



EQ-5D-5L Utility Index for different countries



Basler Biometrische Sektion

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- // Background and Problem Statement
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Background EQ-5D

One of the most frequently used generic questionnaires to assess health states and utilities

‘EuroQol EQ-5D-3L’ with 5 dimensions and 3 levels of severity introduced in 1990

5805 hits for „EQ-5D“ in PubMed; ~48,600 in Google Scholar (2018-04-03)

EQ-5D-5L introduced in 2005



<https://euroqol.org/eq-5d-instruments/> accessed 2018-04-03



EQ-5D-5L

// 5 Dimensions

- // Mobility
- // Self-care
- // Usual activities
- // Pain / discomfort
- // Anxiety / depression

// 5 Levels

- // No
- // Slight
- // Moderate
- // Severe
- // Extreme / unable

// 3125 (= 5⁵) possible health states

Under each heading, please tick the ONE box that best describes your health TODAY

MOBILITY

- I have no problems in walking about ☐
- I have slight problems in walking about ☐
- I have moderate problems in walking about ☐
- I have severe problems in walking about ☐
- I am unable to walk about ☐

SELF-CARE

- I have no problems washing or dressing myself ☐
- I have slight problems washing or dressing myself ☐
- I have moderate problems washing or dressing myself ☐
- I have severe problems washing or dressing myself ☐
- I am unable to wash or dress myself ☐

USUAL ACTIVITIES (e.g. work, study, housework, family or leisure activities)

- I have no problems doing my usual activities ☐
- I have slight problems doing my usual activities ☐
- I have moderate problems doing my usual activities ☐
- I have severe problems doing my usual activities ☐
- I am unable to do my usual activities ☐

PAIN / DISCOMFORT

- I have no pain or discomfort ☐
- I have slight pain or discomfort ☐
- I have moderate pain or discomfort ☐
- I have severe pain or discomfort ☐
- I have extreme pain or discomfort ☐

ANXIETY / DEPRESSION

- I am not anxious or depressed ☐
- I am slightly anxious or depressed ☐
- I am moderately anxious or depressed ☐
- I am severely anxious or depressed ☐
- I am extremely anxious or depressed ☐



Valuation

Each health state is rated with anchors

// 1 $\cong$ perfect health

// 0 $\cong$ death

// Negative values are possible

Health states are rated by the general public, i.e., not by the sick people in a given state

