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CROSSWALK EQ-5D-5L VALUE SET FOR SLOVENIA

PREHODNI EQ-5D-5L VREDNOSTNI SET ZA SLOVENIJO

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ABSTRACT

Introduction: Due to the availability of the EQ-5D-5L instrument official translation into Slovenian its use is widespread in Slovenia. However, the health profiles obtained in many studies cannot be ascribed their appropriate values as the EQ-5D-5L value set does not yet exist in Slovenia. Our aim was to estimate an interim EQ-5D-5L value set for Slovenia using the crosswalk methodology developed by the EuroQol Group on the basis of the EQ-5D-3L Slovenian TTO value set. Our secondary aim was to compare the interim values obtained with the EQ-5D-3L Slovenian values.

Methods: To obtain a Slovenian interim EQ-5D-5L value set, we applied the crosswalk methodology developed by the EuroQol Group to the Slovenian EQ-5D-3L TTO value set. We examined the differences between values by comparing the mean 3L and 5L value scores and the distribution of values across all respondents.

Results: By definition, 3-level and 5-level versions have the same range (from 1 to -0.495) and a health state coded 22222 in the 3-level version corresponds to 33333 in the 5- level version. While the addition of a "slight" severity level (22222) in the 5-level version has a low informational value, the addition of a "severe" health state (44444) covers larger range of the scale. The 5-level version results in fewer health states being valued below 0 and above 0.8.

Conclusion: The EQ-5D-5L value set, based on the crosswalk methodology, should be used until a value set for the EQ-5D-5L is derived from preferences elicited directly from a representative sample of the Slovenian general population.

Keywords:
EuroQol, EQ-5D-5L, interim value set, health-related quality of life, patient-reported outcomes

IZVLEČEK

Uvod: *Uporaba instrumenta EQ-5D-5L je v Sloveniji že zelo razširjena zaradi razpoložljivosti uradnega prevoda instrumenta v slovenski jezik. Žal zdravstvenim profilom raziskovane populacije, pridobljenim v številnih raziskavah, ni mogoče pripisati njihovih vrednosti, saj v Sloveniji še nimamo izračunanih vrednosti EQ-5D-5L zdravstvenih stanj. Naš cilj je bil oceniti vrednosti zdravstvenih stanj EQ-5D-5L za Slovenijo z metodo mapiranja, ki jo je razvila skupina EuroQol. Za osnovo smo uporabili slovenske vrednosti zdravstvenih stanj EQ-5D-3L. Naš sekundarni cilj je bil primerjati pridobljene 5L vrednosti s slovenskimi vrednostmi EQ-5D-3L.*

Metode: *Za pridobitev slovenskega nabora vrednosti EQ-5D-5L smo uporabili metodologijo mapiranja, ki jo je razvila skupina EuroQol, preračunali pa smo jo iz vrednosti EQ-5D-3L TTO. Razlike med vrednostmi smo preučili s primerjavo povprečnih vrednosti 3L in 5L in porazdelitvijo vrednosti med vsemi anketiranci.*

Rezultati: *Po definiciji imata seta vrednosti za 3 in 5 ravni (EQ-5D-3L in EQ-5D-5L) enak razpon vrednosti (od 1 do -0,495), zdravstveno stanje 22222 v 3-stopenjski različici pa ustreza stanju 33333 v 5-stopenjski različici. Medtem ko ima dodatek "manjše" stopnje težavnosti oz. kodiranega stanja 22222 v 5-stopenjski različici majhno informacijsko vrednost, je dodana vrednost "hude" stopnje težavnosti oz. zdravstvenega stanja kodiranega kot 44444 večja in zajema večji obseg lestvice. 5- stopenjski set vrednosti rezultira v manj zdravstvenih stanjih, ki so ocenjene pod 0 in nad 0,8.*

