

# Environmental Burden of Disease Workshop February 12, 2007

Institute of Population Health

R. Samuel McLaughlin Centre for  
Population Health Risk Assessment

PAHO/WHO Collaborating Centre in  
Population Health Risk Assessment

Université d'Ottawa | University of Ottawa



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# Workshop Objectives

## *Sheryl Bartlett, Health Canada*

- EBD: a measure of the amount of disease that can be attributed to environmental causes
- Focus on:
  - methodologies
  - analyses
  - challenges
  - economic valuation
  - policy development



# WHO Environmental Burden of Disease Programme

## *Annette Prüss-Üstün, World Health Organization*

- EBD: quantification of health impacts caused by environmental risks at population level
- EBD used to:
  - set priorities
  - common ‘health language’
  - basis for economic valuation
  - monitor progress
  - Identify vulnerable population subgroups
- World Health Organization:
  - methodology development
  - regional EBD estimates
  - guidance for national assessments
  - expert-based approach
  - evaluate interventions
- *25% of global disease burden due to the environment (preliminary estimate of 13% in Canada)*



# Global Burden of Disease of Air Pollution

*Aaron Cohen, Health Effects Institute*

- Comparative risk assessment (CRA): put risk factors in perspective
- PM10 chosen as indicator pollutant for air pollution GBD analysis
- Attributable fractions estimated to be 4% for CPD, 5% for lung cancer, 1% for acute respiratory infections in children, and 1% for overall mortality
- Uncertainty analysis also conducted: burden may be underestimated



# Sub-national Analysis of Environmental Risks and Burden of Disease

*Gretchen Stevens, Harvard University*

- CRA in Mexico (following WHO approach):
  - Child/maternal undernutrition
  - Other nutritional related risks and inactivity
  - Addictive substances
  - Sexual and reproductive health risks
  - Environmental risks
- Mortality: high blood glucose, BMI, blood pressure
- DALYs: alcohol, BMI, blood glucose
- Projected increases in life expectancy:
  - water and sanitation, indoor air pollution (2 months on average)
  - urban air pollution (2 months)
- Gains in life expectancy most pronounced in lower SES groups
- Policy implications: identify areas where need for intervention is greatest



# Global Burden of Disease of Radon

*Sarah Darby, Oxford University*

- Radon risk coefficients based on combined analyses of residential radon case-control studies (16% per 100 Bq/m<sup>3</sup>)
- Attributable fractions for Europe (EU25):
  - Rn, but not AS: 1.3%
  - Neither Rn nor AS: 13.6%
  - Rn and AS jointly: 6.8%
  - AS, but not Rn: 78.3%
- Attributable fractions increase with age
- Nearly 80% of lung cancer deaths occur below 100 Bq/m<sup>3</sup> (less than most stringent action level of 150 Bq/m<sup>3</sup> in U.S.)



# Avoidable Causes of Environmental Cancer

*Julian Peto, UK Institute of Cancer Research*

- Need to define 'environmental'
- Consider genetically susceptible subgroups
- Need to separate smokers and nonsmokers
- *60% of cancer deaths thought to be associated with smoking*
- Other possible causes include infections (2-5%), obesity (4-10%) and diet (4-30%), depending on smoking status
- Environmental cancer presently unavoidable: 25% among smokers, 50% among nonsmokers



# Economic Valuation of the Environmental Burden of Disease

*Doug Coyle, University of Ottawa*

- Economic evaluation: assess relative costs and benefits of interventions (CEA, CUA, CBA)
- Burden of disease studies:
  - mortality (early death)
  - morbidity from disease
  - health care costs
- EBD studies useful to:
  - highlight burden of disease
  - *provide baseline for evaluation of interventions*
- Quality adjusted life years (QALYs): life years weighted by quality of life
- RTI estimates of environmental disease burdens range from \$1 billion for GI disease to \$50 billion for heart disease
- Require better data on attributable fractions



# Preventing Fatal Diseases Increases Health Care Costs: Cause Elimination Life Table Approach

*Luc Bonneaux, Netherlands Interdisciplinary Demographic Institute*

- *Preventing mortality is hard!*
- Health care has led to increased life expectancy, including at older ages
- Health care costs increase notably with age (although hospital costs decrease at older ages)
- Smokers incur more health care costs than nonsmokers at all ages (although mortality due to smoking reduces total health care costs)
- Evolving CRA (obesity vs smoking): 400,000 tobacco deaths annually in U.S., with 300,000 obesity related deaths [considerable uncertainty about the latter figure, now estimated to be much lower]
- Secular changes:
  - declining CV mortality, obesity related deaths
  - decreasing incidence of low birthweight
  - increasing height and body frames (less adiposity for fixed BMI)



*‘Credibility is a rare good,  
difficult to obtain and  
easy to lose.’*

## Panel: Development and Use of EBD in a Canadian Context

*Doug Haines, Health Canada (Chair)*

*Michael Wolfson, Ray Edwards, Paul de Civita, Luc Bonneux*

- Need to choose metric for EBD calculations: Health Adjusted Life Expectancy (HALE)
- Take advantage of Canada's strong system of health statistics
- Consider 'web of causality' (health determinants) model, from a life-course perspective
- Policy needs for EBD indicators: assess impacts, evaluate public policy choices and interventions, motivate action on health and the environment
- Indicators should be: defensible, accessible, available, affordable, and integrated



*'Roughly one quarter of global burden of disease is linked to environmental factors.'*

# Next Steps

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- Workshop report summarizing today's discussions
- Building on WHO guidance, initiate EBD program for Canada
- Specify methods, obtain data, conduct analyses
- Interpretation of results
- Examine policy implications



# Some well deserved Thank You's!

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- Organizers
- Planning Committee
- Arrangements
- Speakers
- Participants



**Adjourned!**

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