Valuations are by country

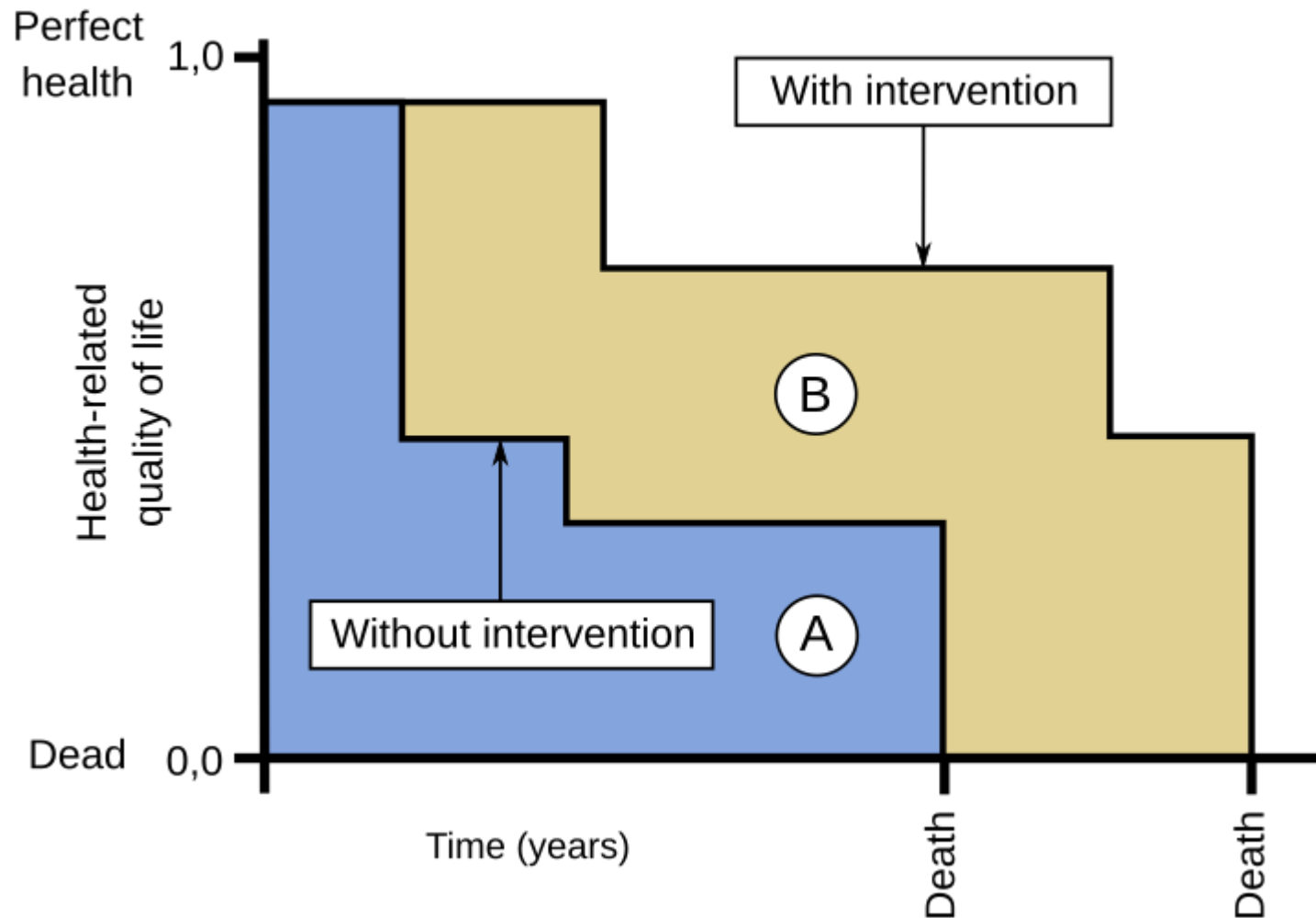
Several methods used to elicitate the valuations, e.g.,

// time trade-off : “I’d rather live 5 years in perfect health than 10 years with condition A.”

// discrete choice experiment: “I prefer extreme pain over severe depression + severe difficulties walking.”

// A (non-random) sample of the health states is directly evaluated, all valuations are then derived from a model.

Quality adjusted life-years



QALYs = area under the curve
 A = QALYs without intervention
 B = QALYs gained by intervention

By Jmarchn - Own work, CC BY-SA 3.0,
<https://commons.wikimedia.org/w/index.php?curid=67001576>



Why are QALYs important?

NICE aims to spend less than £20,000 to £30,000 per QALY

That is not a hard limit; it will go almost twice as high for end-of-life drugs

NICE National Institute for Health and Care Excellence

[NICE Pathways](#)[NICE Guidance](#)[Standards and indicators](#)[Evidence services](#)[Sign in](#)

[Home](#) > [NICE Guidance](#) > [Lifestyle and wellbeing](#) > [Behaviour change](#)

