

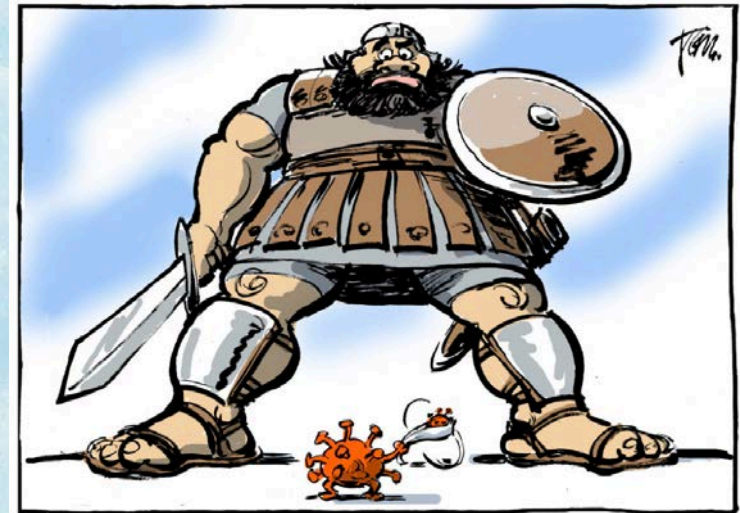
Health impact assessment and valuation

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Updates

- Comparison of methods for health impact assessment and valuation being undertaken for 2nd EU Clean Air Outlook
 - Health impact assessment
 - Valuation
- Expert Panel on Clean Air in Cities

Health impact assessment

- Last EC analysis was based on WHO-Europe HRAPIE study (2013)
 - EC approach has traditionally informed the UNECE approach
 - Much research published since 2013
 - Evidence growing on additional effects
 - New information on some endpoints, including mortality
 - Review undertaken as part of work on the EC's Clean Air Outlook

HIA Review looked at practice elsewhere

- WHO's original HRAPIE study
- Global Burden of Disease
- AirQ+
- European Environment Agency
- DG MOVE, DG ENER, DG ENV
- Denmark
- Finland
- France
- Germany
- Ireland
- Sweden
- UK
- US Environmental Protection Agency
- Studies for OECD
- UNEP LCIA indicators

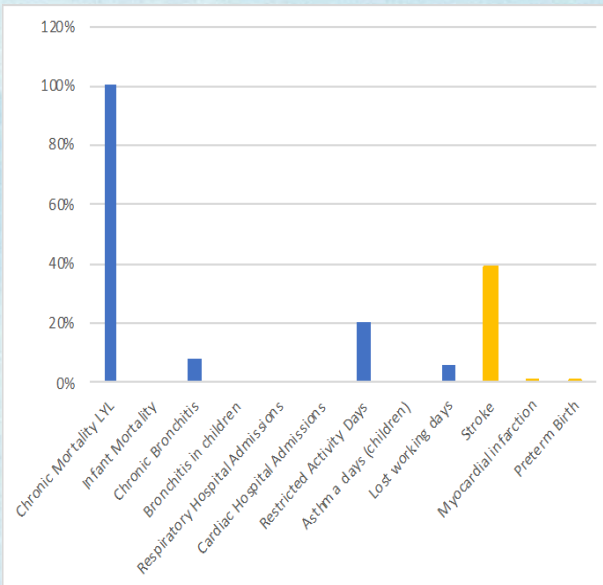
Likely not to
be a
complete
review of
practice
either in
these
countries /
institutions
or
elsewhere

Mortality

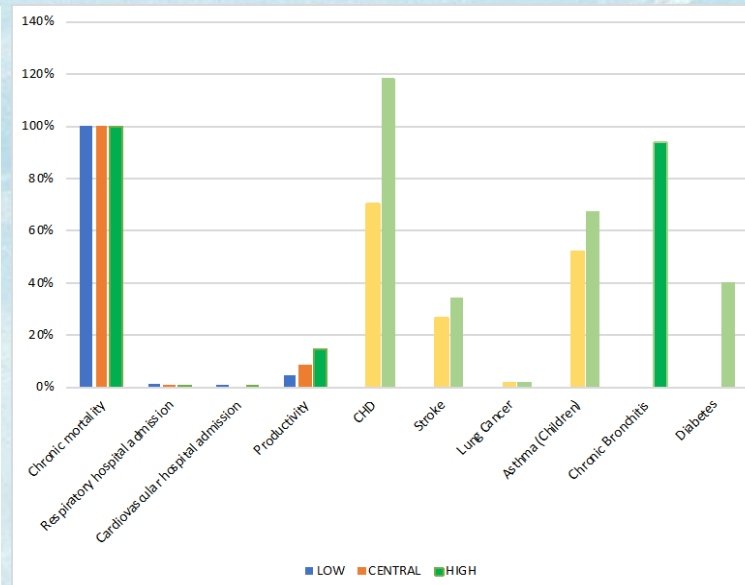
- Increased evidence for effects at low concentrations
 - MAPLE, ELAPSE, US Medicare study
- Further review, e.g. Pope et al (in press, Environmental Research), generally suggests an increase in $PM_{2.5}$ function
 - But need for review of reviews
 - Increases in mortality estimates require careful thought on interpretation of deaths. Little/no conceptual problem for life years lost
- For NO_2 , some development since HRAPIE in quantification studies, e.g. UK
 - COMEAP (2018) report gives two positions
 - Defra / Ricardo work includes a simpler approach based on COMEAP (2018)

