ENVIRONMENTAL BURDEN OF DISEASE WORKSHOP SUMMARY

McLaughlin Centre for Population Health Risk Assessment
University of Ottawa, Senate Room
Ottawa, Ontario, Canada

February 12th, 2007

This summary is based on presentations and discussions held at the 2007 'Environmental Burden of Disease Workshop'. The objective of the Workshop was to review current methods used to estimate the Environmental Burden of Disease (EBD) internationally and to explore the application of these methods in the Canadian context. The views of speakers, panel members and workshop participants, including those from the World Health Organization, governmental organizations, academic institutions, and non-governmental organizations are included. The organizing committee for the workshop included representatives from the University of Ottawa and Health Canada[1].

This summary represents the main messages of the speakers and panel members, as well as those emerging from the afternoon group discussion session. Additional information, including the final report of the Workshop, the presentations from the speakers and panel members, and the Environmental Burden of Disease Workshop participants list are available at http://www.mclaughlincentre.ca/events/EDB_WS.shtml.

[1] Comments made at the EBD workshop are not necessarily those of HC but reflect the comments of the individual attendees.

Key Concepts in Understanding Environmental Burden of Disease

Workshop Summary

What is the Environmental Burden of Disease (EBD)?

- **The environment** is an important determinant of population health, formally defined by WHO (2006) as the physical, chemical and biological factors external to a person, and all the related behaviours.

- **Environmental burden of disease** is a measure of the proportion of the human disease burden that may be attributed to environmental causes.

Role of Environmental Burden of Disease

- EBD calculations can be used to gauge the impact of our environment on population health.

- This can be done by estimating the fraction of the human disease burden attributable to different environmental causes. Other indicators of risk, such as person years of life lost or the reduction in life expectancy due to environmental causes, can also be used to describe the environmental burden of disease.

- Evaluation of the environmental burden of disease can be helpful in setting priorities for environmental health risk management interventions.

- More generally, evaluation of the environmental burden of disease provides a basis for: (1) monitoring progress towards enhancing environmental health; (2) identifying potentially vulnerable populations and subgroups; (3) performing economic evaluations of the impact of the environment on the population; and (4) developing policies and strategies for addressing environmental health risks.

Characteristics of an Environmental Burden of Disease Initiative for Canada

- A comprehensive program designed to quantify the environmental burden of disease for Canada should be evidence-based and systematic.
- Such a program will require coordinated efforts among different disciplines, including policy makers, basic and social scientists, biostatisticians; and economists.
- The methodologies used in a Canadian EBD initiative should be compatible with those employed internationally, yet applicable to Canadian public and population health priorities.
- An EBD program will involve both the development of environmental exposure and attributable risk estimates for Canada, as well as an economic evaluation of the impact of the environment on population health.

Components of Environmental Burden of Disease Estimates

- Data on environmental exposures from publicly available databases.
- A comparative risk assessment (CRA) framework quantifying the global and regional burden of disease attributable to selected major risk factors (WHO, 2002).
- Systematic reviews and surveys of expert opinion of amount of disease that is atttibutable fraction to environmental risk factors.
- Disease registries and other administrative health databases.
- Assessment of major sources of uncertainty.
- Risk measures can include both the fraction of the human disease burden attributable to specific environmental risk factors, and the specific health risks associated with key environmental exposures.
- Health risks can be gauged in a different ways, including Quality Adjusted Life Years (QALYs) and Disability Adjusted Life Years (DALYs) lost due a specific environmental risk factor.

Economic Valuation of the Environmental Burden of Disease

- Economic valuation of the environmental burden involves an evaluation of the direct and indirect cost associated with mortality and morbidity of human diseases associated with the environment in which we live.
- Economic valuation could be useful in highlighting burden of disease, and in providing a baseline evaluation of environmental risk management interventions.

Examples of Global Burden of Disease Estimates

- WHO (2006) has estimated that 25% of the global disease burden is due to the environment. WHO has also made a preliminary estimate of the environmental burden of disease for Canada of 13%. (This figure is lower than the global estimate because of the higher rate of mortality from communicable diseases and injuries among developing countries.)
- Air pollution (PM10) has been estimated to be responsible for 4% for cardiopulmonary disease, 5% of lung cancer, 1% for acute respiratory infections in children, and 1% of overall mortality (Cohen et al., 2004).
- Both indoor and outdoor air pollution have been estimated to lead to a reduction of 2 months in life expectancy in Mexico.
- Residential radon has been estimated to be responsible for 10% of the human lung cancer burden, with most of the radon related lung cancer deaths occurring at exposures below 100 Bq/m^3.
- At least 60% of all cancer deaths are thought to be associated with tobacco smoking.
- Other possible causes of cancer include infections (2-5%), obesity (4-10%), and diet (4-30%), depending on smoking status (Peto, 2001).

Conclusions

- Environmental burden of disease analyses can help in understanding the contribution of our environment to the human disease burden, and in establishing priorities for risk management interventions designed to reduce the environmental burden of disease.
- A multi disciplinary research program is needed to develop an EBD profile specific to the Canadian context.
- It is critical that data collection and analysis techniques be carefully constructed in order to ensure that informative and accurate environmental burden of disease results be obtained.

Further reading

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