Judging whether public health interventions offer value for money

Local government briefing [LGB10] Published date: September 2013

<https://www.nice.org.uk/advice/lgb10>

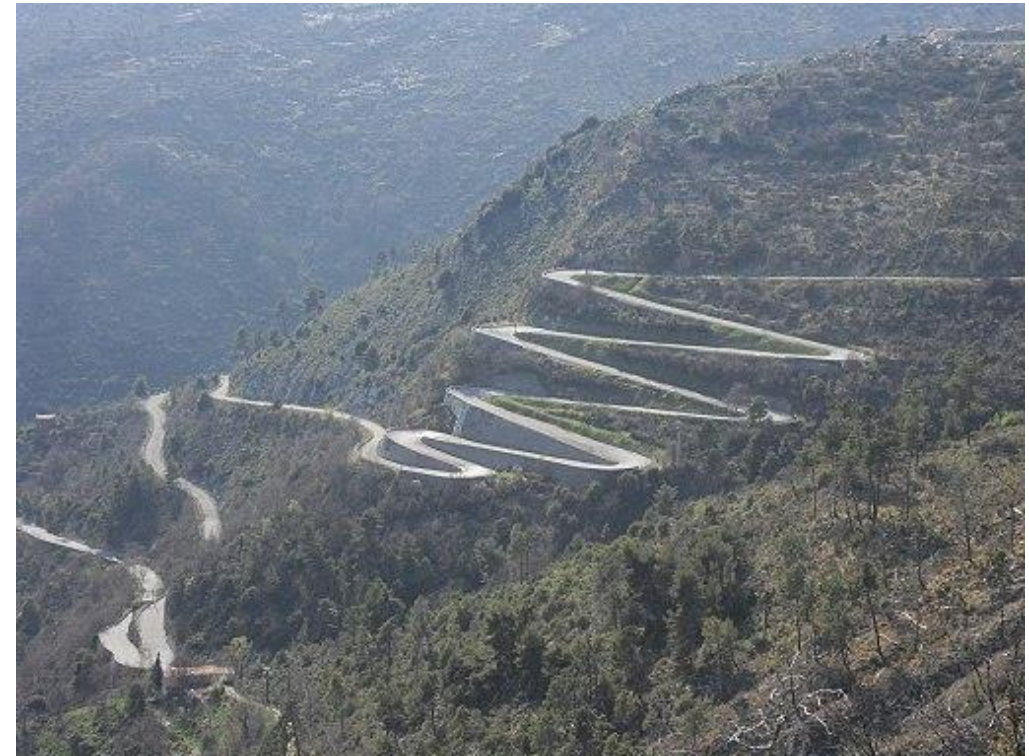
Recall

Health valuations are elicited by country

Some differences are to be expected, e.g., if you need a wheel chair



en.wikipedia.org/wiki/Netherlands#/media/File:Nijl%C3%A2nnermolen_Workum.jpg



[commons.wikimedia.org/wiki/File:Col_de_Braus_\(2\).jpg](https://commons.wikimedia.org/wiki/File:Col_de_Braus_(2).jpg) von G CHP (Eigenes Werk) [CC BY 2.5]



Problem Statement

How important are the differences between countries?

How to analyze EQ-5D-5L in a multi-national trial?



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Data – elicited sets

86 of the 3125 states were elicited to model all 3125 states

Country	Patients (n) participated	Age range	Range of EQ-5D-5L	No of health states
Canada	1209	18-89	-0.148 to 0.949	86
England	996	18-75+	-0.281 to 0.951	86
Japan	1026		-0.025 to 0.895	
Korea	1085	19-60+	-0.066 to 0.833	86
Netherlands	1003	18-80+	-0.446 to 1	86
Uruguay	794	20-83	-0.264 to 1	86



Data – „crosswalk“ sets

Based on patients' completion of both the EQ-5D-3L and the EQ-5D-5L descriptive systems, the Crosswalk Project established a link between the EQ-5D-5L and the EQ-5D-3L descriptive system, for which value sets in more countries are available. By using the crosswalk link function and the individual responses to the EQ-5D-5L descriptive system, the single index value for the EQ-5D-5L can be estimated.

Belgium, Denmark, Europe, Finland, France, Germany, Japan, Netherlands, New Zealand, Slovenia, Spain, Thailand, UK, US, Zimbabwe.

The crosswalk value were downloaded from the EuroQol.org website.



