What Is a Year of Life Worth? Empirical Findings from Worldwide Economic Studies on the Value of a Statistical Life

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Background

The evaluation of healthcare interventions – particularly in the context of health technology assessments (HTAs) – invariably implies some kind of (explicit or implicit) cost benefit analysis. One possible anchor for the valuation of health benefits is the value of a statistical life year (VSLY).

However, currently used benchmarks for the willingness-to-pay (WTP) per life year gained (LYG) are controversial and lack robust empirical support. Against this background, we analyzed the economic literature reporting empirical data on the value of a statistical life (VSL).

Methods

An extended systematic literature search was conducted in the databases EconBiz and EconLit for the period from January 1995 to December 2020 according to the following key words: value of life, statistical life, value of a statistical life, value of a life year, value of a statistical life year, value of a quality-adjusted life year (QALY).

We considered studies that provided information on the elicitation method (Human Capital Approach; Stated Preferences/Contingent Valuation, SP/CV; Stated Preferences/ Discrete Choice Experiments, SP/DCE; Revealed Preferences/ Wage Risk, RP/WR, Revealed Preferences/ Non-Occupational, RP/NO, Revealed Preferences/ Other, RP/Other) and design (cross-sectional vs. panel data) of the study, and described the data collection period as well as population characteristics. After transformation of VSL into VSLY values, we expressed the VSLY – contingent on variables including regional origin of data, study design, and valuation method – in € 2019 and as multiples of annual gross domestic product (GDP) per capita.

For regression analysis we used the ordinary least squares (OLS) model after log-transforming the VSLY estimates.
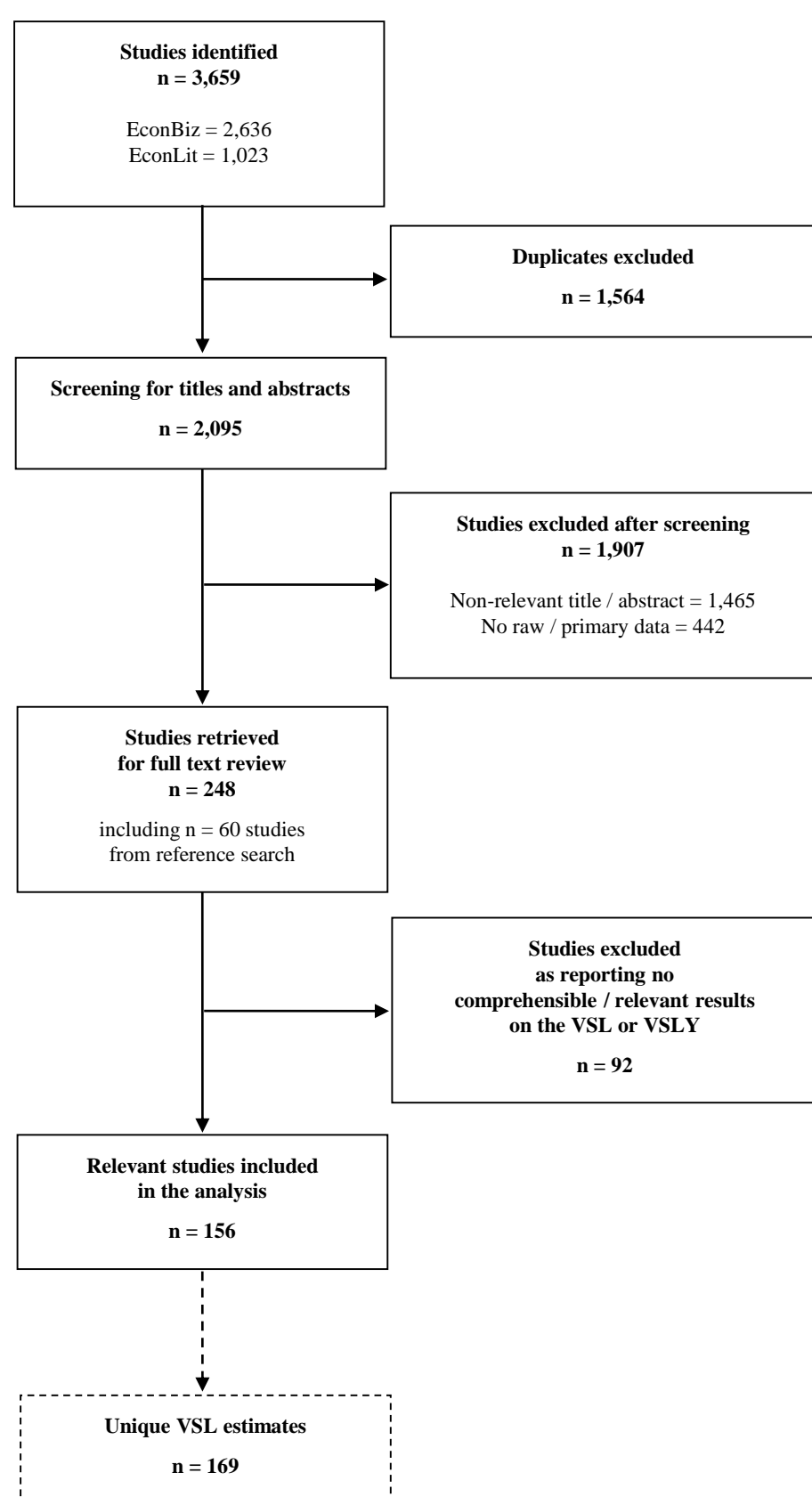
**Flowchart of the systematic literature search.**

