



WORKING FOR A HEALTHY FUTURE

# Quantified HIA and public health policy – a case study, some new directions

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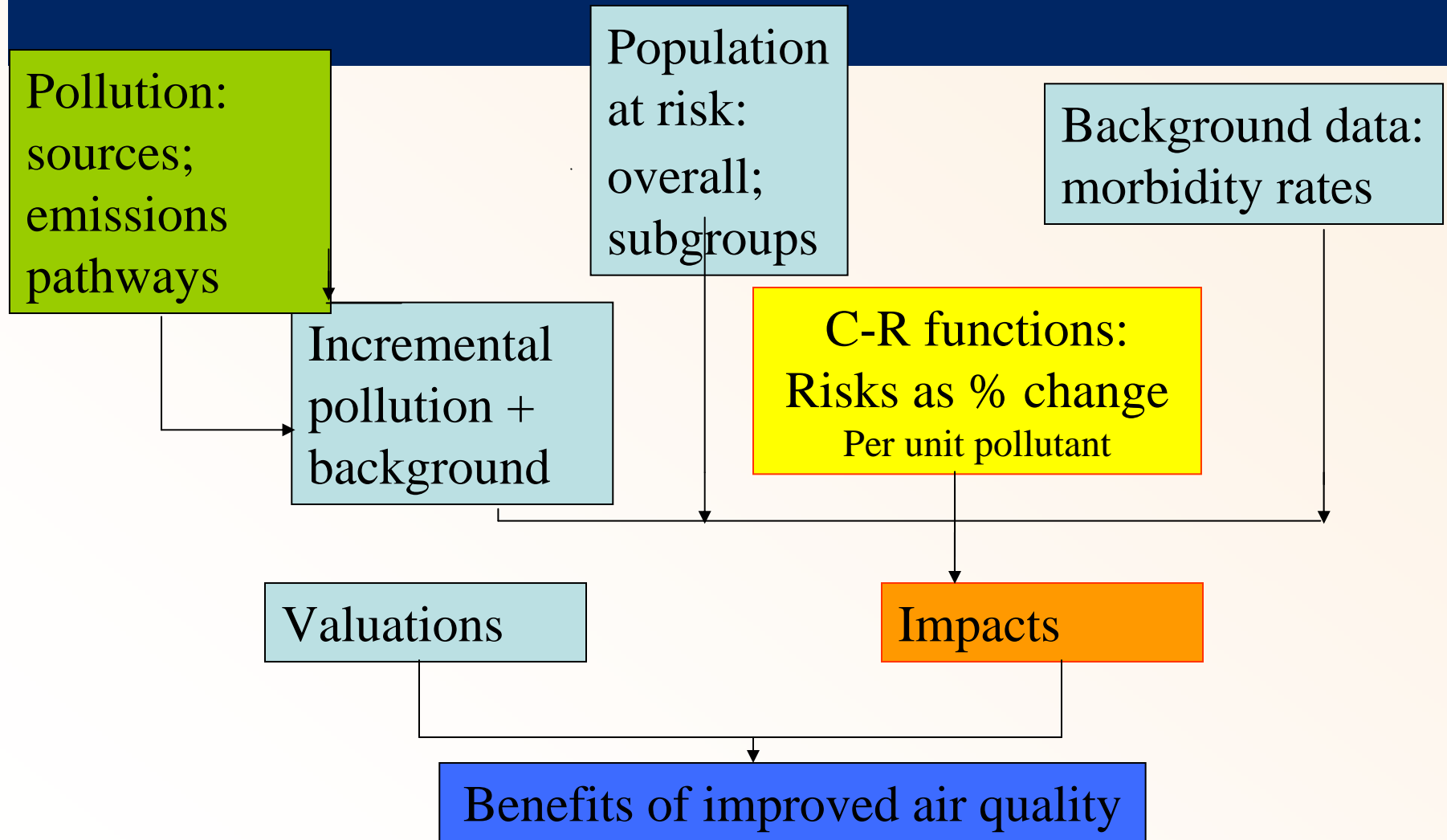
# Brief overview

- The Clean Air for Europe Programme – an example of quantifying the health effects of outdoor air pollution for use in policy development
  - <http://ec.europa.eu/environment/air/cafe/index.htm>
- Wider issues of environment and health (E&H)
  - What can we quantify?
  - e.g. can we quantify the health benefits of (having access to) greenspace?
- HIA in support of environment and health policy in Scotland
- A few final remarks...

