

# The Search for a Cost Effectiveness Standard: 1-3 Times GDP/Capita?

Michael Schlander<sup>1,2</sup>, Oliver Schwarz<sup>1,3</sup>, Diego Hernández<sup>1</sup>, Ramon Schaefer<sup>1,2</sup>

<sup>1</sup>Division of Health Economics at German Cancer Research Center (DKFZ) & University of Heidelberg (Germany)

<sup>2</sup>Institute for Innovation & Valuation in Health Care (INNOVAL<sup>HC</sup>), Wiesbaden (Germany)

<sup>3</sup>Heilbronn University, Campus Schwabisch-Hall (Germany)

## Introduction & Objectives

The search for “value for money” represents a fundamental motivation underlying comparative health economic evaluations. Value is frequently conceptualized as willingness-to-pay (WTP) per quality-adjusted life year (QALY) gained.

Any benchmark for the value of a statistical life year (VSLY) should be supported by empirical data capturing the preferences of the population in question. The WHO, for example, proposed one to three times annual GDP/capita as a potentially useful reference point. However, currently used benchmarks for the WTP/QALY, including the WHO recommendation, are controversial and lack robust empirical support.

Against this background, we reviewed the economic literature reporting 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 study characteristics were used as explanatory variables 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/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 reversion 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

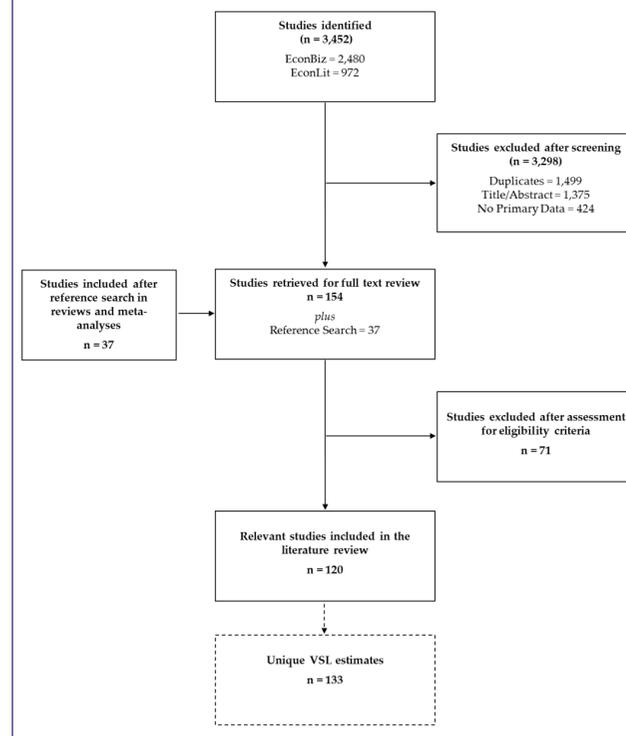
## Literature Search

Databases:  
EconBiz and 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



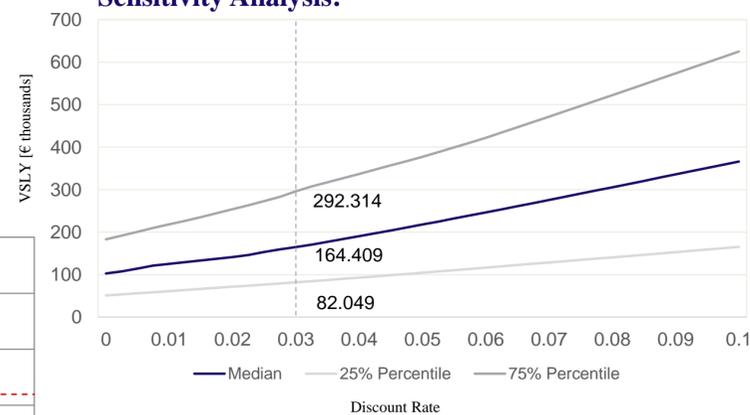
## Results & Key Findings

The median VSLY was €164,409 (mean, €223,428) or 6.4 times annual GDP/capita. The median VSLY (per GDP/capita) showed substantial differences by

- ▢ methodology: RP/WR, €259,230 (9.1); SP/DCE, €186,620 (5.3); SP/CV, €124,020 (4.5); RP/NO/other, €179,244 (5.4); and
- ▢ regional origin of data: Asia, €42,998 (5.2); North America, €271,179 (6.9); Europe, €158,448 (5.1); Other, €80,396 (12.5).

	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/capita.

Regression results indicate that studies with North American data sources reported significantly higher VSLY estimates, like those valued with the RP/WR method. Differences remained statistically significant even after adjusting for GDP/capita.

In our regression analysis, study design (panel data, €277,933, versus cross-sectional data, €158,156) as well as size of fatality risk were not significant at conventional levels. Results were primarily sensitive to discount rate.

Our results suggest that the empirical willingness-to-pay for a statistical life year might be substantially higher than currently accepted international benchmarks, including the WHO recommendation.