Zaključek: *Nabor vrednosti EQ-5D-5L, ki je pridobljen z mapiranjem, lahko raziskovalci v Sloveniji uporabljajo vse dokler ne bodo na razpolago vrednosti stanja EQ-5D-5L, pridobljene neposredno iz preferenc reprezentativnega vzorca slovenske splošne populacije do zdravstvenih stanj.*

Ključne besede:
EuroQol, EQ-5D-5L, prehodni vrednostni set, z zdravjem povezana kakovost življenja, izhodi poročani s strani pacientov

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1 INTRODUCTION

The EuroQol instrument (EQ-5D) is the most commonly used preference-based quality-of-life measure deriving health state utilities for use in cost-utility analyses (1, 2). In Slovenian health technology assessment (HTA) there is no preference expressed for a specific instrument (3); however, cost-utility is an analysis often used in HTAs.

The EQ-5D five-level version (EQ-5D-5L) was developed by the EuroQol organization in 2009 (4) to avoid the methodological limitations (5) of the three-level version, and has by now been tested in different samples, showing strong psychometric properties. The new instrument seems to reduce the ceiling effect, improve discriminatory power and establish convergent and known-group validity in comparison to the three-level questionnaire (6-9).

EQ-5D is a generic instrument and can be used in economic as well as population studies, measuring health-related quality of life. One of the advantages prompting its widespread use is country-specific value sets. These are usually obtained from the general population, although recent studies are engaged in elicitation of preferences from patients and other population subgroups, such as adolescents (10, 11). Before 2009, three-level value sets were developed and used across countries. With the arrival of EQ-5D-5L, value sets based on preferences directly elicited from representative general population samples began to develop. The data collection for the first two sets in England and Canada started as early as 2012 (12, 13), although the first value sets were only published in 2016 (13-17). Currently, there are 20 value sets published, the most recent ones being from Vietnam and Hungary (18, 19).

Slovenia is one of the countries with an official translation of the EQ-5D-5L questionnaire, but without supporting values for each of the 3,125 health states. While the five-level instrument is already used in many studies measuring the health status of different population subgroups, those health states cannot be ascribed their values. The EQ-5D-3L value set for Slovenia was published in 2020 (20).

In the meantime, an interim scoring method for the EQ-5D-5L was published that allows EQ-5D-5L values to be derived from any existing EQ-5D-3L value set (21). Interim values are available for many countries (Denmark, France, Germany, Japan, the Netherlands, Spain, Thailand, the United Kingdom, the United States, and Zimbabwe), although Poland is the only Central European country with an interim EQ-5D-5L value set (22). The National Institute for Health and Care Excellence (NICE) recommends the use of the crosswalk value set in HTA (21).

In the present study, our aim was to estimate an interim EQ-5D-5L value set for Slovenia using the crosswalk methodology developed by the EuroQol Group and to compare values obtained using the EQ-5D-5L crosswalk with those based on the EQ-5D-3L and EQ-5D-5L values from other countries' interim sets.

2 METHODS

2.1 Questionnaire

The EQ-5D is a standardized measure of health status developed by the EuroQol Group to provide a simple, generic measure of health for clinical and economic analyses and population health surveys (24). Both three- and five-level versions consist of two measures: the EQ-5D descriptive system and the EQ visual analogue scale (EQ VAS). The EQ-5D-5L descriptive system comprises the same five dimensions as the EQ-5D-3L (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression), but with five levels of severity (no problems, slight problems, moderate problems, severe problems, and extreme problems/unable to) compared to three levels of severity (no problems, some problems, and extreme problems/unable to/confined to bed) in the EQ-5D-3L.