# CAFE: Clean Air for Europe

- Clean Air For Europe (CAFE) Programme
  - Umbrella programme of the European Commission on control of ambient air pollution
  - Focus on health protection and protection of ecosystems
- Extensive work programme managed by DG Environment
- Strongly based in evidence, including detailed reviews for CAFE by expert groups convened by the World Health Organisation (WHO).
  - WHO reviews were mostly qualitative, not quantitative
- DG Environment commissioned also a HIA and cost-benefit-analysis of the main proposed policies – CAFE CBA
  - Led by AEA Technology with IOM, Metroeconomica and EMRC

# Components of model for air pollution HIA



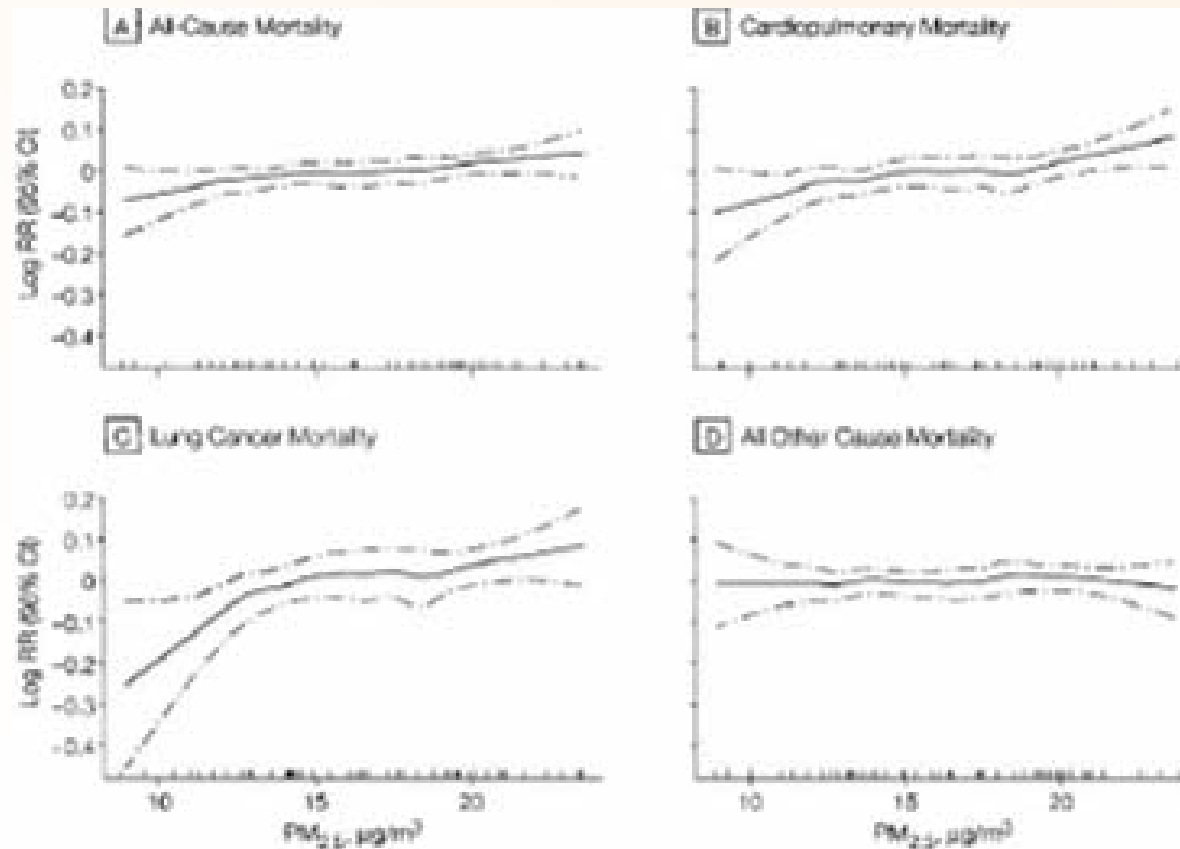
# Viewpoint on evidence in HIA

- I think the aim of HIA is to make best practicable evidence-based estimates of the future health consequences of proposed policies including their distribution
- Implies a different viewpoint on evidence compared with basic scientific papers
  - Epidemiology looks for proof 'beyond reasonable doubt', using e.g. standard 5% statistical significance levels.
  - This criterion is too conservative for HIA it implies systematic under-estimation of health impacts; i.e. too many things that might be caused by air pollution are left unquantified and (so) are overlooked.
  - A better criterion for HIA is 'balance of probabilities' or 'more likely than not'. ['Can we make a better estimate than zero?].
  - This implies making quantitative judgements (and assessments of their uncertainty) before the evidence is compelling or there is consensus about it. [We used some functions that were not statistically significant]. The precautionary principle...
- Winning this position is not easy in policy applications