Data – real study

Not all possible health states occur often in real life, e.g. the combination „unable to walk“, „extreme pain“, „unable to wash or dress myself“ but „no problems doing my usual activities“ seems rather unlikely.

To gauge the effects of the different valuations in practice the baseline EQ-5D-5L states of a real study were evaluated for each of the countries.



Statistics

For each of the 3125 possible health states the difference between the two countries with the highest and the lowest valuation was calculated.

These differences were analyzed by descriptive statistics including boxplots and histograms.

The differences in valuations between two different health states were also calculated and analyzed for each pair of distinct health states.

For the clinical trial we used the observed health states of 313 patients



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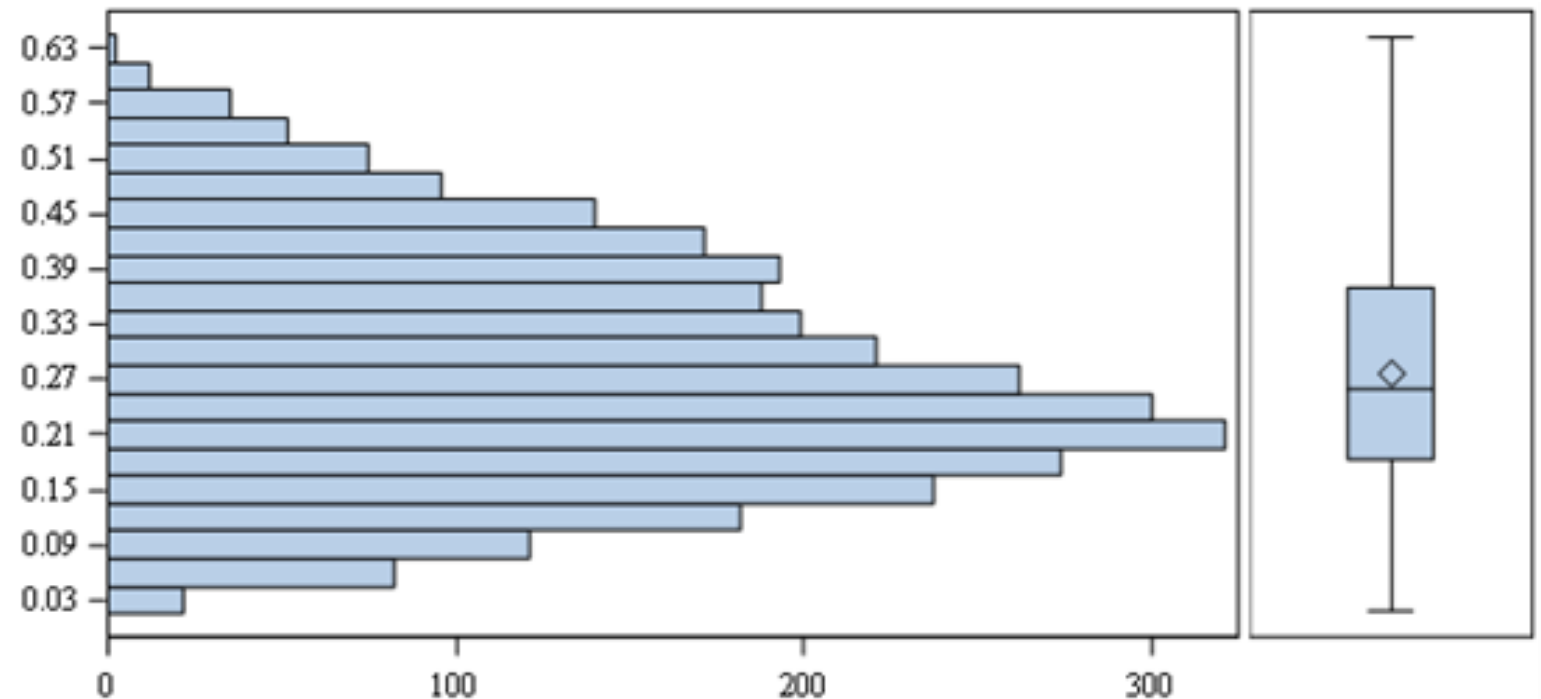
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Maximal Difference between Countries – Elicited sets