Examples of additional effects linked to PM_{2.5} exposure

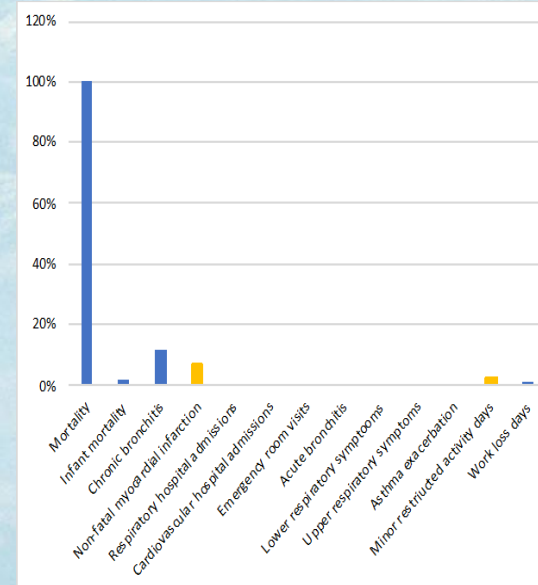
Sweden



UK



USA



In all cases chronic mortality valuation has been (approximately) adjusted to give reasonably consistent comparison across countries. Data shown are combination of response functions and valuations

Productivity

- UK approach gives significantly higher (x4) estimate of productivity effects
 - Includes effects via mortality and outside the labour market
- Dechezleprêtre (2019, for OECD) also gives significantly higher damage
 - Based on econometric techniques, not impact pathway approach

General observations

- Many European authors retain HRAPIE as main source
- Growing tendency to include additional health impacts
- BUT no consistency in which impacts to include and what functions to use
- Some additional impacts make little difference to economic outcomes
- BUT some would:
 - Diabetes, stroke, dementia
- Further research into exposure to both very high concentrations and to low concentrations, particularly for mortality
 - Suggestive of underestimation of mortality impact
 - Which would require more thought on what 'a death' means
- Little evidence that current HRAPIE based methods would overestimate damage, underestimation seems far more likely
- Useful if studies include a position based closely on HRAPIE at least for the purpose of comparison

Valuation

- Some of the valuations used previously in EC/UNECE work are now dated and look out of line with other evidence
- Mortality
 - VSL valuation – adoption of mean VSL from OECD (2012) is appropriate (€3 million)
 - No perceived need for both mean and median values
 - OECD work currently being updated
 - Leaves open the question of the VOLY
 - Range in use: €16k to €133k, partly through alternative views on quality of life for those whose life is shortened (poor health vs ‘typical’ health for age vs perfect health), partly through variation in original source material
 - Very little original work on the VOLY, some economists still dispute the concept (e.g. OECD)

Summary of alternative valuations used

Table 10. Values from each source converted to EUR, 2005.

	Holland 2014	OECD 2012	Hunt 2016	DG MOVE	DCE 2018	Savolahti 2018	Åstrom (P.C.)	Defra 2020	USEPA 2011
Currency conversion to €2005	1.00	0.85	0.65	0.74	0.08	0.71	1.00	0.75	0.80
VOLY median	57,700			51,764	44,442	49,328			
VOLY mean	133,000					114,383			
Acute mortality VOLY								16,488	
Chronic mortality VOLY								31,903	
VSL median	1,090,000								
VSL mean	2,220,000	3,060,000		2,662,134		1,894,463			7,085,475
Chronic deaths VSL					1,750,300				
Acute deaths VSL					1,179,550				
Infant Mortality VSL low	1,635,000	4,590,000							
Infant Mortality VSL high	3,330,000	6,120,000							
Respiratory Hospital Admissions	2,220		1,299		4,055			6,187	18,877
Cardiovascular Hospital Admissions	2,220		1,299		5,137			6,317	21,749
Chronic Bronchitis in adults	53,600		217,344		295,040				390,099
Chronic bronchitis per year in adults								10,888	
Bronchitis in children	588		301						408
Myocardial infarction							27,530		67,010
Congestive heart failure					8,371				
Chronic heart disease								163,317	
Lung cancer					12,404			36,541	
Stroke							555,936	231,925	
Diabetes								136,470	
Preterm birth							39,693		

Some variation (but not all) is artificial – values applied to different definitions of impact and variation accounted for via response functions

Summary of alternative valuations used (cont.)

	Holland 2014	OECD 2012	Hunt 2016	DG MOVE	DCE 2018	Savolahti 2018	Åstrom (P.C.)	Defra 2020	USEPA 2011
Asthma adults new incidence								263,246	
Asthma children new incidence								372,124	
Asthma symptoms children	42								43
Asthma lower respiratory infections children			301						
Bronchodilator use					13				
Cough					24				
Emergency room visits for asthma									294
Lower respiratory symptoms					7				15
Upper respiratory symptoms									24
Restricted Activity Days	92		110		75				
Minor Restricted Activity Days	42		40						51
Work loss days	130								119
School loss days									71

Some variation (but not all) is artificial – values applied to different definitions of impact and variation accounted for via response functions

Next steps

- Recommendations to be made on updated set of response functions and valuations for application in the EU's Clean Air Outlook
 - In the absence of clear consensus:
 - Retention of HRAPIE functions, + updated valuations where previous recommendations are outdated
 - Sensitivity analysis
- Happy to consider additional sources if any participants would like them considered

Expert Panel on Clean Air in Cities (Bratislava, November 2019)

- Main item on this on Wednesday, but...
- Very little information available on the costs or benefits of local measures
 - Lack of information on benefits as change in emission, concentration, health impacts, economic values
 - EC Fitness Check of AAQ Directives, EUROSAL report
- Difficulties:
 - Measures taken in combination
 - Measures are often not taken by air pollution officials
 - Measures are often part of other plans, hence AQ benefits may be co-benefits
- But from an air quality planning perspective it is important to have that data
 - Let me know if you have such data, even if only for one or a few measures