# Health Effects quantified in CAFE CBA

- Chronic (long-term) exposure to particulate matter (PM):
  - Mortality (PM) – the dominant effect
  - Development of bronchitis (PM)
- Acute (short-term) exposure to PM and to ozone (O3)
  - Mortality (O3)
  - Hospital admissions
    - Respiratory (PM, O3); Cardiovascular (PM)
  - Days of Restricted Activity; Days off Work (PM, O3)
  - Days with symptoms (PM, O3)
    - In people with chronic lung disease (asthma, COPD)
    - In the general population
- No threshold for PM from human activity; cut-point of 35ppb for O3

# PM2.5 and mortality from Pope et al (2002)



Relative Risk and CIs of mortality 1982-98 and annual average ambient particles (PM<sub>2.5</sub>) in 51 US metropolitan areas, based on a cohort of 319,000 adults aged 30+

# Inequalities in air pollution HIA, in CAFE

- Differences in exposure to air pollution
  - The nature of the air pollution mixture
  - Background concentrations of individual pollutants (i.e. PM, O<sub>3</sub>, NO<sub>2</sub> etc.)
  - Personal exposures, for a given background concentration
- Differences in relative risks, per unit exposure ( $\mu\text{g}/\text{m}^3$ )
  - expressed as % change in risk of adverse health effect
- Differences in background rates of mortality or morbidity
  - the same % change implies a different absolute level of impact, if background rates differ
- Differences in monetary valuation of health effects
  
- CAFE paid some attention to distributional issues, e.g. by age, by country and health status; but not a main focus

# Stakeholder involvement in CAFE HIA/ CBA

- Overseen by CAFE Steering Group: 50-100 people
- Several specific stakeholder consultation days
- Comments on draft methodology – differences on methods discussed before we had results (and then again afterwards...)
  - Strong industry involvement; detailed comments; we published our response (32 pages long...)
  - Comments from other DGs, especially DG Enterprise
  - NGOs very interested but less well resourced
    - Took a very strong interest in results, not in methods
    - Got unpaid help from individual researchers
  - Most member states did not comment on methods
- Formal external review of draft methods: high-level US HIA / CBA team

# HIA and CBA within CAFE – key results

- CAFE included a full HIA and cost-benefit analysis (CBA) of policies – ‘baseline’ and new policies
  - Current levels of PM2.5 air pollution imply loss of life expectancy of about 8 months, on average across the EU-25
  - Both costs and benefits increase as PM2.5 is reduced; in monetary terms, benefits 5-20 times greater than costs for a 20% reduction in PM2.5
  - There is a strong economic case for even stronger reductions i.e. Europe-wide, the benefits of further reductions is 1-3 times greater than costs
- [http://europa.eu.int/comm/environment/air/cafe/pdf/ia\\_report\\_en05092\\_1\\_final.pdf](http://europa.eu.int/comm/environment/air/cafe/pdf/ia_report_en05092_1_final.pdf) (Commission staff paper, Table 33)
- Commission policy was influenced, but not decided, by the results of CAFE HIA / CBA – probably a correct approach.

# Beyond air pollution – Quantifying effects of other pollutants...

# Beyond air pollution.....

- Air pollution amenable to quantification
  - Simple causal pathway (if you accept causality, as most air pollution researchers now do)
    - Emissions to air, exposure by inhalation
  - Strong research base (a lot of evidence, a strong research community)
  - Important public health effects, so there is impetus to know how big they are
    - In terms of life years, estimated effects are greater than passive smoking or road traffic accidents
    - Miller and Hurley (2005) IOM TM

# Quantifying wider E&H pollutant effects

- Many other pollutant-health combinations: the pathways are more complex.
- Full chain or impact pathway approach, from
  - Policies that affect emissions to air, soil and water;
  - Through (dispersion) modelling to changes in micro-environments
  - (Through time-activity patterns) to changes in exposures
  - To changes in health (and its monetary value)
- Transport policies – air pollution, noise, accidents, community cohesion
  - ExternE, HEARTS, Transport for London...
- Heavy metals (e.g. the EC project ESPREME);
- Agriculture and waste (e.g. the METHODEX project);
- Various other talks at this Conference ....

