

General population reference values for the EQ-5D-5L index in Poland: estimations using a Polish directly measured value set

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Introduction The EQ-5D is, apart from the 36-Item Short Form Health Survey (SF-36), one of the most popular generic instruments for the measurement of health-related quality of life (HRQoL).¹⁻³ The questionnaire is available in 2 versions: original, 3-level form (EQ-5D-3L) and the more recent, 5-level form (EQ-5D-5L). In comparison to the EQ-5D-3L, the EQ-5D-5L has some psychometric advantages, including a lower ceiling effect and higher sensitivity.⁴ A Polish validation of EQ-5D-5L has recently been published.⁵

The use of EQ-5D in Poland is supported by the availability of many country-specific tools. Local valuation studies enable the estimation of quality-adjusted life-years considering the health preferences of the Polish society.^{6,7} Research on population norms allows the results of a specific patient to be related to the mean value of the reference group from the general population matched for age and gender.^{8,9}

Reference values for the Polish general population for the EQ-5D-5L index published in 2017⁹ were based on an old and imperfect approach to calculating health state utility values. In that study, the Polish interim EQ-5D-5L value set, based on a crosswalk method and questionnaire mapping, was used.¹⁰ Health state utility values for EQ-5D-5L were obtained, based upon the preferences for EQ-5D-3L of the Polish population,⁶ by using an official mapping algorithm developed by the EuroQol Group.¹¹

Recent years have seen the publication of a new EQ-5D-5L index estimation method in Poland.⁷ In this research, the health preferences of a representative group within Polish society (n = 1252) were studied with direct methods, including the time trade-off (TTO) and discrete choice experiment (DCE), with a final utility model based on both types of data (hybrid model). This published method of calculating the EQ-5D-5L index is currently the preferred way, as recommended

by the EuroQol Group and by the guidelines of the Agency for Health Technology Assessment in Poland (AOTMiT).^{8,12}

The current study aims to update the 2017 population norms for the EQ-5D-5L index in Poland using the recently published and currently recommended value set,⁷ based on a large national survey of the health preferences of the Polish society and direct valuation methods.

Methods The Polish EQ-5D-5L norms study The sampling details of the Polish normative study have been described in previous publications.^{8,9} Population norms were estimated based on data from 3963 respondents (46.8% males, age range, 18–87 years), which was representative of the adult population of Poland in terms of gender, age, geographic region of residence, education, and socioprofessional group (see Table 1 in Golicki and Niewada⁹).

Several HRQoL questionnaires were distributed. Based on data collected from the EQ-5D-5L, 3 different outcomes were calculated: the subjective perception of health according to the EQ visual analog scale, the level of health limitations within EQ-5D-5L dimensions, and the EQ-5D-5L index values according to the Polish interim value set.⁹ As estimations of the first 2 outcomes remain valid, in this study, we restricted our focus to an update of EQ-5D-5L index norms.

The Polish EQ-5D-5L value set In the current study, EQ-5D-5L index values were calculated based on the recently published Polish directly measured value set, which was developed with the standardized EuroQol Valuation Technology (EQ-VT 2.0).⁷ The final model was based on the TTO and DCE data, and took into account health preferences, as well as some specificity of the Polish society (ie, unwillingness to trade in TTO by religious people). The described value set is characterized by

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Received: March 10, 2021.
Revision accepted: April 14, 2021.
Published online: April 20, 2021.
Pol Arch Intern Med. 2021;
131 (5): 484–486
doi:10.20452/pamw.15943
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TABLE 1 EQ-5D-5L index population norms for Poland by age group and gender (index values based on directly measured time trade-off and discrete choice experiment-based Polish EQ-5D-5L value set)

EQ-5D-5L index value		Age, y							All respondents
		18–24	25–34	35–44	45–54	55–64	65–74	≥75	
Total	N	456	617	654	612	797	525	302	3963
	Mean (SE)	0.983 (0.002)	0.975 (0.003)	0.967 (0.002)	0.935 (0.005)	0.9 (0.005)	0.86 (0.008)	0.76 (0.013)	0.922 (0.002)
	Median (IQR)	1 (0.98–1)	1 (0.97–1)	0.982 (0.952–1)	0.97 (0.932–1)	0.952 (0.895–1)	0.925 (0.844–0.97)	0.843 (0.6–0.932)	0.97 (0.922–1)
Men	N	238	311	302	295	379	228	100	1853
	Mean (SE)	0.985 (0.002)	0.978 (0.004)	0.969 (0.004)	0.947 (0.007)	0.89 (0.008)	0.88 (0.011)	0.78 (0.022)	0.932 (0.003)
	Median (IQR)	1 (0.982–1)	1 (0.97–1)	1 (0.952–1)	0.97 (0.945–1)	0.952 (0.896–1)	0.945 (0.864–0.982)	0.844 (0.682–0.941)	0.975 (0.932–1)
Women	N	218	306	352	317	418	297	202	2110
	Mean (SE)	0.981 (0.003)	0.973 (0.004)	0.966 (0.003)	0.924 (0.009)	0.908 (0.006)	0.845 (0.012)	0.749 (0.016)	0.913 (0.003)
	Median (IQR)	1 (0.97–1)	1 (0.97–1)	0.982 (0.952–1)	0.97 (0.932–1)	0.952 (0.895–0.982)	0.918 (0.831–0.952)	0.843 (0.584–0.925)	0.97 (0.916–1)