Results

The literature search identified 156 studies reporting original data, yielding 169 unique estimates for the VSL. The median VSLY was €168,367 or 6.3 times annual GDP/capita. The median VSLY [per GDP/capita] showed substantial differences by regional origin of data (North America, €288,994 [7.2] versus Europe, €168,367 [5.2]), study design (panel, €288,994 [7.7] versus cross-sectional data, €153,193 [5.6]), and elicitation method (RP/WR, €274,625 [9.1] versus SP/CV, €113,246 [4.4]).
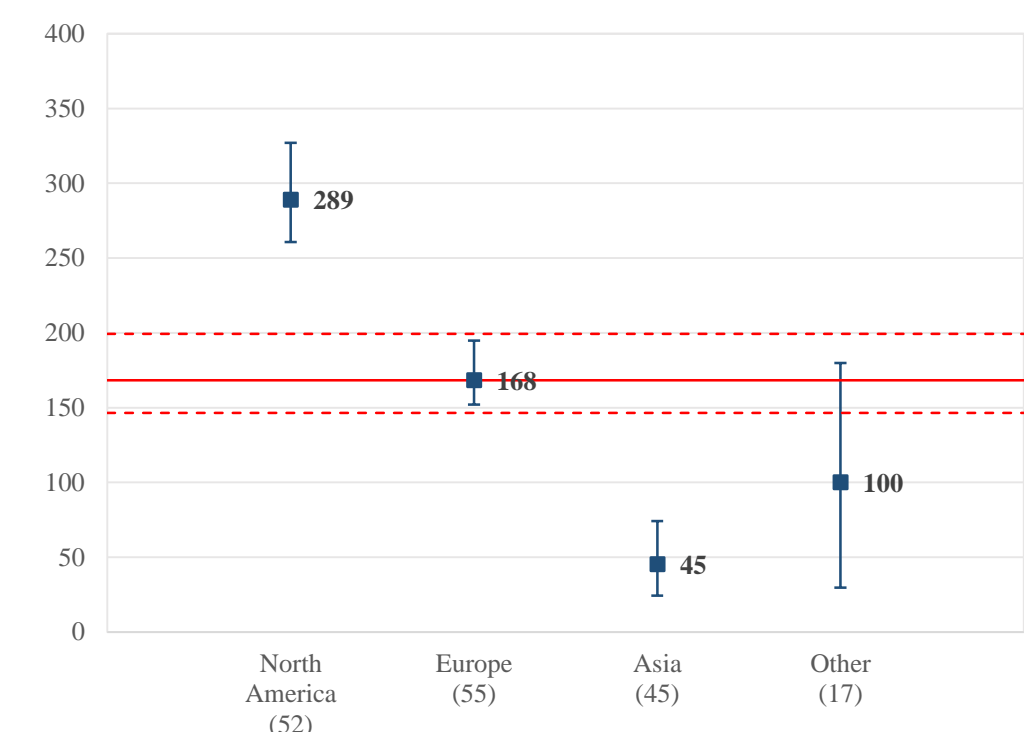
VSL and VSLY estimates [in € 2019].