# INTARESE and HEIMTSA

- Two major, linked, EC-funded Integrated Projects
- INTARESE: Integrated Assessment of Health Risks of Environmental Stressors in Europe
  - Led by David Briggs at Imperial College, London
  - Focus on method development; illustrative applications using case studies
- HEIMTSA: Health and Environment Integrated Methodology and Toolbox for Scenario Assessment
  - Led by us at IOM
  - Focus on real-life policy scenarios across Europe
  - transport, energy, agriculture, industry, households and waste treatment and disposal
- Both with a focus on (i) using best up-to-date evidence and (ii) quantifying and representing uncertainty

# New opportunities.....

Linking HIA and environment and health policy  
in Scotland

And dealing with new issues,  
e.g. health benefits of greenspace

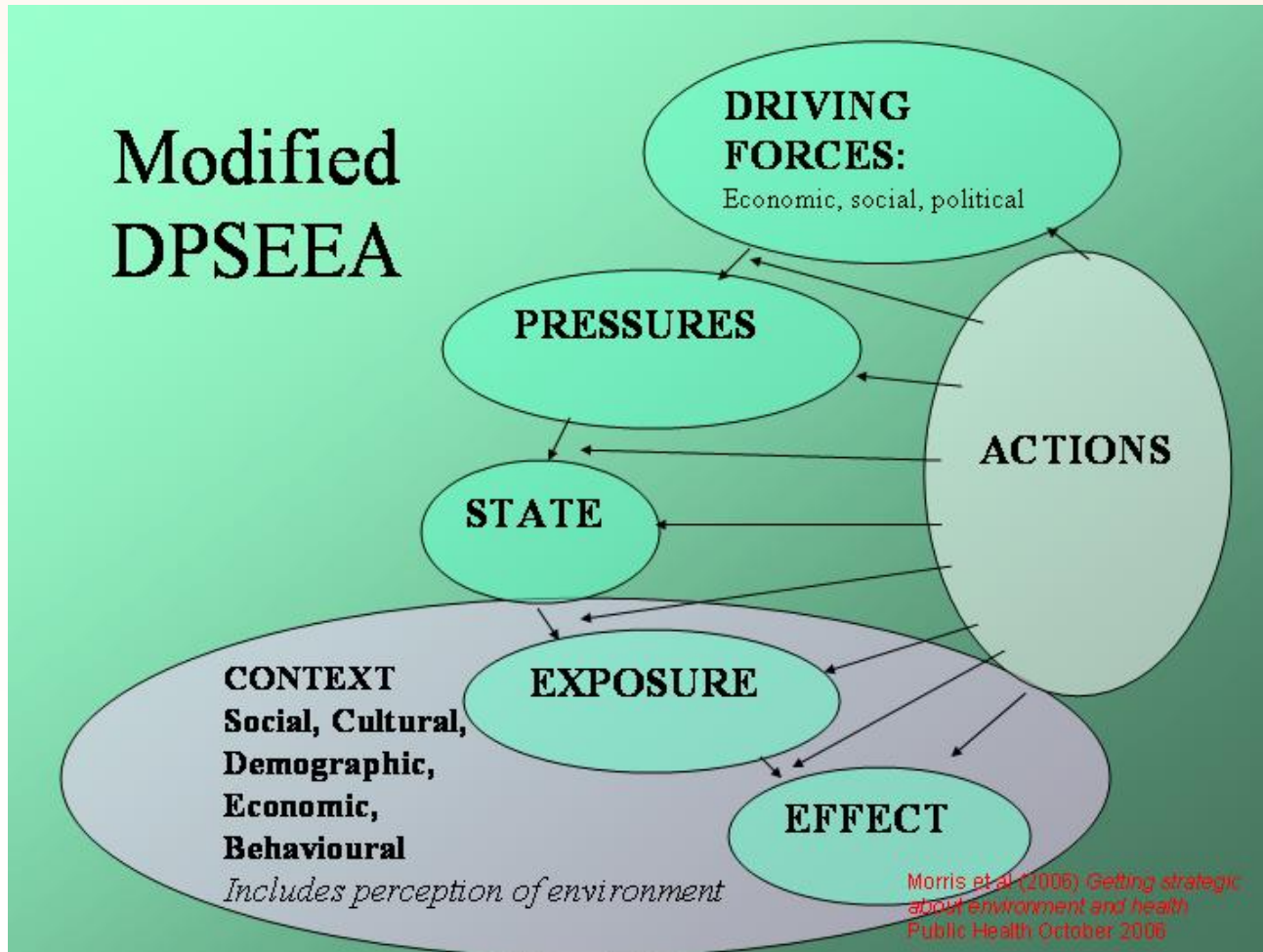
Environment & Health is not just Pollution & Disease

# Developments in Scotland- SFEHS

Dr. George Morris (Scottish Government), with colleagues  
Has been developing the Strategic Framework for Environment  
and Health in Scotland (SFEHS) – Morris et al (2006).  
Public Health; 120: 889-907.