Abbreviations: IQR, interquartile range

the following: a wide range of values from -0.590 (extreme limitations in all EQ-5D-5L dimensions) to 1.000 (no health limitations); a mean value of 0.476 ; 4.4% of all health states (from a total of 3125) perceived by Polish respondents as being worse than death (utility < 0); and a continuity of scale (second highest value 0.982).

The current manuscript presents the results of a secondary study (based on published studies) and did not directly involve humans or animals. Neither approval from an ethics committee nor written informed consent from patients was required.

Statistical analysis We estimated the following descriptive statistics for the EQ-5D-5L index: the mean (SE) and median (interquartile range). The results were presented for the whole sample and for both sexes separately, using predefined age groups: 18–24, 25–34, 35–44, 45–54, 55–64, 65–74, and 75+ years, as standardized in other studies, in order to facilitate comparisons.^{8,9} The statistical significance of differences between the indices based on the 2 analyzed value sets was assessed with a 2-tailed Wilcoxon signed ranks test. The analysis was performed using the StatsDirect 2.8.0 (StatsDirect Ltd, Merseyside, England) statistical software.

Results The EQ-5D-5L index population norms for Poland, calculated with the recently published directly measured (TTO- and DCE-based) Polish EQ-5D-5L value set, are presented in **TABLE 1**. Estimations are presented according to various age and sex categories to facilitate the use of the norms in clinical practice (ie, comparison of a patient with a reference group from the general population).

As expected, EQ-5D-5L index values decreased with age. Men had higher mean health state

utility values than women in all age groups, except the group aged 55 to 64 years.

EQ-5D-5L index values estimated with the final value set were generally higher (57.4%) or equal (38.5%) to those estimated using the interim value set.⁹ The mean difference of 0.034 was significant ($P < 0.001$). Similarly, the mean differences in the subsequent age groups (0.020 , 0.022 , 0.029 , 0.037 , 0.044 , 0.047 , 0.037) were also significant ($P < 0.001$; Supplementary material, *Figure S1*).

Discussion Based on the EQ-5D-5L responses from a representative sample of Polish citizens and the recently published and officially recommended value set, we estimated population norms for the EQ-5D-5L index in Poland, according to the age group and gender. The normative data obtained should be used as reference values in research and in individual patient monitoring.

The results of our study provide a solution to the problem that the Polish HRQoL researchers have faced over the last 2 years. Estimating the patient's EQ-5D-5L index based on the new value set⁷ and comparing it against the old population norm⁹ would lead to flawed conclusions. In most cases, it would underestimate the impact of the disease on HRQoL.

The population norm based on the new value set is systematically higher than the norm based on the mapping. This is in line with the general characteristics of both value sets, as described by Golicki et al.⁷ The directly measured TTO- and DCE-based value set has several advantages: a wider range of values (-0.59 to 1.0), a smaller gap between the best state of health (11111 ; utility = 1.0) and the first state with health limitations (11112 ; utility = 0.982), and a lower concentration of values for moderate health states.

The choice of a new value set is justified by scientific reasons (the advantage of direct

measurement over indirect methods and mapping) and complies with the EuroQol Group's current recommendations.⁷ The use of new Polish population norms for the EQ-5D-5L index allows for the simultaneous consideration of the distribution of EQ-5D-5L health states (the descriptive part of the questionnaire) among the general Polish population and the preferences of Polish society towards EQ-5D-5L-defined health states.

In clinical practice, the application of new population norms makes it possible to easily compare an individual patient's health state with the population mean by gender and age. From the public health perspective, it provides an opportunity to easily estimate the burden of disease for a given condition. These results may be used for outcome measurements in clinical care, economic analyses, and health technology assessment reports for new drugs and medical devices.

Conclusions The currently described Polish population norms for the EQ-5D-5L index, developed through the use of the directly measured value set, should replace the population norms for the EQ-5D-5L index that were published in 2017.

SUPPLEMENTARY MATERIAL

Supplementary material is available at www.mp.pl/paim.

ARTICLE INFORMATION

CONFLICT OF INTEREST DG is a member of the EuroQol Research Foundation (the copyright holder of the EQ-5D-5L) and has received grants from the EuroQol Research Foundation.

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HOW TO CITE Golicki D. General population reference values for the EQ-5D-5L index in Poland: estimations using a Polish directly measured value set. *Pol Arch Intern Med.* 2021; 131: 484-486. doi:10.20452/pamw.15943

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