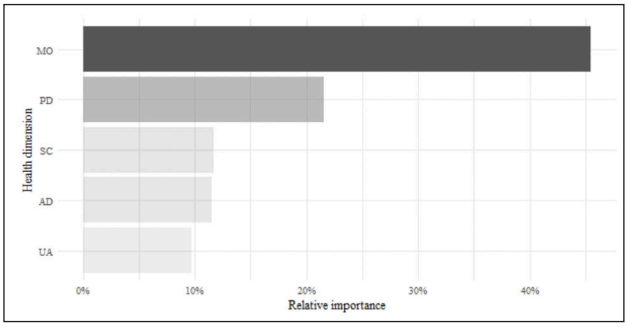
For each dimension, the patient chooses a level, and a five-digit patient profile is thus obtained, such as 12543 (patient has no problems with mobility, has slight problems with taking care of self, has extreme problems with usual activities, suffers from severe pain or discomfort, and has moderate problems with anxiety/depression). EQ-5D health states, defined by the EQ-5D descriptive system, may be converted into a single summary index by applying a formula that essentially attaches values to each of the levels in each dimension. There are 3,125 (35) possible patient profiles in the EQ-5D-5L definition of health states, and each health state has its own value.

2.2 Crosswalk Study

The objective of the Crosswalk study (21) was to develop values sets for the EQ-5D-5L by mapping to the currently available EQ-5D-3L value sets. The study included 3,691 respondents from six European countries (Denmark, England, Italy, the Netherlands, Poland, and Scotland). Participants had a range of different conditions and different levels of severity of reported problems. They completed both the EQ-5D-3L and EQ-5D-5L descriptive systems at the same time. For each health state described by the EQ-5D-5L system, the probability of reporting each of the 243 EQ-5D-3L health states was estimated. This resulted in a large, 3,125×243 matrix of transition probabilities. The EQ-5D-5L index value is calculated by multiplying the 243 transition probabilities by their corresponding EQ-5D-3L index values, and subsequently summing them up.

2.3 Slovenian EQ-5D-3L Value Set

The Slovenian EQ-5D-3L valuation study used the modified Measurement and Value of Health protocol (from the Measurement and Value of Health study) (25). In the study conducted in 2006, 225 individuals valued 15 health states out of total of 23 included in the research. Modelling resulted in a final choice of a six-parameter constrained regression model with a supplementary power term for both visual analogue scale (VAS) and time trade-off (TTO) based value sets. A power term below 1 indicates that respondents show substantially diminishing sensitivity to increasing health problems (20). The Slovenian TTO value set has the lowest value of -0.495 for health state 33333, and 82 health states (33.7%) are valued lower than zero. The most important health dimension is mobility, followed by pain/discomfort. Self-care, anxiety/depression and usual activities are seen as less important.



Source: Authors' own calculations.

Figure 1. Relative importance of health dimensions.

Comparisons with the Polish and UK TTO values show considerable differences, mostly due to mobility having a substantially greater weight in Slovenia. The UK value set generally produces lower values for mild states, while the Polish value set produces higher ones (26). International comparisons show that Polish values differ considerably from those elicited in Western European countries (26).

To obtain a Slovenian interim EQ-5D-5L value set, we applied the crosswalk methodology developed by the EuroQol Group (21) to the Slovenian EQ-5D-3L TTO-based value set (20). We examined the differences between values obtained by comparing the mean 3L and 5L value scores and the distribution of values across all respondents. We also estimated the proportion of states with values less than zero. The statistical analysis was conducted using R (27), charting was done using the ggplot2 package (28) and basic data manipulation with the dplyr package (29).

3 RESULTS

The estimated Slovenian values for 3,125 EQ-5D-5L health state are shown in Figure 1, while the values for some selected health states are presented in Table 1. The whole value set can be obtained from the authors.

Table 1. Selected health states, 3L and 5L values.

