

# Valuation of human lives

Presentation at an

Informal Joint Workshop of the Regulatory Policy Committee  
and the Annual Meeting of Sustainable Development

Experts on

## The Role of Impact Assessments in Policy Making

By

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# Why do we need (explicit) VSL estimates?

- There is (and should be) increased use of Cost-Benefit Analysis (CBA) in (environmental) decision-making.
- In times of scarce public resources, this can help secure that money is spent where it is most useful.
- CBA measure costs and benefits in common units: *money*.
- For policies that affect mortality, this requires a ‘value of a statistical life’ (VSL), for measuring the relevant benefits.
- If VSL is not valued *explicitly*, it will *in practice* be valued *implicitly*, through the policy-decisions actually made.
- These “revealed” VSLs will in practice vary between contexts – and reflect a waste of resources.  
→ explicit VSL estimates help develop consistent policies.

# What is VSL?

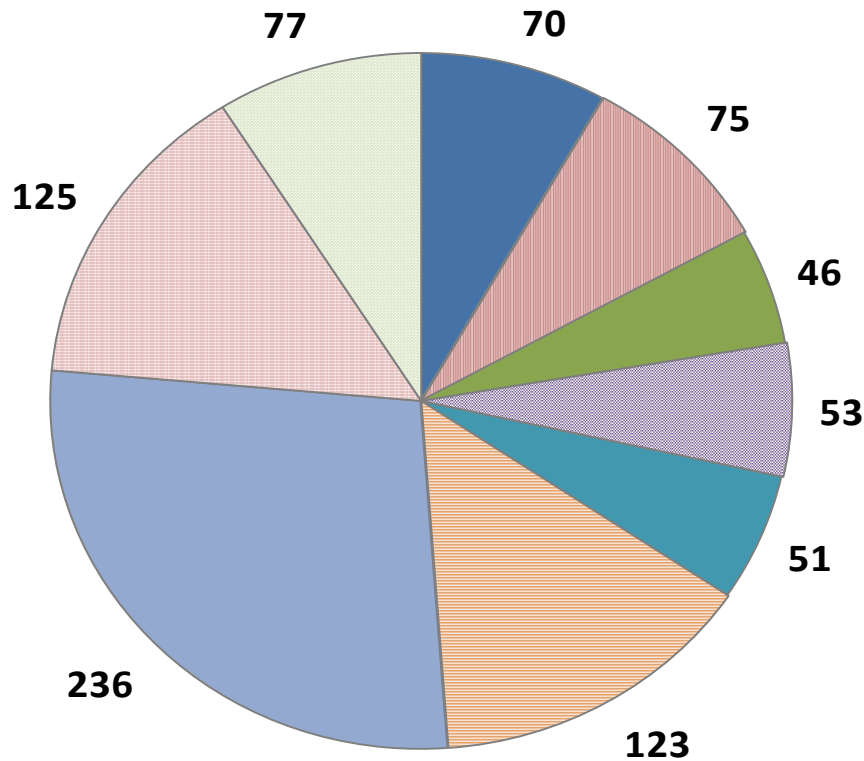
- VSL is **not** the value of **an identified person's** life!
- It is an **ex ante** valuation of a **small** reduction in mortality risks (over a given time period).
- There are two main methods to measure VSL:
  - Hedonic Pricing (HP) methods, normally relying on studies of differences in pay in jobs with different mortality risks.
    - Focuses on men aged 40-50 years, assumes they understand their job risks.
  - States Preference (SP) methods, where people are asked how much they would be willing to pay for e.g. a drug that would reduce their risk of dying from 3 in 10,000 to 2 in 10,000 during one year.
    - Can address any age category, could be affected by 'hypothetical bias', large differences in the quality of surveys.
- Dividing the WTP (or the wage difference) by the risk change gives a value for the VSL.
  - $\text{USD } 300 / 0.0001 = \text{USD } 3,000,000.$