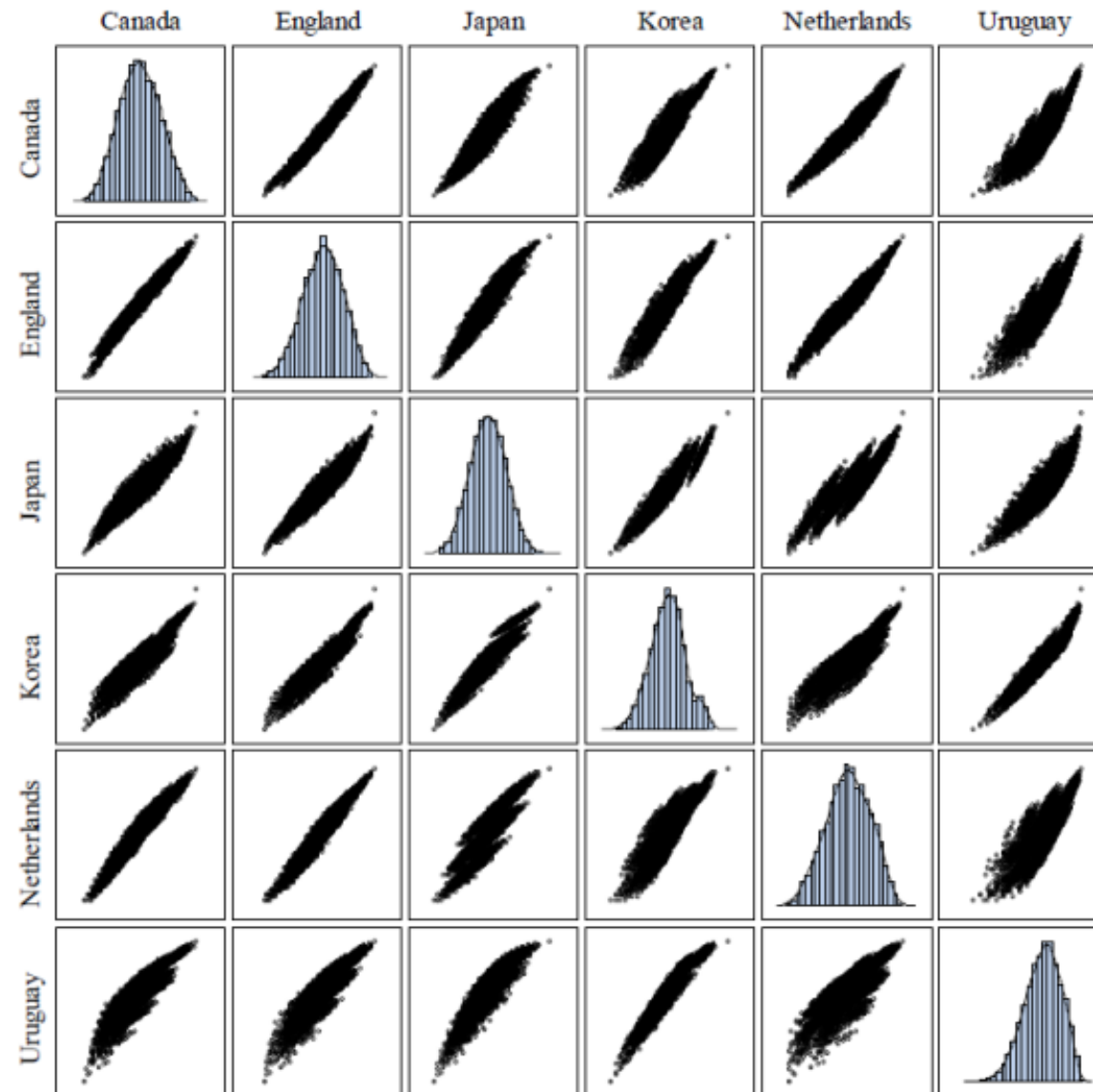
Lowest difference 0.0173 for health state “45512”

