



Evidence for Health Impact Assessment

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Outline.....

- Environmental Burden of Disease study
- Results
- Process
- Evidence in HIA

EBD methodology

- Evolved from the Burden of Disease methodology developed by the WHO, World Bank and Harvard
- Aims to....
 - Quantify the links between environment and health
 - Summary measures of health to aid decision-making
 - DALYS = Years of Life Lost + Years with Disability
 - Comparisons possible between policy scenarios
 - DPSEEA framework used to support the assessment

EBD assessment for Ireland

- Risk factors
 - Outdoor air pollution
 - All-cause and Cardio-respiratory mortality
 - Lead
 - Neurodevelopmental impairment, incidence of Mild Mental Retardation
 - Unsafe drinking water
 - Acute Gastrointestinal Illness
- Well-established causal relationships
 - Dose-response functions
 - Quantitative evidence-base
 - WHO-produced guidelines

Causal frameworks.....

- Identify available data sets
 - All secondary data
- Assess exposure
- Apply dose-response functions
- Estimate attributable mortality/morbidity

Results - Outdoor Air Pollution

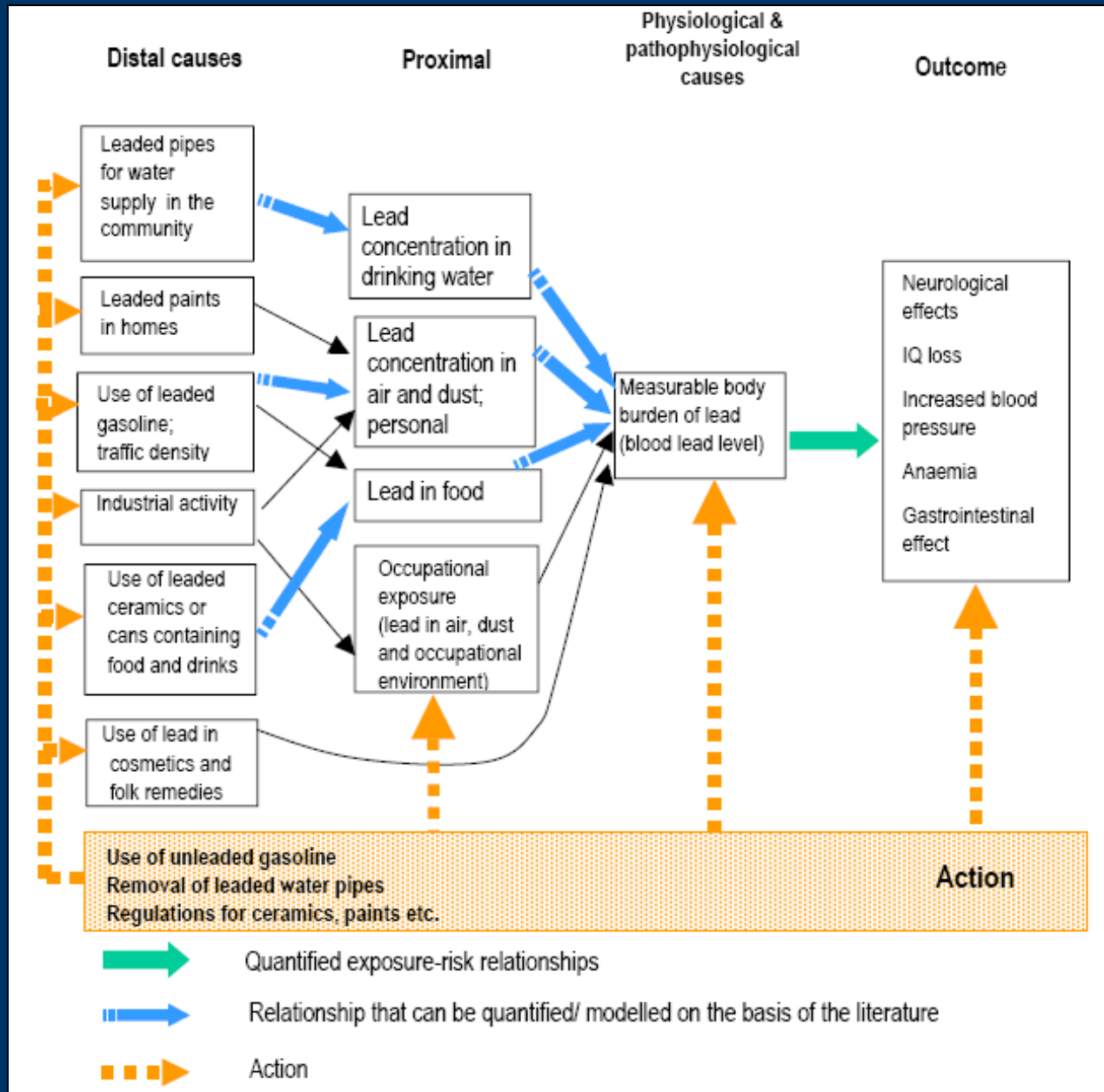
Counterfactual theoretic background $PM_{10} = 10\mu g/m^3$:

| Exposure | Health Outcome | Best estimate (low, high) |
|----------------------------------|-------------------------------------|--------------------------------------|
| Short-term exposure to PM_{10} | All cause mortality, all ages | 59 (44, 74) |
| Long-term exposure to $PM_{2.5}$ | Cardiopulmonary mortality >30 years | 433 (157, 706) |
| | Lung cancer mortality >30 years | 87 (32, 142) |

Counterfactual background $PM_{10} = 20\mu g/m^3$ (2010 Stage 2 European Air Quality guideline value) Dublin City only:

| Exposure | Health Outcome | Best estimate (low, high) |
|----------------------------------|-------------------------------------|--------------------------------------|
| Short-term exposure to PM_{10} | All cause mortality, all ages | 34 (25, 42) |
| Long-term exposure to $PM_{2.5}$ | Cardiopulmonary mortality >30 years | 138 (52, 219) |
| | Lung cancer mortality >30 years | 27 (11, 142) |

Results: Exposure to lead



Results: Exposure to lead

- Link between lead and neurodevelopmental impairment very well quantified
- Exposure assessment
 - Only one study fulfilled inclusion criteria
- No national analytic capacity
 - Needs assessment/Establish protocol with external agency?
- Exposures through drinking water?

Methods: Exposure to unsafe drinking water

- **Scenario-based assessment**

Scenarios I – VI based on common exposure profiles (Sanitation coverage, quality of water supply, etc)

- Scenario I: Ideal, no transmission of diarrhoeal disease, low environmental faecal-oral load (RR = 1)
- Scenario VI: No improved water supply, no basic sanitation, water supply not routinely controlled, very high environmental faecal-oral load

- **Relative Risks for Acute Gastrointestinal Illness for each scenario derived from literature**

Methods: Exposure to unsafe drinking water

Exposure scenarios in Ireland:

Scenario II

Regulated water supply and full sanitation coverage, with partial treatment for sewage, corresponding to a situation typically occurring in developed countries

Scenario III

Incremental improvements related to improved access to drinking water (generally piped to household), improved personal hygiene and *drinking water disinfected at point of use*

Methods: Exposure to unsafe drinking water

- WHO Euro A: 100% Scenario II (RR = 2.5)

