

New Estimates of the Willingness-to-Pay for a Statistical Life Year: A Systematic Review of the Empirical Economic Literature

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Introduction & Objectives

The evaluation of medical interventions – in particular in the context of Health Technology Assessments – invariably implies some kind of – explicit or implicit – cost value analysis. One possible anchor might be the value of a statistical life year (VSLY), which should be also of interest to health care policy makers.

However, there is far-reaching uncertainty as to the “correct” VSLY. In the absence of a valid VSLY, a central point of reference is missing for any type of cost benefit analysis – with or without use of quality-adjusted life years (QALYs) as a measure of benefit.

Against this background, we conducted a systematic review of economic studies providing empirical data on the value of a statistical life (VSL), which were published between 1995 and 2015.

Data & Methods

Our systematic literature search identified 120 studies reporting original data, yielding 133 unique estimates for the VSL. The following explanatory variables were used for the OLS regression analysis of the VSLY estimates:

- ▢ regional origin of data: Asia; Europe; North America; Other
- ▢ valuation method: revealed preferences, RP: wage risk, WR; non-occupational/other, NO/other; stated preferences, SP: contingent valuation, CV; discrete choice experiment, DCE
- ▢ study design: panel analyses; cross-sectional analyses
- ▢ income (as GDP per capita)

VSLY median/ 95% confidence intervals were computed by nonparametric bootstrapping.

Transformation of VSL Estimates into the VSLY:

Abbreviated Calculation Procedures:

- ▢ VSL (base case or mean for each experimental setting) from all relevant studies
- ▢ Currency reconversion from US-\$ (or else) to local currency unit (LCU) using exchange rates
- ▢ VSL inflated to year 2014 using country-specific CPIs
- ▢ GDP per capita from year of data generation, inflated as VSL
- ▢ Conversion of LCU values for 2014 to Euro (by using PPPs)

VSLY Computation:

- ▢ Calculation separately for men and women, residual life expectancy data from WHO Life Tables by country
- ▢ Base case discount rate 3% (for sensitivity analyses, 0% - 10%)
- ▢ Formulas: $VSLY = \frac{VSL \cdot (1+r)^{t-1} \cdot r}{(1+r)^t - 1}$ or (for $r = 0\%$): $VSLY = \frac{VSL}{t}$
- ▢ Calculating VSLY average (and range, if data were available), weighted by study population sex ratio

Literature Search

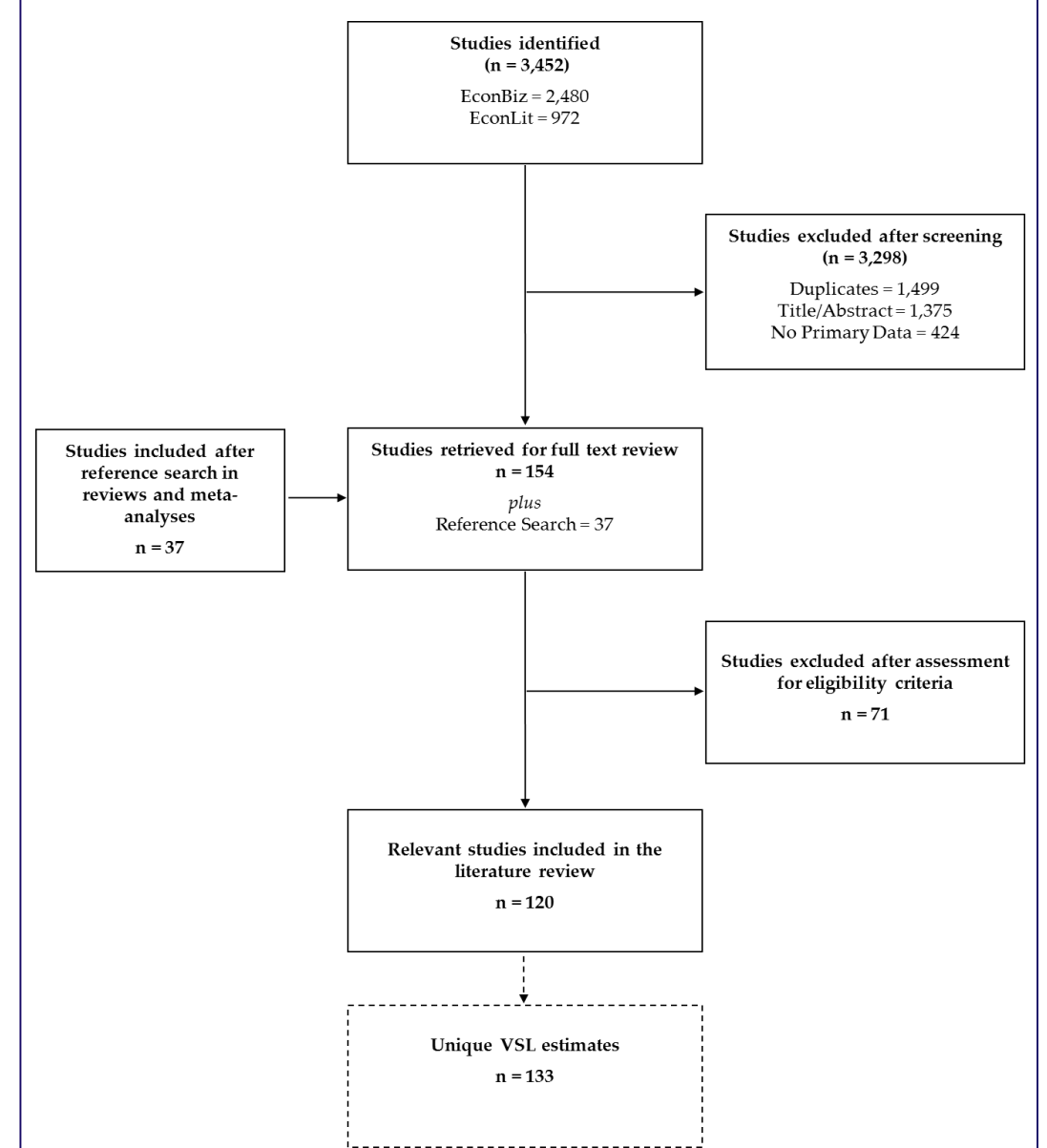
Databases:

EconBiz
EconLit

Search Terms:

Value of Life, Statistical Life,
Value of a Statistical Life, Value of a Life Year,
Value of a Statistical Life Year,
Quality-Adjusted Life Year (QALY),
Value of a Quality-Adjusted Life Year (QALY)

PRISMA Flowchart



Results & Key Findings

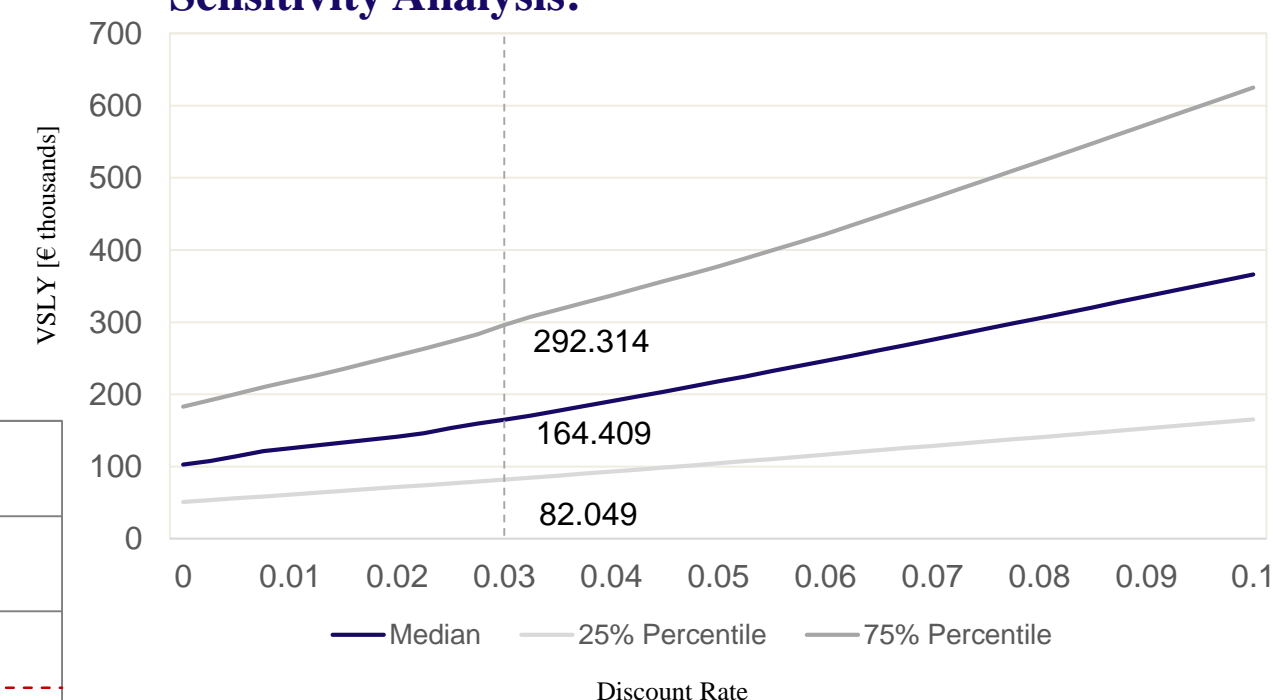
The median VSLY was €164,409 (mean, €223,428) or more than six times annual GDP per capita.

Our (median) VSLY showed large heterogeneity by

- ▢ study design: panel, €277,933; cross-sectional, €158,156;
- ▢ methodology: RP/WR, €259,230; SP/DCE, €186,620; SP/CV, €124,020; RP/NO/other, €179,244; and
- ▢ regional origin of data: Asia, €42,998; Europe, €158,448; North America, €271,179; Other, €80,396.

	Median Values	95% Confidence Intervals (nonparametric bootstraps)	
		Lower Bound	Upper Bound
VSL	€3,827,509	€3,125,307	€4,847,382
VSLY	€164,409	€137,413	€204,121

Sensitivity Analysis:



Summary & Conclusions

The median VSLY exceeded €164,000 or six times annual GDP per capita.

VSLY estimates showed statistically significant differences by regional origin of data, with North American results (median, €271,179) being higher than European (median, €158,448) and Asian (median, €42,998) ones. The difference between North America and Europe remained statistically significant even after adjusting for GDP per capita.

Our regression analysis showed neither statistically significant results by study design (panel versus cross-sectional data) nor by size of fatality risk.

Our results suggest that the empirical willingness-to-pay for a statistical life year might be substantially higher than currently accepted international benchmarks for cost effectiveness within the health care context.