Highest difference 0.642 for health state “44444”. (-0.289 in The Netherlands and at +0.353 in Uruguay)

The median discrepancy across all 3125 possible health states was 0.260 with IQR 0.182 to 0.371



Scatter plot by Country – Elicited sets



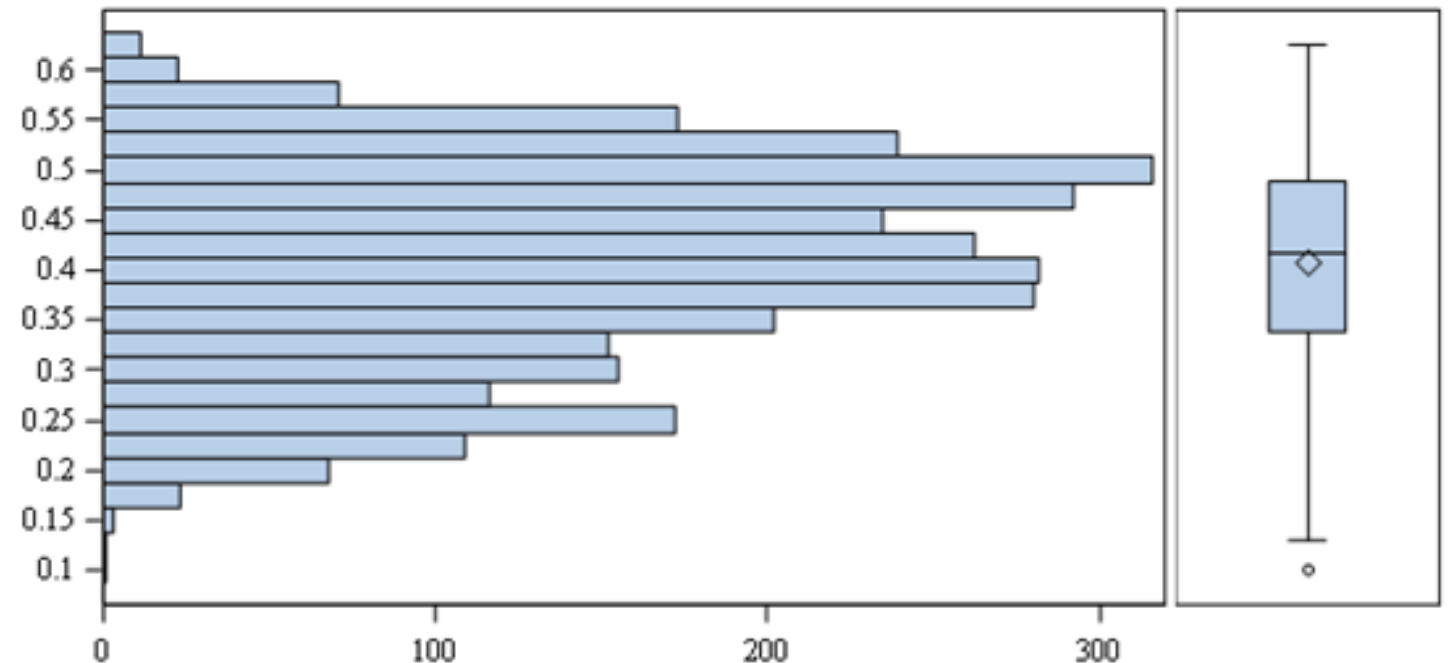
Maximal Difference between Countries – Crosswalk sets

Smallest difference was 0.100 for health state “11111”

Largest difference was 0.626 for health state “15155” with Japan scoring +0.440 and the UK -0.186.