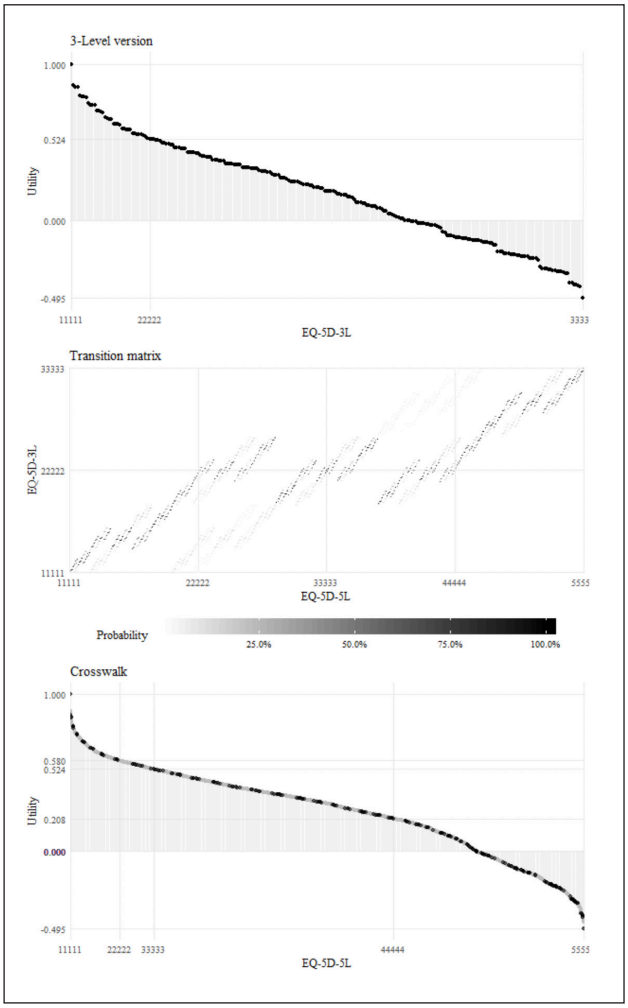
EQ-5D-3L	EQ-D5-5L	Utility
11111	11111	1.000
.	11211	0.894
.	11112	0.885
.	12111	0.879
.	11121	0.836
.	21111	0.747
.	11222	0.741
.	12221	0.738
.	22211	0.666
.	22222	0.580
.	23332	0.555
.	22333	0.554
.	33322	0.543
22222	33333	0.524
.	44433	0.392
.	34443	0.315
.	33444	0.277
.	44444	0.208
.	44555	-0.075
.	45554	-0.102
.	55544	-0.351
33333	55555	-0.495

Source: Authors' own calculations.

By definition of the crosswalk methodology both versions, three-level and five-level, have the same range (from 1 to -0.495) and the health state coded 22222 in the three-level version corresponds to 33333 in the five-level version. The five-level version has a lower mean and median and is less skewed. The addition of a "slight" severity level in the five-level version has low informational value. The difference between a "slight" health state (a health state where all health dimensions are at the "slight" level, coded: 22222) and "middle" health state (33333) is 0.056, which corresponds to 3.7% of the total range (a range between perfect health, namely 11111, and the worst health state, 55555). The addition of the "slight" level results in proportionally less "good" health states (0.5% of health states with a value higher than 0.8), when compared to the three-level version (1.6% of health states with a value higher than 0.8).

Table 2. Comparison of the Slovenian EQ-5D-3L and Slovenian EQ-5D-5L crosswalk value sets.

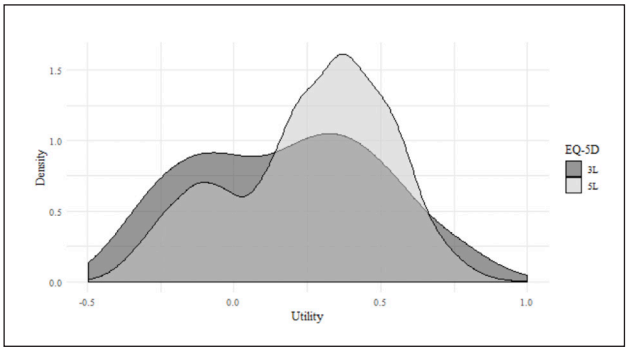
Parameter	Slovenian EQ-5D-3L Crosswalk value set	Slovenian EQ-5D-5L value set
Number of health states	243	3125
Range	-0.495 to 1	-0.495 to 1
Mean±SD	0.18±0.324	0.258±0.27
Median	0.190	0.304
Skewness	0.070	-0.419
Kurtosis	2.170	2.450
States worse than dead (index <0), n (%)	82 (33.745%)	653 (20.896%)
States with index >0.8, n (%)	4 (1.646%)	16 (0.512%)



Source: Authors' own calculations.