# OECD's meta-analysis of VSL estimates

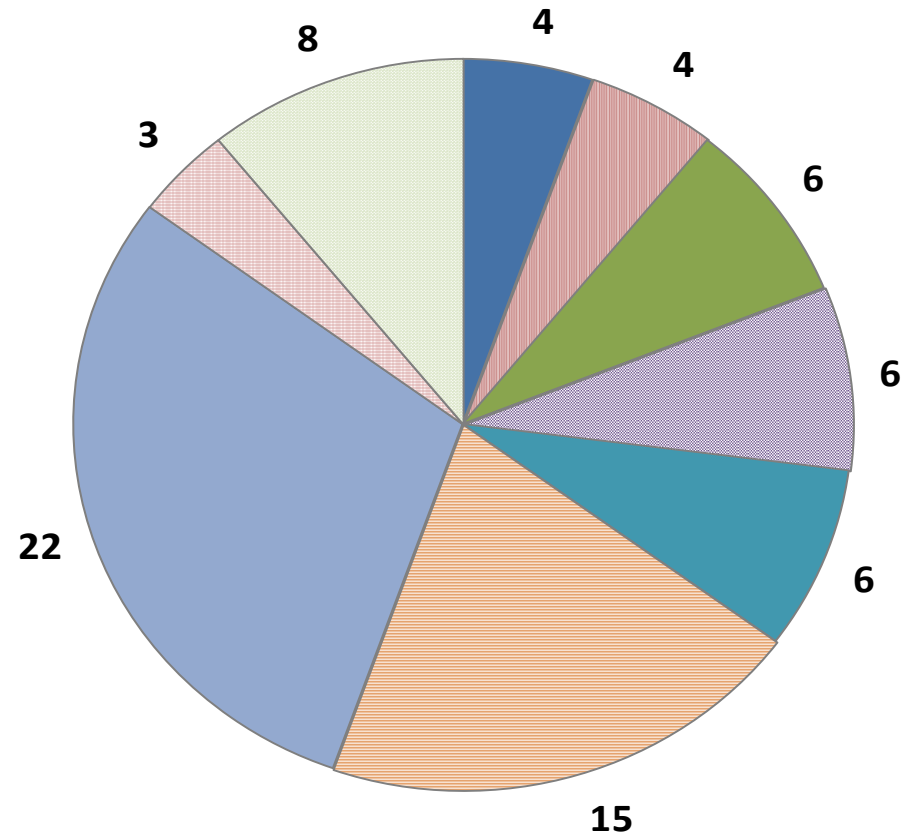
- In order to help countries implement CBAs, OECD has carried out a meta-analysis of all available *mean* VSL estimates from SP surveys made using environmental, health and traffic risk contexts.
- Excluded estimates based on 'willingness-to-accept' (WTA).
- Meta-analysis: Attempting to *explain* the differences in existing VSL estimates.
- Countries can draw on this analysis to do so-called '**benefits transfers**':
  - Estimating a VSL value to use in *their* policy assessments based on VSL values already estimated in *other* countries, taking due account of relevant differences between the countries concerned.
- A domestic SP study would be *better* – but also more *costly*.