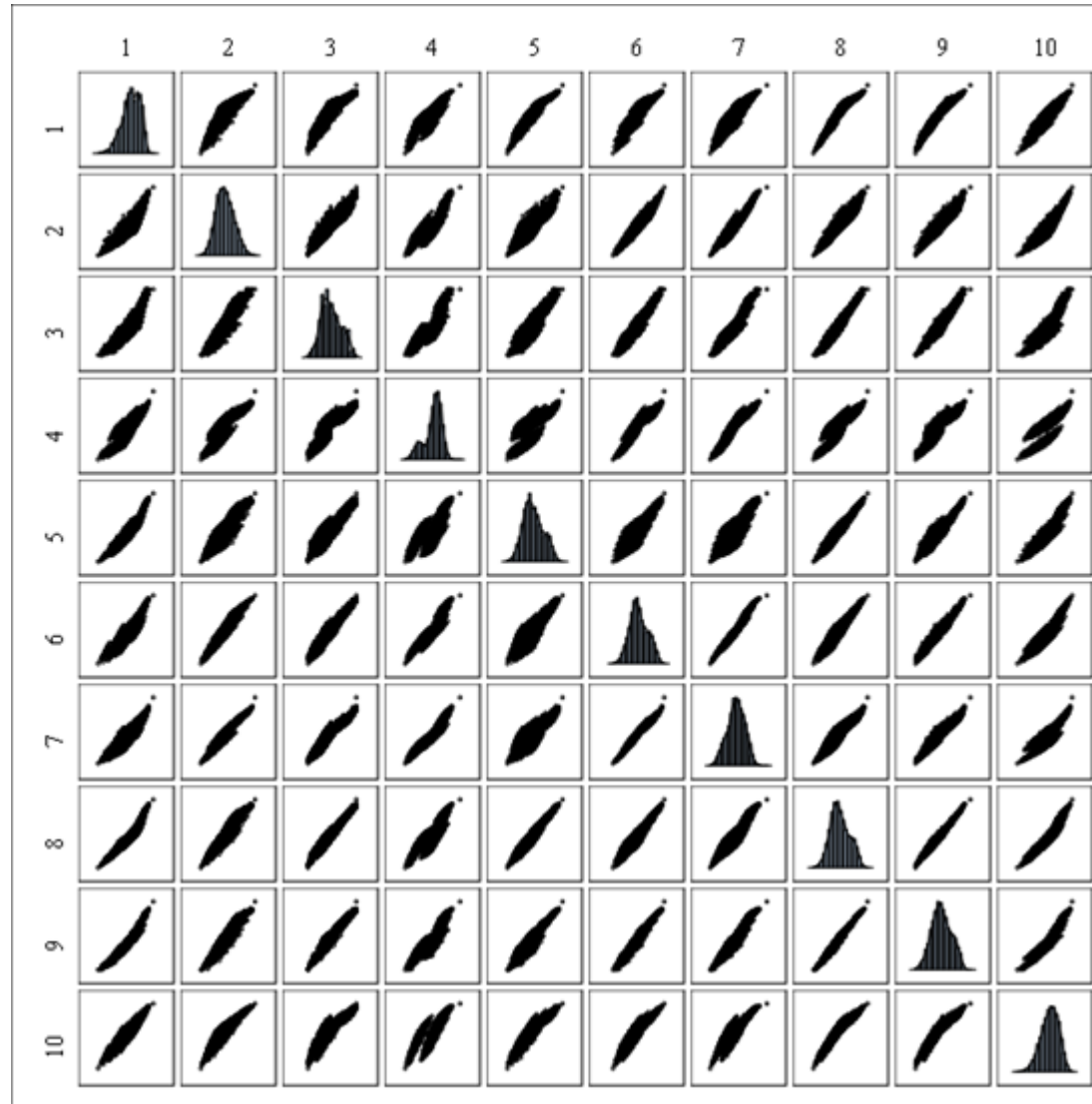
For 99% of the health states the difference was larger than 0.190

The median difference was 0.417 across the 3125 possible health states with an IQR of 0.337 to 0.490.



