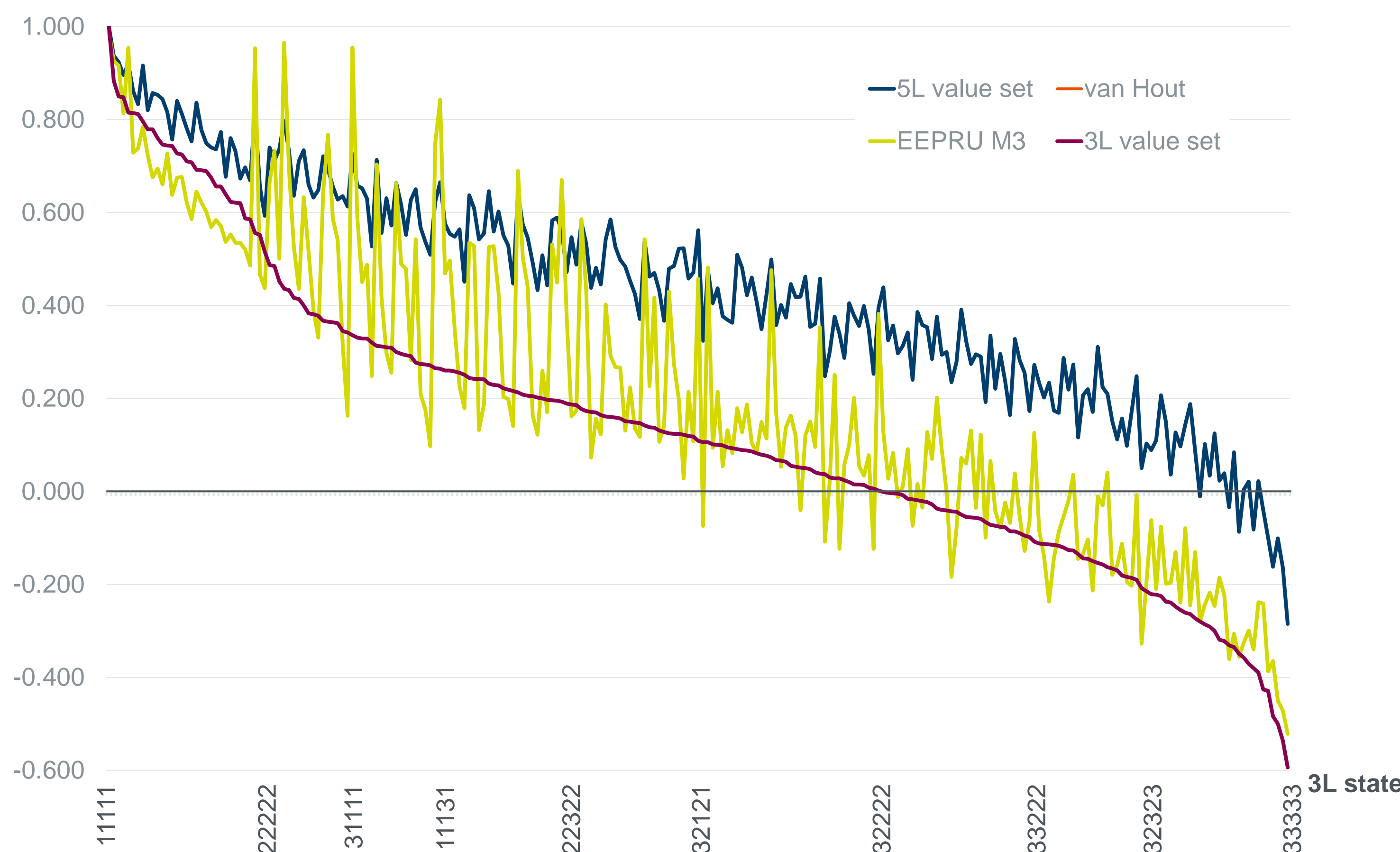
**Notes** - Smoothed histogram plots created using a range of 0.1 for utilities within each class (to allow comparison to ref 8)  
- EEPRU M3 = Utility values for the subcategory 'males, 45-55 years' based on the DSU mapping function  
Histogram plots for other subcategories look very similar and lie slightly above / below the M3 curve

**Table 1. Descriptive characteristics of the value sets and mapping functions**

Characteristic	EQ-5D-3L value set	EQ-5D-5L value set	van Hout crosswalk	DSU mapping EEPRU *
Valuation study to develop value sets: approach and sample size	TTO data (n = 3,395) collected in 1993	TTO/DCE data (n = 996) collected in 2012/13	n = 1,501 UK patients completing both EQ-5D-3L & 5L	n = 49,999 UK respondents completing both EQ-5D-3L & 5L
% health states worse than dead	34.6%	5.1%	26.7%	21.7%
Selected health state values <sup>†</sup>				
• Full health 11111	1.000	1.000	1.000	0.99
• 2 <sup>nd</sup> best 11211 or 12111	0.883	0.950	0.906	0.94
• Moderate 22222 (3L) / 33333 (5L)	0.516	0.593	0.516	0.43
• Worst 33333 (3L) / 55555 (5L)	- 0.594	- 0.285	- 0.594	- 0.53

DCE: Discrete Choice Experiment; DSU: Decision Support Unit; TTO: Time Trade-Off  
\* Utility values derived with the DSU mapping function vary slightly across age and sex categories  
<sup>†</sup> Dimensions are listed in the same order as on the questionnaire (mobility, self-care, usual activities, pain/discomfort, anxiety/depression)

**Figure 2. Utility values for 243 corresponding health states**  
Ranked from best to worst, based on the 3L value set



**Notes:** - van Hout crosswalk values are identical to the 3L tariff for these 243 health states due to the mapping approach used  
- EEPRU M3 = Utility values for the subcategory 'males, 45-55 years' based on the DSU mapping function  
Histogram plots for other subcategories look very similar and lie slightly above / below the M3 curve

## Conclusions

- ▶ Utility values predicted by the different UK value sets and mapping functions vary considerably
- ▶ The choice of value set can have an impact on utility values used in CUA, but the direction and magnitude of the change may not be easy to predict
- ▶ Whilst the EQ-5D-5L instrument and EEPRU data set have clear advantages, comparing utility values used in past and future appraisals and, hence, maintaining consistency in HTA decision-making may become more difficult

## REFERENCES

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