# Estimates and surveys, by country

## Estimates



## Surveys



■ Canada

■ France

■ Italy

■ Sweden

■ United Kingdom

■ United States

■ Other OECD

■ China

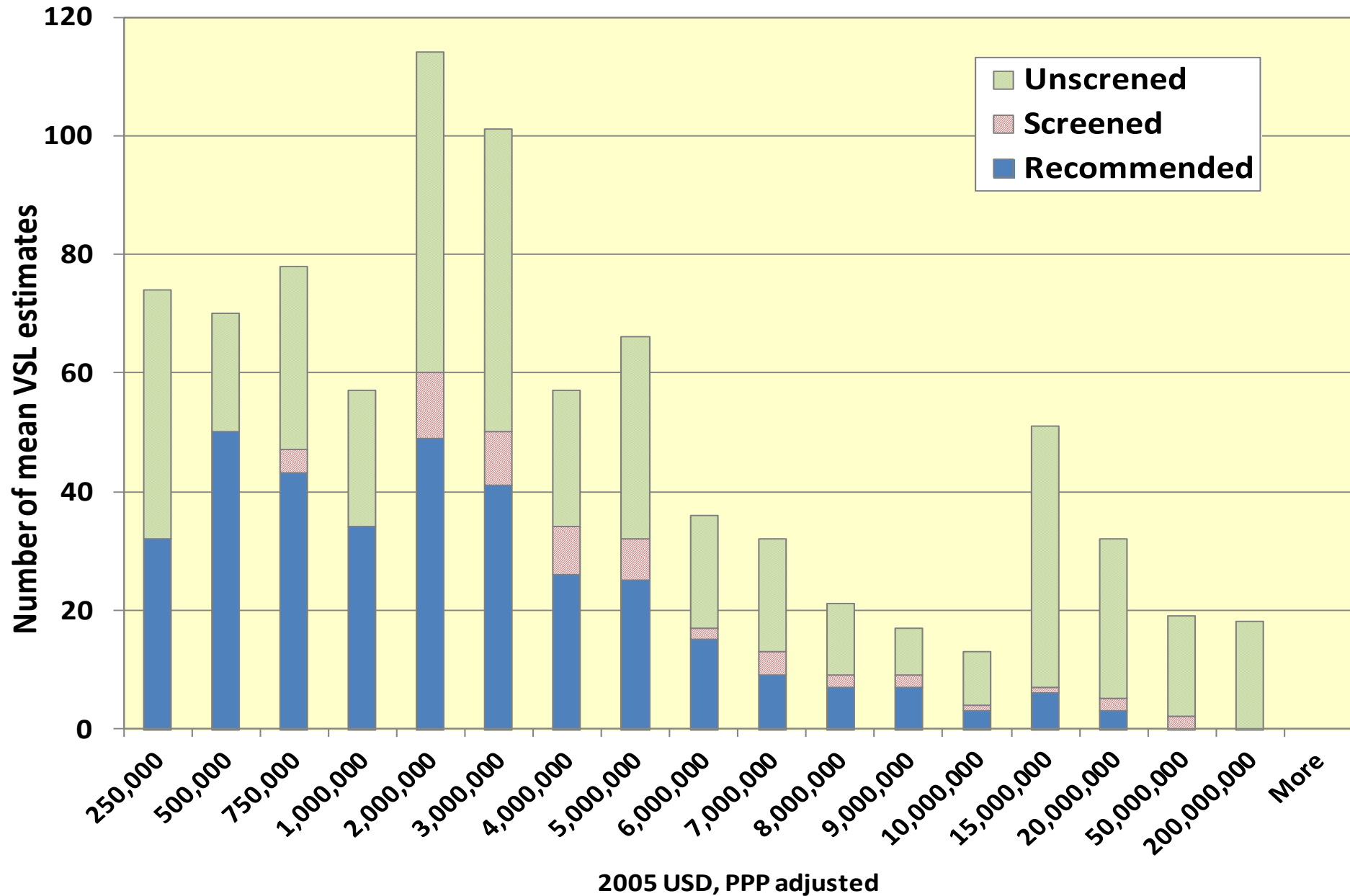
■ Other non-OECD



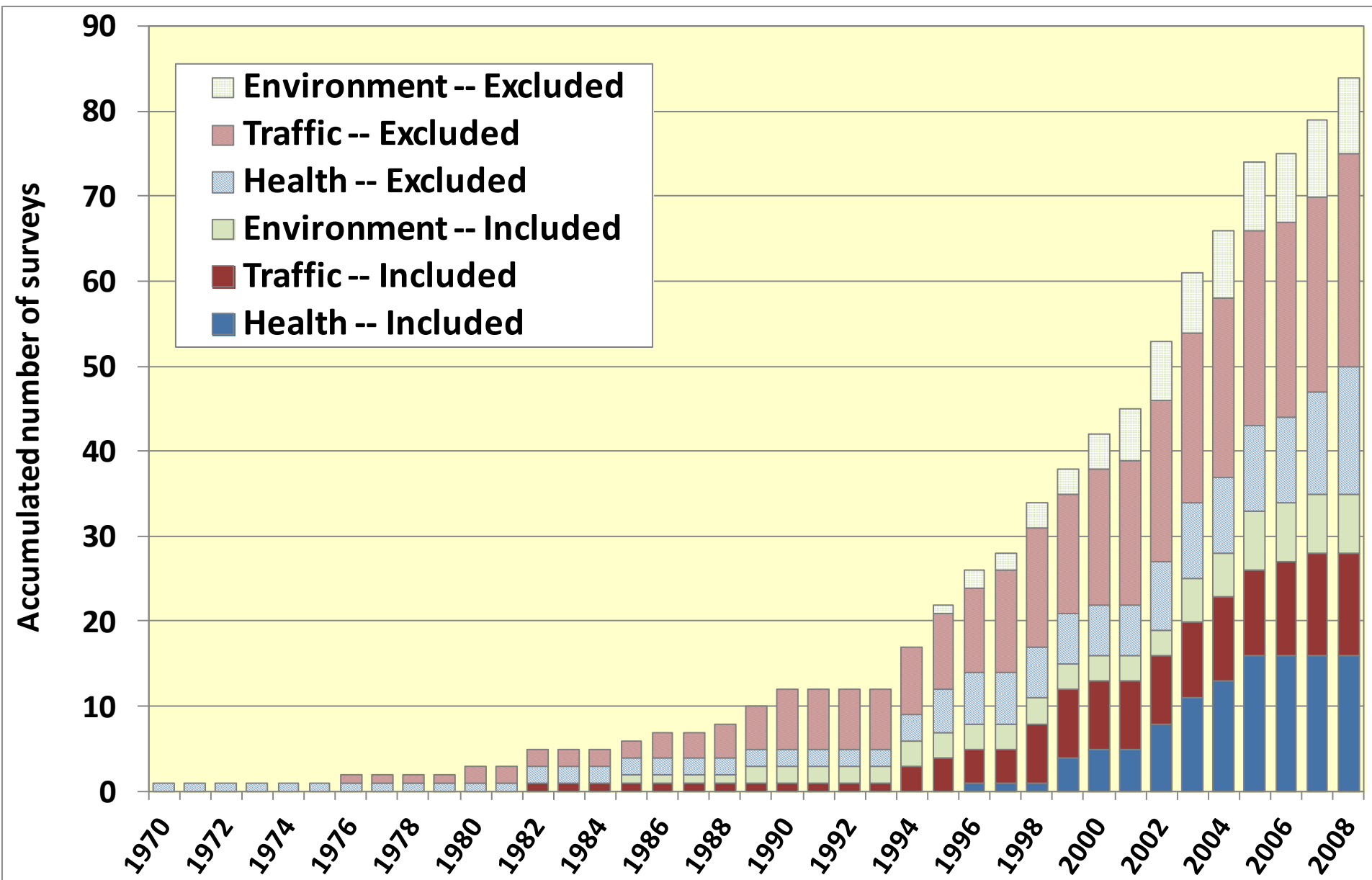
# Screening of the sample of VSL estimates

- Started out with 856 unscreened VSL estimates from all over the world.
- In order to base the final meta-analysis on ‘good quality’ VSL estimates – well suited as a basis for policy assessments, we excluded estimates that
  - Provided no information on the size of the risk change valued (231).
  - Came from surveys where the full sample was <200 persons, or was based on a sub-sample (e.g., age group) of <100 persons (118).
  - Came from samples clearly not representative of the general population (e.g., only health personnel, or only students) (102).
  - The original authors (also) recommended that we should exclude (55).