Scatter plot by Country – Crosswalk sets

Denmark="1"
 France="2"
 Germany="3"
 Japan="4"
 Netherlands="5"
 Spain="6"
 Thailand="7"
 UK="8"
 US="9"
 Zimbabwe="10"





Systematic differences and differences in the valuation of change

In almost all health states, Germany reported higher valuations than France

Large discrepancies between the countries were also observed when analyzing changes from one health state to another health state.

In many cases not only the magnitude of the change was different between the countries but also the direction of the change

A change from health state “44444” to “55511” is valued as an improvement of 0.679 units in The Netherlands and as a worsening of 0.169 units in Uruguay.



Valuations of sample study (n=313)

Value Set	Mean	Std Dev	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
Canada	0.698	0.208	0.019	0.572	0.765	0.860	0.949
England	0.713	0.229	-0.117	0.558	0.786	0.893	1.000
Japan	0.699	0.176	0.161	0.581	0.717	0.831	1.000
Korea	0.704	0.173	0.172	0.560	0.765	0.830	1.000
Netherlands	0.622	0.273	-0.289	0.449	0.717	0.848	0.953
Uruguay	0.818	0.147	0.240	0.730	0.861	0.927	1.000
Denmark (cw)	0.677	0.175	0.083	0.555	0.722	0.797	1.000
France (cw)	0.604	0.268	-0.169	0.402	0.635	0.839	1.000
Germany (cw)	0.742	0.202	0.069	0.595	0.806	0.887	1.000
Japan (cw)	0.665	0.132	0.127	0.571	0.671	0.740	1.000
Netherlands (cw)	0.658	0.212	0.088	0.503	0.713	0.833	1.000
Spain (cw)	0.666	0.241	-0.198	0.509	0.729	0.857	1.000
Thailand (cw)	0.570	0.199	-0.124	0.432	0.582	0.723	1.000
UK (cw)	0.610	0.235	-0.107	0.442	0.696	0.768	1.000
US (cw)	0.714	0.158	0.188	0.605	0.777	0.826	1.000
Zimbabwe (cw)	0.710	0.131	0.303	0.621	0.743	0.810	0.900

(cw) : crosswalk set



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Discussion

The EQ-5D-5L utilities of health states vary substantially between the different countries.

- // The median difference was 0.417 for the crosswalk sets and 0.315 for the countries with elicited value sets across all 3125 possible health states.
- // For the sample study the valuations by 0.114 for the countries with elicited value sets and by 0.224 for the crosswalk sets.

NICE is critical of -5L: “Currently the 5L valuation set is not recommended for use.”

(https://www.nice.org.uk/Media/Default/About/what-we-do/NICE-guidance/NICE-technology-appraisal-guidance/eq5d5l_nice_position_statement.pdf 2018-04-03)

For health economic modelling the value set of that specific country should be used.

For a clinical trial using different value sets (e.g., the German one for patients from Germany and the French one for patients from France) is, in our view, not interpretable.



Conclusion

Beware of the huge country differences.

When analyzing multinational clinical studies, several country-specific value sets should be used to evaluate treatment effects.

Using just one country set, e.g. the one from England, provides results that are only valid for that country.



References

Devlin N, Shah K, Feng Y, Mulhern B, van Hout B. Valuing health-related quality of life: An EQ-5D-5L value set for England. *Health Economics* 2017:1-16, 23-06-2017

<https://euroqol.org/eq-5d-instruments/eq-5d-5l-about/valuation/> (accessed 2018-03-24) and the references cited therein.



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Thank you!



Bye-Bye