VSLY estimates are calculated with a 3 % discount rate. 95 % CIs are calculated by employing non-parametric bootstrapping.
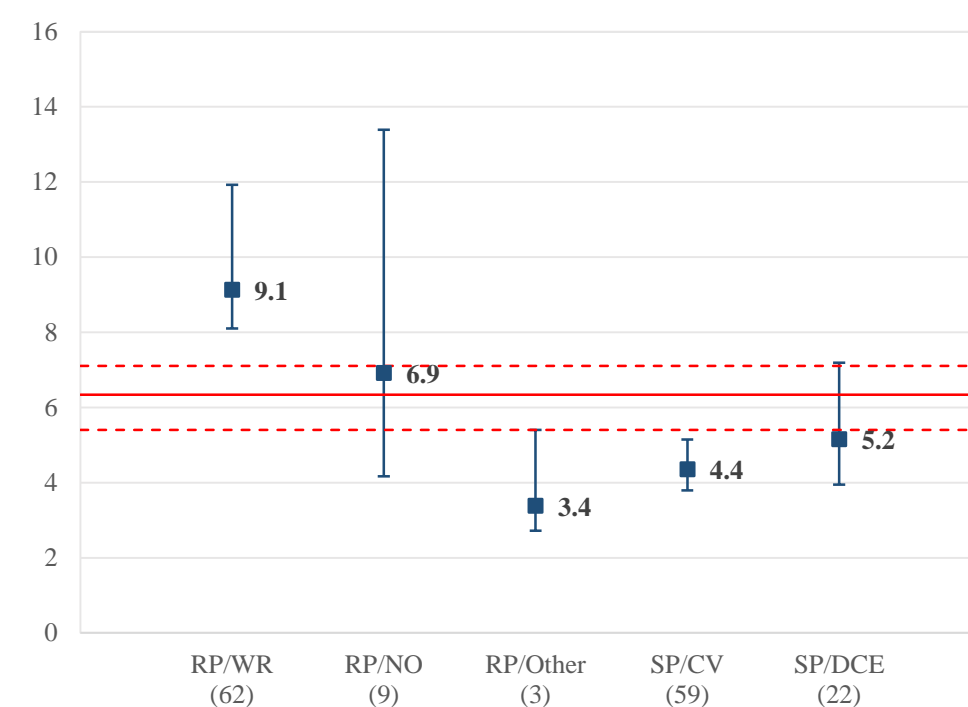
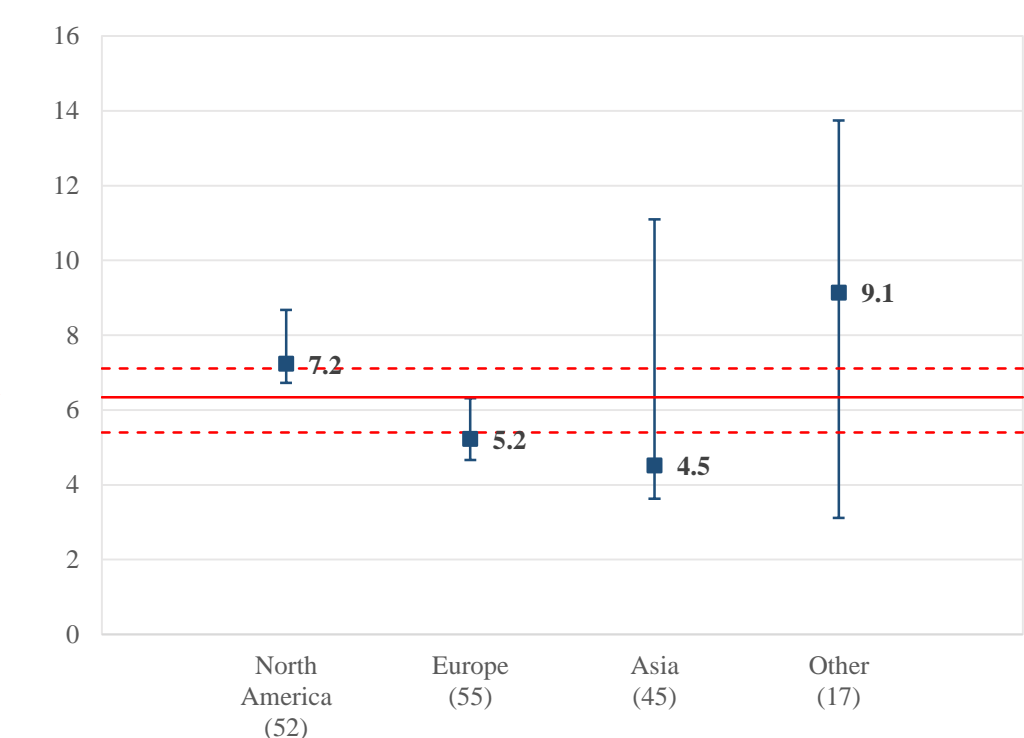|	Value	95 % Confidence Intervals	
		Lower Bound	Upper Bound