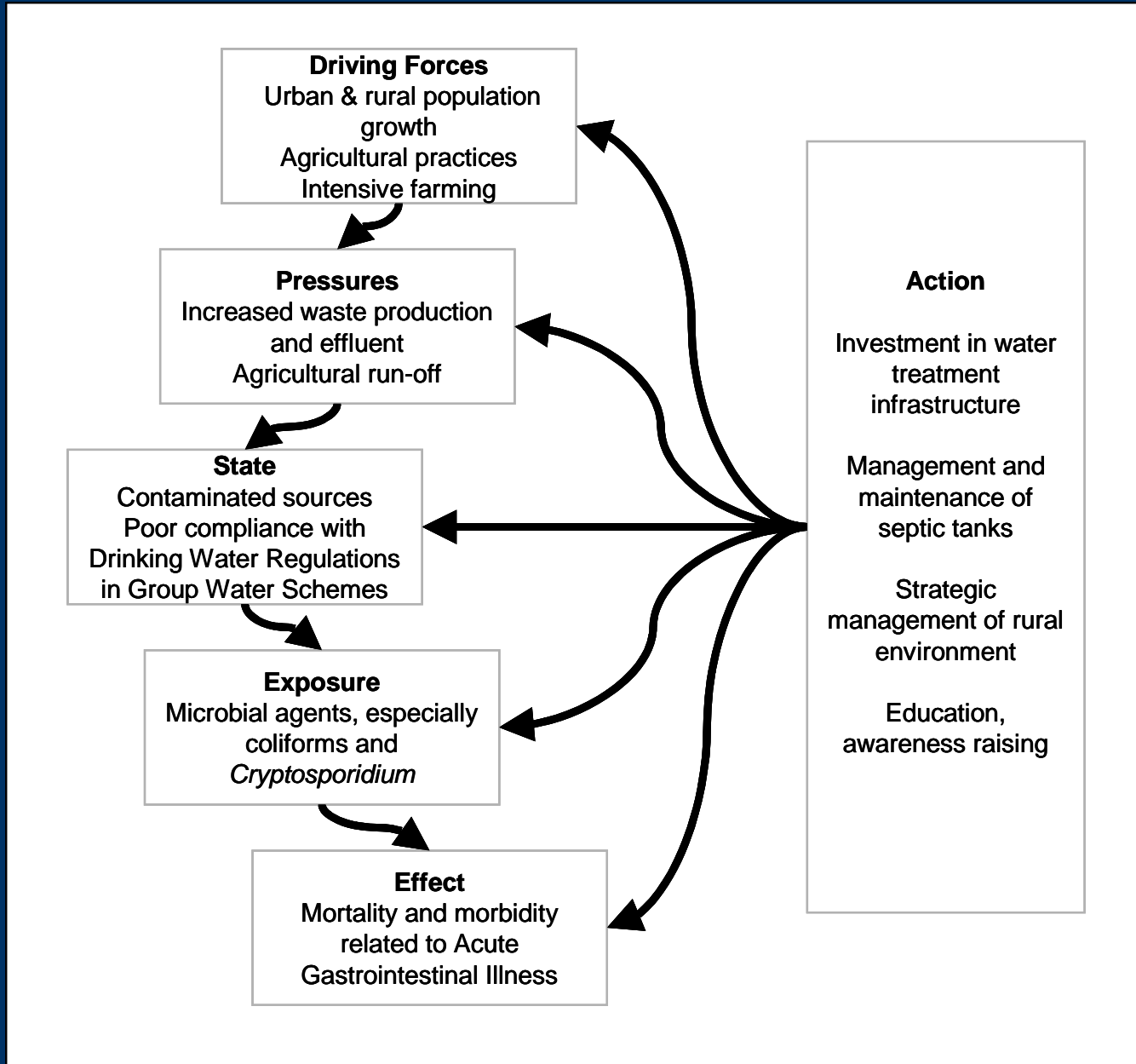
Attributable episodes = 518,215

- Alternative exposure distribution:
 - Scenario II 96.4% of population (RR = 2.5)
 - Scenario III 5.6% served by private Group Water Schemes (RR = 4.5)

Attributable episodes = 557,945

Difference: 39,730 episodes

Results: Exposure to unsafe drinking water



Results....

- Value from the process
 - Lead
 - Not able to quantify burden but identified gaps in our analytic capacity
 - Gaps in exposure data
 - Outdoor air
 - Great but dependent on good exposure data (city areas)
 - Through the process, discovered that several of the assumptions that we had previously made were incorrect
 - Unsafe drinking water
 - Inequitable distribution of the exposure (and burden!)
 - Necessity for strategic management i.e. policy level

Evidence for HIA

- HIA flexible methodology
 - Allows us to look at the possible positive impacts
 - Identify things that we didn't know we needed to know
- Danger of quantitative 'bias'
 - Quantitative more easy to present to policy-makers
 - Empirical results make policy-makers and economists happy
 - Individuals and society less impressed!

Stakeholder & qualitative evidence in HIA

- Democratic
- May not lend itself easily to CBA
 - Does not make it any less worthy of consideration
- Keep building the evidence-base
- Keep improving the methods
 - Best practice, patience and persistence!

Thank you!

Acknowledgements

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