



# The Economics Interface

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ECHA study on valuing health endpoints related to chemicals exposure:

What to make of the numbers?

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## Quick background

Seven years in academia with some health and risk valuation experience

‘Precise Preferences and Survey Design in Contingent Valuation’, *Economica*, 64: 681-702, 1997 (with M W Jones-Lee, G Jones)

‘Benefit Transfer in Europe: How Reliable are Transfers Between Countries?’, *Environmental and Resource Economics* 29: 67-82, 2005 (with R Ready, S Navrud et al)

Eight years in UK Home Office establishing economic evidence base (including monetary valuations of (e.g.) the costs of crime)

Two years in ECHA, overseeing the ECHA WTP study

Now an independent consultant and ECHA ‘senior expert to aid methodological development work related to socio-economic analysis’

From the UK ‘tradition’ of ‘healthy scepticism’ towards stated preference valuation

## General approach to my review

‘Non-technical/-econometrical’

Retrospective design lessons/critique

‘Do the numbers make sense?’

What does the existing valuation and other literature say?

What might be reasonable values?

## General (positive and negative) remarks

An awful lot of research for the money

Some truly innovative aspects and 'new numbers'

Why didn't we include non-cancer VSL?

Was it too much research? (Complexity, speed of completion etc)

## Skin and dose toxicity – EU-wide results

### Mean EU28-wide WTP values

	€2013
Acute dermatitis	227
(2x/yr.)	289
(4x/yr.)	329
(1x/yr. for 2 yrs.)	308
(1x/yr. for 5 yrs.)	352
(1x/yr. for 10 yrs.)	339
(2x/yr. for 2 yrs.)	271
(2x/yr. for 5 yrs.)	391
(2x/yr. for 10 yrs.)	447
(4x/yr. for 2 yrs.)	334
(4x/yr. for 5 yrs.)	383
(4x/yr. for 10 yrs.)	615
Chronic dermatitis	1055
Acute kidney failure	532
Chronic kidney failure	2761

- Is the dermatitis single episode value too high?
- The single-year, multi-episode values imply very rapid diminishing marginal returns
- The multi-year values imply very high discount rates (c.200%)
- The chronic dermatitis illness seems much more serious than the acute illness
- Chronic kidney failure involves three days (approx.) in hospital every week for the rest of your life

## Skin – EU-wide results

- Is the dermatitis single (2-week) episode value too high at €227?
  - Value of symptom day (Ready et al) around €50-70 (2013)
  - Lundberg et al value of chronic atopic eczema around €120 per month (2013) (8% income)
  - Lundberg et al DWs around 0.95 - €8.60/day at €63,000 VOLY (2013)
- The single-year, multi-episode values imply very rapid diminishing marginal returns
  - Second episode worth €62, third and fourth €40
  - What counts as insensitivity?
- The multi-year values imply very high discount rates (c.200%)
  - No reason why values should fall so significantly over time (exc. adjustment/experience)
- The chronic dermatitis illness seems much more serious than the acute illness
  - Standard gamble so budget constraints no explanation
  - DW 0.95 plus two hospital stays (Ready et al)  $\approx$  €4,000, *or*
  - DW 0.95 (controlled) plus two weeks DW 0.75 (uncontrolled)  $\approx$  €4,000

## Kidney failure – EU-wide results

- Chronic kidney failure (€2761) involves three days (approx.) in hospital every week for the rest of your life
- Acute kidney failure (€532) involves two weeks in hospital and two weeks' recovery
- Ready et al hospital admission (3+4 days) €471 (2013)
- Disability weights vary widely
  - GBD (2012): ESRD with dialysis 0.573 (€35,000/year)
  - GBD (2004): ESRD 0.1 (€6,000/year)
  - Nafar et al for Iran: ESRD with dialysis 3.6 DALYs/case (€220,000/case undiscounted)
  - Manns et al for Canada: ESRD 24.4 QALYs/case (?)
- Standard gamble so values not budget-constrained

## Fertility and developmental toxicity - Results

### People who want a child – private good

Health outcome	Base value
Value of a statistical pregnancy	21 600
Value of a statistical case of MINOR birth defects	4 300
Value of a statistical case of INTERNAL organs	128 200
Value of a statistical case of defects on EXTERNAL body parts	25 700
Value of a statistical case of VLBW	126 200
Value of a statistical infertility (in vitro fertilisation treatment)	29 400

### General population – public good

Health outcome	Base value
Value of a statistical pregnancy	37 900
Value of a statistical case of MINOR birth defects	50 700
Value of a statistical case of INTERNAL organs	771 300
Value of a statistical case of EXTERNAL body parts	453 600
Value of a statistical case of VLBW	548 300

## Fertility and developmental toxicity - Results

- Private values for (in)fertility seem in line with (limited) literature
- Private values for ‘defects’ seem quite low, e.g. VLBW:
  - Rautava et al. (2009) estimated 1.3 QALYs lost by age 5 (€75,000 undiscounted)
  - Petrou et al. (2009) estimated 0.167 QALY decrement at age 11 (€94,000 discounted)
- but literature is *very* limited
- Very big difference between private and public values
- Unspecified ‘co-benefits’ account for large proportion of values (e.g. €103k vs €24k for private ‘external defects’)
- Public values for those wanting a child same or lower than general population

## Carcinogenicity – EU-wide results

Recommended willingness-to-pay values for cancer risk reduction (scaled to EU28)

<b>Original results</b>	<b>€<sub>2012</sub></b>
Value of statistical life (VSL)	5,000,000
Value of a statistical case of cancer (VSCC)	396,000
<b>Values based on robustness check</b>	
Value of statistical life (VSL)	3,500,000
Value of a statistical case of cancer (VSCC)	350,000
Value of statistical cancer morbidity (VCM)	410,000

- Quality of life and level of pain have no effect on values – VCM is really just unspecified ‘cancer premium’
- VCM implies quite small cancer premium compared with SP literature, but in line with QoL-based cancer numbers (e.g. HSE)
- VSCC seems untenable
  - 5-year survival rate = 60% (age 45-60)
  - If VSL = €3.5m, VSCC = €1.4m at least (without discounting)?

## Thoughts and questions

- Skin single episode acute value might seem OK but multi-episode and chronic values seem far too low
- Simple scope sensitivity test unconvincing
- Does scope insensitivity invalidate the single episode value
  
- Kidney values seem unrealistically low – QoL evidence and ‘constructed’ WTP suggest much higher
  
- Fertility values have very little to compare against, but the numbers seem OK if rather low
- But the unspecified ‘co-benefits’ account for a large proportion of the values
  
- Cancer VSL and VSM values seem reasonable, but VSCC does not
- VSM not apparently related to anything – what really drives it?
- Can VSL and VSM be valid when VSCC is not?