# Impacts of the screening on VSL distribution

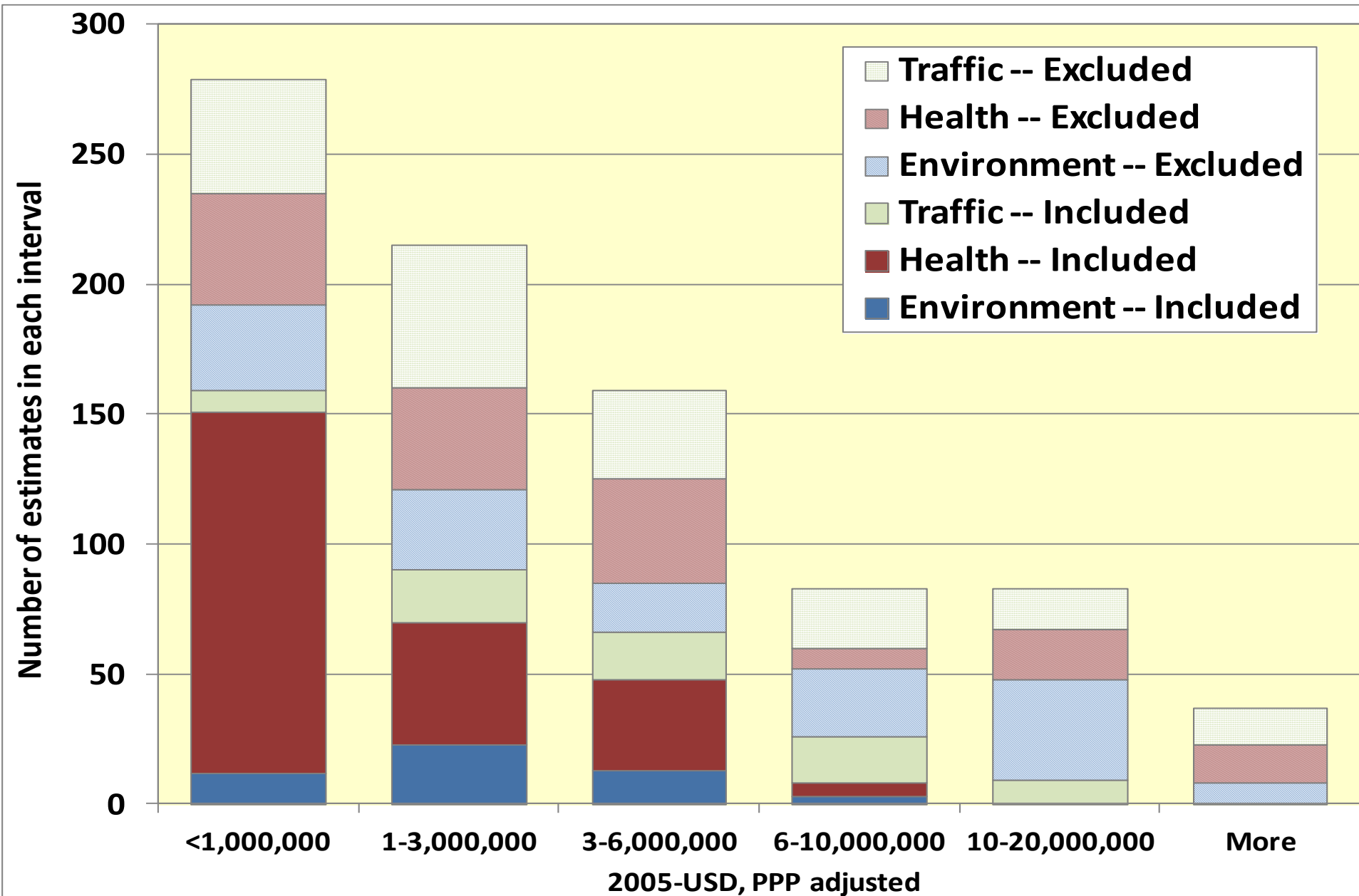


# Impacts of the screening on the surveys included





# Impacts of the screening, by risk category



# Impacts of the screening, by risk category II



# Regressions on the “recommended” sample

	Model I	Model II	Model III	Model IV	Model V
Ingdp	0.752*** (0.206)	0.823*** (0.190)	0.885*** (0.186)	0.832*** (0.185)	0.741*** (0.192)
Inchrisk	-0.461*** (0.101)	-0.588*** (0.120)	-0.561*** (0.111)	-0.590*** (0.0897)	-0.612*** (0.0909)
tumbull	-0.941 (0.826)	-0.305 (0.626)	-0.142 (0.632)	-0.00910 (0.649)	-0.129 (0.671)
envir		-1.303*** (0.374)	-0.566* (0.306)	-0.857** (0.367)	-0.855** (0.345)
traffic		-0.533 (0.333)	-0.204 (0.327)	-0.230 (0.287)	-0.464* (0.246)
public			-0.879*** (0.255)	-0.744** (0.272)	-0.684*** (0.228)
household			-0.166 (0.290)	-0.150 (0.248)	-0.203 (0.238)
cancerrisk				0.516 (0.332)	0.620* (0.326)
latent				-0.320 (0.385)	-0.272 (0.371)
noexpln					0.746*** (0.221)
Constant	2.923 (2.441)	1.511 (2.290)	1.154 (2.255)	1.358 (2.271)	1.950 (2.360)
Estimates	350	350	350	350	350
R-squared	0.717	0.779	0.814	0.827	0.845
Root mean square error	0.905	0.803	0.739	0.714	0.677