Figure 2. Distribution of values for EQ-5D-3L and EQ-5D-5L versions and transition matrix.

On the other hand, the addition of an extra level in the lower part of the scale, the "severe" health state (coded: 44444), has greater informational value. The difference between the "middle" health state (33333) and "severe" health state (44444) is 0.208, which corresponds to 21.1% of the total range. The difference between the "severe" health state (44444) and PITS health state (55555) is 0.703, or 47% of the total range. Moreover, the addition of the "severe" level results in proportionally fewer health states with values below zero (20.9% of health states) for the five-level version when compared to the three-level version (33.7% of health states with values lower than zero).



Source: Authors' own calculations.

Figure 3. Density of utility scores.

We found that the Slovenian interim EQ-5D-5L value set generated values that are narrower and more densely distributed around the median than those generated by the EQ-5D-3L value set. A higher density can be observed in other countries as well, such as Denmark, France, Germany, the United Kingdom, Poland, the Netherlands, and Spain (22, 23). It appears that these characteristics are related to the crosswalk methodology, but this issue remains unresolved at the moment.

4 DISCUSSION

The Slovenian crosswalk or interim value set derived in this study is created following the EuroQol Group crosswalk methodology as a temporary solution for use until the Slovenian EQ-5D-5L value set, based on directly elicited preferences from the general population, is available. As the number of studies using the EQ-5D-5L instrument is increasing and the corresponding value set is not yet available, the presentation of these values will enable researchers to ascribe the related values to the health states of the population under study.

In Central and Eastern Europe there are currently eight EQ-5D value sets available: VAS- and TTO-based 3L value sets (20) from Slovenia alongside the crosswalk set published in this study; three value sets from Poland, 3L TTO (30), 5L TTO (31) and crosswalk (22) value set; and 3L and 5L value sets from Hungary (19). In the article we did not present all of the 3,125 health state values, but just a few selected ones that can be used in population, economic or clinical studies until the directly elicited population-based EQ-5D-5L value set is available in Slovenia. Due to the restrictions on the range of the scale (22), relatively fewer health states are valued below zero and above 0.8. At the same time, relatively more health states are valued as moderate (0.4-0.8). It would be interesting to study whether the same phenomena are observed in the directly elicited EQ-5D-5L value set.

The strength of the study is the use of the official crosswalk methodology provided by the EuroQol organization, although the fact is that the analyses to obtain the matrix for mapping the EQ-5D-5L to EQ-5D-3L value sets were run on an international sample of respondents that did not include Slovenians (21). Furthermore, the values, which can be obtained in full from the authors, will be of use to researchers and users of EQ-5D-5L until the directly elicited value set is available. The limitation of the mapping is certainly the dependency of the data between both datasets, as well as some assumptions which are part of the methodology – imposing them leads to various errors that are not present in directly elicited value sets.

5 CONCLUSIONS

In the study we estimated the EQ-5D-5L value set for Slovenia, based on the crosswalk methodology. The values obtained can be applied by researchers to health states obtained in various types of studies in the Slovenian context. The values should be used until a value set for the EQ-5D-5L is derived from preferences elicited directly from a representative sample of the Slovenian general population. The users of the EQ-5D-5L are thus able to use the updated EQ-5D instrument, which is claimed to have improved properties in comparison to the same instrument with three levels of problems for all dimensions.

CONFLICT OF INTEREST

VPR is a member of EuroQol Group. MO has no conflict of interest.

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ETHICAL APPROVAL

Not required as only secondary data are used in this study.

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