

Valuation of Health Impacts in ExternE

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Need for valuation

- Epidemiological evidence of link between air pollutants (PM, SO₂, O₃, NO₂ & CO) and premature death & illness
- Focus here on mortality effects since have dominated previous benefit analyses of air quality policy

Epidemiological characterization of mortality impacts

- “Acute” impacts – short term exposure to pollutants leads to deaths easily attributable to exposure \Rightarrow VSL
- “Chronic” impacts – long term exposure to pollutants leads to deaths, but that are not directly attributable. Can only observe life expectancy loss over whole population \Rightarrow VLYL

Valuation practice to date

- Empirical valuation studies
 - Risk – based: e.g. risks in work-place compensated by higher wages; expenditure on safety measures in transport
 - ⇒ VSL estimates
 - Problematic since e.g.
 - a) not same size of risk changes as in air policy context;
 - b) Different age groups impacted

Examples of VSL

- ExternE (1998) Euro 3.1 million
- DG Environment Euro 1 million
- US EPA \$3.7 million
(\$6.1 including wage risk)

Measurement of VLYL

- Need derives from
 - epidemiological unit of measurement
 - Simple way of adjusting for age (since impacts primarily affect elderly)
- Method to date in ExternE
 - Convert VSL estimate to discounted stream of annual life year values over remaining lifetime (based on population survival probabilities)
 - **Problem:** Assumes linearity between VSL and LE.

Examples of VLYL used in policy analysis

Source	Year of price level	VOLY	Comment
ExternE (1998)	1995	€0.12 million €0.084 million	acute (short term) effects chronic (long term) effects Both estimates use 3% discount rate. Derived from VSL
EAHEAP (1999)		€0.18 million	Cited as a VOSL figure, but specific to a loss of 1 year of life
NewExt(2003)		€0.044 million	Based on conversion from VSL
USEPA (2003)	1999	€0.18 million €0.45 million €0.30 million €0.53 million	<65 years, 3% discount rate >65 years, 3% discount rate <65 years, 7% discount rate >65 years, 7% discount rate

Valuing premature death: New evidence

- EC NEWEXT Research project
 - Survey-based method; adapts existing method derived in N. American studies
 - Undertaken in 3 EU countries
 - WTP 5:1000₁₋₁₀; 1:1000₁₋₁₀; 5:1000₇₀
 - ⇒ country-specific and pooled analysis

NEWEXT Results

- VSL of € 1.045m (based on WTP 5:1000₁₋₁₀)
- Recommend as **central value** since first question asked; easier risk change to understand)
- VSL of € 3.3m (based on WTP 1:1000₁₋₁₀)
- Recommend as upper range estimate
- VLYL of €50,000 (based on conversion of WTP 5:1000₁₋₁₀; (5:1000 Δ in risk equates to Δ in LE of 40 days)) (See Rabl (2001) for method)
- **Discount Rate** of 6% approx (3 country average)
(Implicit from WTP 5:1000₁₋₁₀ and 5:1000₇₀)

NEWEXT Results (cont.)

- WTP Regression results (5:1000 immediate)
 - no association between respondent age and WTP
 - Higher income associated with higher WTP
 - Hospitalisation for cardio- and respiratory illnesses in past 5 yrs associated with higher WTP
 - No association between WTP and cancer and chronic illnesses

Planned New Empirical work (reflecting remaining uncertainties)

- EC NEEDS Research project
 - Ask LE question directly
 - Experiment in survey with:
 - context specification
 - Payment vehicle
 - Open-ended questions
 - Collect implicit valuations (e.g. resources spent on health care)
 - Further testing of transfer functions
- EC DG RTD Health valuation project
 - Focus on valuation of impacts on children's health

Current External position on valuation of premature death

- New values derived from risk change WTP questions to be used as starting point
- Rationale dependent on epidemiological measures
- VLYL to be used

Morbidity valuation – key values

Health end-point	Recommended unit values €
Respiratory hospital admissions 8 days hospitalisation: 14 days hospitalisation:	3,675 central value (2,380-4,970)*
Cardiac hospital admissions 8 days hospitalisation: 14 days hospitalisation:	2,764 (central)
A&E visits for respiratory illness	311
GP visits: Asthma Lower respiratory symptoms	56 76
Respiratory symptoms in asthmatics: Adults Children	146 294
Restricted activity days	139
Chronic bronchitis	Not valued

* Updated EAHEAP WTP+COI. Based on NHS savings of €2100 – 3,500 (1999/2000 prices) and WTP of €280 - €1190 (1999 prices).

Morbidity valuation

- Recent 5-country study (CSERGE, Navrud, 1999) has provided up-dated values for many end-points
- EC DG Research project (ExternE-Pol) looking to up-date value for e.g. Chronic Bronchitis since epidemiology does not match symptoms valued