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Base VSL values

Million 2005-USD, PPP adjusted

	<b>Full sample</b>	<b>Trimmed sample</b>	<b>'Recommended' sample</b>	<b>OECD countries (screened)</b>	<b>EU-27 (screened)</b>
Mean VSL	6.1	5.0	2.4	3.7	4.4
(standard error)	(0.49)	(0.32)	(0.15)	(0.22)	(0.29)
Weighted mean VSL*	7.4	6.3	3.0		
(standard error)	(0.89)	(0.3)	(0.25)		
<b>Median</b>	<b>2.4</b>	<b>2.4</b>	<b>1.2</b>	<b>2.9</b>	<b>3.6</b>
Observations	856	814	350	206	135

\*Weighted by the inverse of the number of observations from each SP survey.

# Example: Calculating a VSL value for Israel

- $VSL_p' = VSL_s (Y_p / Y_s)^\beta$
- GDP per capita, 2009, PPP-adjusted:
  - Israel ( $Y_p$ ): 27 661 USD
  - OECD average ( $Y_s$ ): 33 054 USD
- Ratio:  $27\ 661 / 33\ 054 = 0.83684$
- Ratio to the power of  $0.8 / 0.4$  ( $\beta$ ):  $0.86719 / 0.93123$ 
  - $0.86719 * 2.9$  ( $VSL_s$ ) =  $2.5$  (million 2005-USD).
  - $0.93123 * 2.9$  ( $VSL_s$ ) =  $2.7$  (million 2005-USD).
- PPP-adjusted, 2005 exchange rate: 3.743627.
- $VSL_p'$  in 2005 money value:  $9.4 / 10.1$  million NIS.
- CPI, 1<sup>st</sup> quarter 2011 (2005=100): 116.5.
- $VSL_p'$  in 2011 money value:  $11 / 12$  million NIS.

# Adjustments to base values I

Adjustment factor	Recommendation
<b>Population Characteristics</b>	
Income	No adjustment <i>within</i> a country or group of countries the policy analysis is conducted for (due to equity concerns). For transfers <i>between</i> countries, VSL should be adjusted with the difference in GDP per capita to the power of an income elasticity of VSL of 0.8, with a sensitivity analysis using 0.4.
Age	No adjustment for adults due to inconclusive evidence. Adjust if regulation is targeted on reducing children's risk. VSL for children should be a factor of 1.5 – 2.0 higher than adult VSL.
Health status of population and background risk	No adjustment (due to limited evidence)



# Adjustments to base values II

Adjustment factor	Recommendation
<i>Risk Characteristics</i>	
Timing of risk (Latency)	No adjustment (due to limited evidence).
Risk Perception (source or cause)	No adjustment (due to inconclusive evidence). Sensitivity analysis for lower values in the environment sector than in health and traffic.
Cancer or Dread (Morbidity prior to death)	No adjustment if regulation is targeted on cancer risks and/or risks that are dreaded due to morbidity prior to death. Morbidity costs prior to death should be added separately.
Magnitude of risk change	No adjustment. However, since the magnitude of the risk change clearly affects the VSL, a sensitivity analysis based on VSL calculated from a risk change similar in magnitude to the policy context should be conducted. A risk change of 1 in 10,000 annually is suggested for calculating a VSL base value.

# Adjustments to base values III

Adjustment factor	Recommendation
<i>Other adjustments</i>	
Altruism and Public vs. Private risk	No adjustment (due to limited evidence and unresolved issues). Use “Private risk” to calculate a VSL base value. Provide illustrative adjustments in sensitivity analysis.
Discount for hypothetical bias in SP studies	No adjustment (due to limited evidence)
Correction for inflation	Adjustment based on the national Consumer Price Index (CPI).
Correction for increased real income over time	Adjust VSL with same percentage as the percentage increase in GDP per capita.

## More information

- [www.oecd.org/env/policies](http://www.oecd.org/env/policies)
- [www.oecd.org/env/policies/vsl](http://www.oecd.org/env/policies/vsl)
- [Nils-Axel.Braathen@oecd.org](mailto:Nils-Axel.Braathen@oecd.org)