VSL (median)	€3,898,938	€3,226,503	€4,574,677
VSLY (median)	€168,367	€146,613	€199,249
VSL (mean)	€5,947,828	€4,585,329	€7,607,164
VSLY (mean)	€256,701	€200,443	€327,093
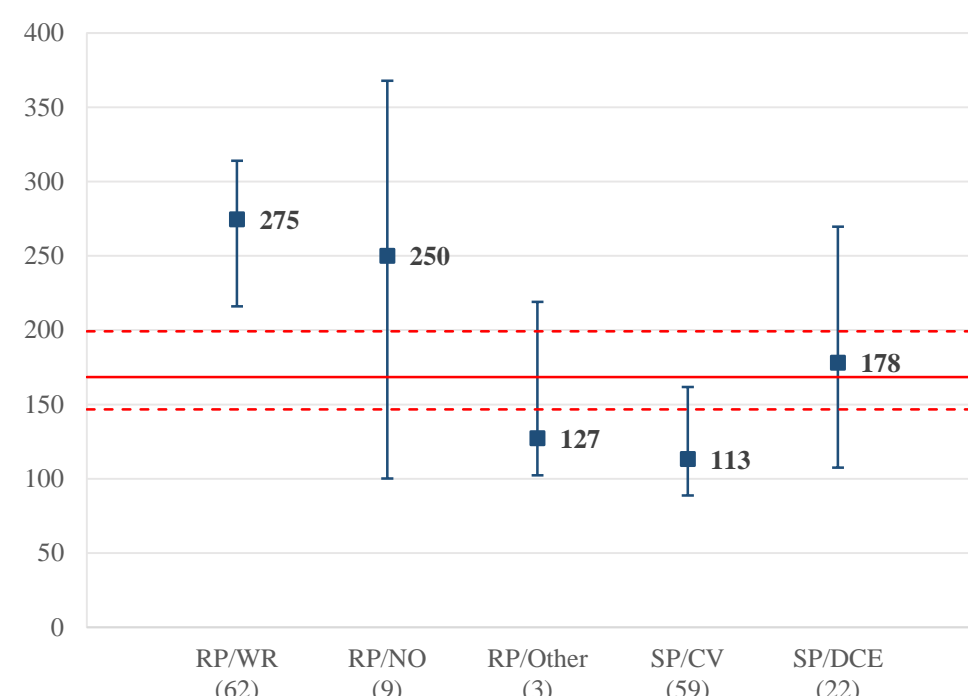
VSLY estimates [in T€ 2019] by elicitation method.