- Recognises important but limited role of health protection, via control of pollution and disease
- Sees a need to recognise complexity, take a more holistic view
- Includes a strong focus on good environment and well-being
- And a strong focus on context (social, cultural, economic – including people's perceptions)
- And on inequalities and environmental justice...
- Has adopted a modified version of the DPSEEA Model as a framework..

# From Morris et al. (2006): Public Health



# What is the role for HIA, and for quantification?

- Where does quantification come into this bigger picture?
- We hope to get funding for a proposal (Environmental Determinants of Public Health in Scotland: EDPHiS) to help quantify this complexity
  - Interdisciplinary collaboration of 8 organisations, mostly based in Scotland
    - Emissions to air, soil, water; exposure assessment; health effects of pollutants; social determinants; spatial modelling; consultation etc.
  - See how far we can go towards quantification...
  - Answers necessarily approximate ...but may be better than no answers at all, provided that uncertainties are identified and addressed. (“It takes longer if you don’t get started.”)
  - Develop ways of integrating quantitative and qualitative methods (Salim Vohra) on e.g. health benefits of greenspace
    - HIA guide with greenspace, Scottish HIA Network and others...

# Before quantification comes description...

- Listening to people who have studied this... Four kinds of health benefits
  - Health protection – e.g. trees capturing air pollution, protecting against storm damage...
  - Psychological restoration – increase in well-being... (c/f Anthea's work)
  - Environments that encourage (safe) physical activity..
  - Environments that encourage (positive) social interaction...
- All of these are difficult to quantify; describing them is a 1<sup>st</sup> step
  - Victoria Park in London....
- Also difficult to describe
  - What characteristics of (urban) greenspace are conducive to health benefits?
  - How do we describe access and use? (Distance is a crude measure)
- Is trying to quantify these issues a worthwhile and feasible project?
  - The poet John Montague looked at this – back in 1971.

# From 'Balance Sheet' (Hymn to the New Omagh Road): The Rough Field (1971) by John Montague

## *Loss*

Item: The shearing away of an old barn  
criss-cross of beams where pigeons moan  
high small window where the swallow built  
white-washed dry-stone walls.

## *Gain*

Item: 10 men from the district being for a period of time fully employed,  
their 10 wives could buy groceries and clothes to send 30 children  
content to school for a few months, and raise local merchants' hearts  
by paying their bills.

# From 'Balance Sheet' by John Montague

## *Loss*

Item: The filling-in of chance streams uncovered wells, all unchannelled sources of water that might weaken foundations bubbling over with macadam.

## *Gain*

Item: A man driving from Belfast to Londonderry can arrive a quarter of an hour earlier, a lorry load of goods ditto, thus making Ulster more competitive in the international market.

# From 'Balance Sheet' by John Montague

## *Loss*

Item: The disappearance of all signs of wild life, wren's or robin's nest, a rabbit nibbling a coltsfoot leaf, a stray squirrel or water rat.

## *Gain*

Item: A local travelling from the prefabricated suburbs of by-passed villages can manage an average of 50 rather than 40 m.p.h. on his way to see relatives in Omagh hospital or lunatic asylum.

# From 'Balance Sheet' by John Montague

## *Loss*

Item: The removal of all hillocks  
and humps, superstition styled fairy forts  
and long barrows, now legally to be regarded  
as obstacles masking a driver's view.

## *Gain*

Item: The dead of Garvaghey graveyard ..... can have an unobstructed  
view – the trees having been sheared away for a carpark – of the living  
passing at great speed, sometimes quick enough to come straight in...

# An alternative viewpoint....

- Science makes progress through measurement; and we need to consider measurement when making scientific evidence available for public policy
- Quantification is an attempt at measurement
  - The 'instrument' is an evidence-based model of the impact of environment on health, including a model of the uncertainties in that measurement process
- There are limitations to measurement
  - Einstein – what counts not = what can be counted
  - Important to be upfront about the limitations and ensure they are not overlooked
  - Go beyond quantitative or qualitative.....
  - .....to methods that take account of both quantitative and qualitative approaches – no intrinsic conflict

# But we might agree....

- It is difficult to aggregate over different kinds of benefits, whether assessed quantitatively or not;
- And there are conflicts between who gains and who loses.
- In making policy, these difficulties and conflicts need to be faced and addressed as political issues.
- HIA – whether quantitative or not – should inform these political choices, not try to reduce them to ‘technical’ ones.