VSLY estimates [in T€ 2019] by region.

**VSLY estimates to GDP/capita by elicitation method.**

VSLY estimates to GDP/capita by region.

Note: Median values are presented. Ranges in blue denote 95 % CIs for median values, the red straight line is the median value for the entire sample, and red dashed lines stand for 95 % CIs for the entire sample median. CIs are calculated by means of non-parametric bootstrapping.

Regression results indicate that studies with North American data sources reported significantly higher VSLY estimates (p<0.1), than those valuated with RP/WR (p<0.1) and RP/NO (p<0.05) method. Differences remained statistically significant even after adjusting for GDP/capita.

Our analysis showed statistically significant differences neither by study design (p>0.1) nor by size of fatality risk (p>0.1).
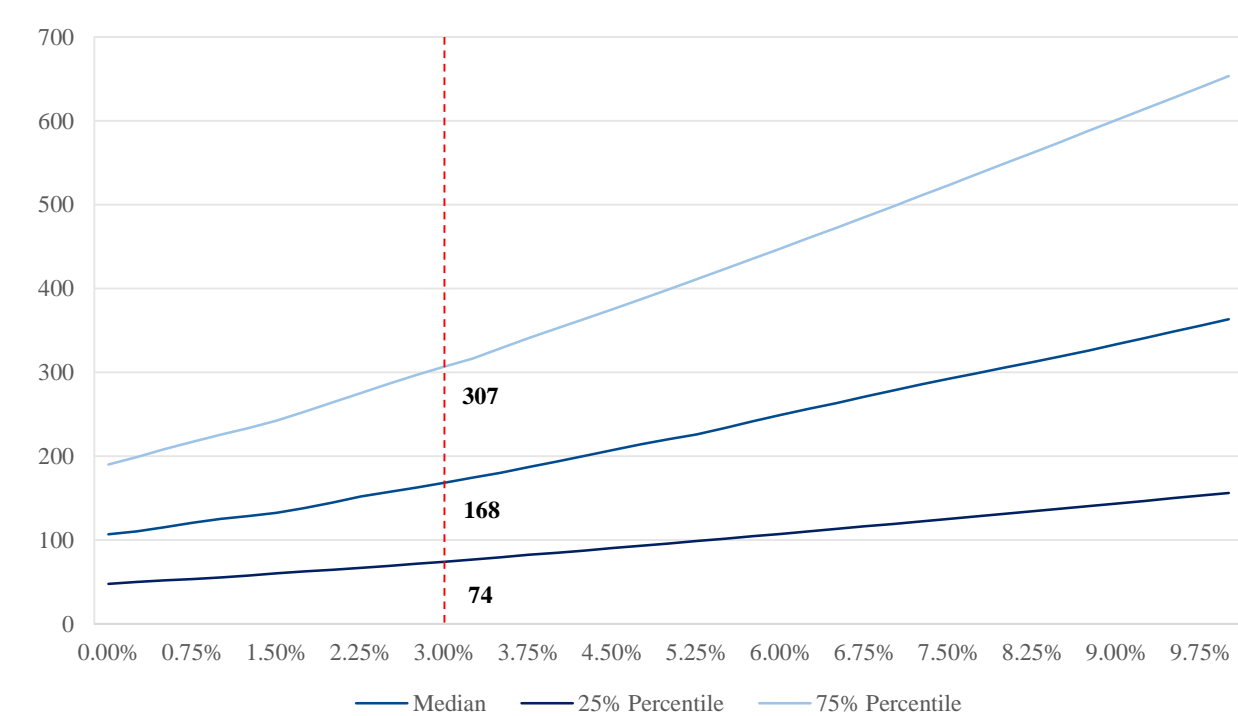
Sensitivity analysis for VSLY estimates [in T€ 2019].

From bottom to top, straight lines denote for the first quartile (25th percentile), second quartile (median) and third quartile (75th percentile) of the entire sample.

Conclusions

Our findings indicate that the WTP for a LYG may be substantially higher than the benchmarks currently used by international HTA agencies.

The analysis adopted a "demand-side perspective" reflecting (stated or revealed) preferences – whereas an alternative "supply-side perspective" might be used to reflect the realities of health schemes operating under a fixed budget constraint. Note that the present study does not imply endorsement of an approach using fixed thresholds to determine cost effectiveness, irrespective of context.