

Appendix B – Working Group Issue Papers

Economics, Benefits Transfer, and Policy

Issue Paper: Working Group #1

(Note: These issue papers were developed to help stimulate the discussion at the workshop, identify key issues that need to be addressed in the future, and define a set of strategies that can be used to address the issues in the future. The papers were developed with the assistance and input from breakout group chairs and facilitators.)

This paper outlines several key ideas and concepts for discussion in Group 1: Economics, Benefits Transfer, and Policy. Previous workshops and studies, as well as dialogues with partner countries, have identified several specific issues that could serve as a springboard for discussion. The concepts outlined here are meant only as an aid in guiding the group discussion and to help the group focus on key issues. The goal of this group is to develop a process by which consistent methodologies are encouraged for (1) valuing health impacts in developed and developing countries, (2) applying best practices to transfer valuation estimates across countries, and (3) providing appropriate context for the interpretation for economic benefit estimates.

Discussion issues include:

Estimation/Transferability of Benefit Estimates

- The generalizability of valuation frameworks for chronic and acute morbidity and mortality within and between developed and developing regions.
- Ensuring consistency in matching valuation studies and epidemiological studies: In most cases, valuation studies for health endpoints are conducted separately from epidemiological studies of the same health endpoints. Differences in definition of health endpoints can lead to mismatches and potentially bias results. For example, an epidemiological study may examine asthma attacks in severe asthmatics, while a cardiovascular study may elicit WTP for reduced asthma symptoms in the general population of asthmatics. Some type of adjustment would need to be made to the WTP estimate to account for the different level of severity between the populations of asthmatics.
- Accounting for age, life expectancy, health status, and socioeconomic status in transferring benefits within and between developed and developing regions: WTP estimates from developed countries are based on the preferences of populations with relatively high income, long life expectancy, and a particular age/health status distribution. To the extent that these preferences (and WTP) are dependent on the underlying attributes of the population, failure to account for differences in these attributes between developed and developing countries can lead to potentially severe biases in estimates of benefits of pollution reeducations.
- Accounting for differences in the ability to engage in averting/mitigating behavior to reduce exposure to health risks from air pollution: Estimates of health risks are generally reduced from functions that incorporate averting/mitigating behavior by

affected populations. It may thus be expected that in countries where economic or institutional factors lead to lower levels of averting/mitigating behavior, measured risks may be larger than in countries where such behaviors are more widespread. This has implications for the measurement of both risk and the values of reducing air pollution.

- Accounting for political and institutional factors in transferring benefit estimates: Political and institutional structures can differ widely between countries. Institutional factors such as health systems and welfare programs can affect the distribution of income and burden of health costs in the population. These can affect WTP of individuals and may lead to a wide disparity between benefits based on aggregate WTP and social costs, which include public expenditures for medical care. In addition, differences in efficacy of political institutions in achieving legislative objectives may increase perceived uncertainties about benefits of pollution reduction legislation or regulation.
- Expression of uncertainties regarding the transfer of benefit estimates within and between developed and developing regions: In addition to the large uncertainties surrounding primary estimates of WTP even within the country of origin, additional uncertainties are introduced by transferring WTP functions across countries. Communication of these uncertainties is a complex task and it is important to do so in a manner which informs decision-makers rather than adding to an already difficult communication of basic results.

Policy Issues

- The applicability of the Benefit/Cost Analysis (BCA) framework to developing countries. Does this fit within the decision-making process actually in place? Does the government system facilitate or hamper the consideration of these issues? Does a pure BCA framework make sense given the political and institutional framework?
- What is the appropriate context for BCA within different political and institutional frameworks? How should distributional consequences be considered?
- Is there institutional capacity in place? What are the institutions in charge of environmental/public health decision-making? What legal barriers or incentives exist for utilizing BCA in decision-making?
- What is the relative importance of local environmental issues in the public agenda? Of global environmental issues?
- Is there public support for environmental initiatives?
- How should uncertainties regarding valuation of health effects be incorporated into decision-making on environmental issues?

Indoor Air Quality Issues & Susceptible Populations

Issue Paper: Working Group #2

(Note: These issue papers were developed to help stimulate the discussion at the workshop, identify key issues that need to be addressed in the future, and define a set of strategies that can be used to address the issues in the future. The papers were developed with the assistance and input from breakout group chairs and facilitators.)

Indoor air exposure plays an important role for the global burden of disease, particularly in susceptible populations in developing countries. Research needs to clarify the effects of indoor air pollution mitigation on mortality and morbidity throughout the age range. As the body of knowledge concerning susceptible populations (infants, children, immuno-compromised and elderly) expands, direction for future research and policy are becoming evident. Issues for each topic (indoor air and susceptible populations) are described below:

- Effectiveness of intervention strategies: The reliability of past research on intervention strategies may be limited by a lack of analysis under real-world conditions and long-term monitoring. In addition, less emphasis has been placed on personal factors that will influence the adoption and correct use of new technologies.
- Accuracy of aggregate monitoring for exposure assessment: Until recently, past studies have used data that was aggregated over time and space. Such analysis excludes the impact of high emissions episodes and individual exposure profiles.
- Relationship between indoor air pollution and health effects: The exposure-response relationship for indoor air and cardiovascular and other effects is still unclear. The continued use of research protocols that are not adapted for health effects and exposure routes associated with indoor air, such as case definitions, may hinder this process.
- Trends in energy production and use: Trends in the centralization of energy production and the replacement of more with less carbon intensive fuels will impact patterns of indoor air pollution. These patterns should be modeled on a sectoral and city-specific basis.
- Role of poverty: Studies have identified poverty level as an indicator of susceptibility, due to lack of access to health care, as well as malnutrition increasing risk factors for ALPI.
- Neonatal research: New research is being conducted on the particular susceptibility of air pollution, especially indoor air, of infants <1 year, and the risk of late fetal loss, low birth weight and other indicators of infant morbidity and mortality.
- High incidence populations: Exposure to indoor air pollution is heaviest for children and adult women. Knowledge concerning the personal factors influencing this correlation will be useful in future intervention programs.

Development and Transfer of Dose-Response Relationships and Exposure Models in Developing Countries

Issue Paper: Working Group #3

(Note: These issue papers were developed to help stimulate the discussion at the workshop, identify key issues that need to be addressed in the future, and define a set of strategies that can be used to address the issues in the future. The papers were developed with the assistance and input from breakout group chairs and facilitators.)

A key step in analyzing the economic impacts of air pollution on public health is the quantification of health effects. A substantial amount of scientific literature exists on exposure assessment and development of dose-response relationships in developed countries. However, adaptation and transfer of the dose-response relationships and exposure models in developing countries present several challenges that have not been completely addressed by these bodies of work. While many issues remain, three key issues that have been raised by experts involved in this workshop are the following:

- Application in developing countries of dose-response relationships and exposure models from countries with advanced economies: Countries that lack air quality models and scientific research basis may conduct air pollution analysis by substituting their population and pollutant concentration data into international dose-response curves and exposure models. These analyses may not take into account factors such as local demographics and varying chemical compositions, sources and mixes of air pollutant concentrations. The appropriateness of extrapolating dose-response estimates for exposures outside of a particular study's exposure range and the degree of correlation between ambient exposure and personal exposure measurements are additional questions with wide-ranging implications. In some countries, indoor air exposures can be orders of magnitude greater than ambient, which may be an important factor in assessing the health impact of ambient pollutants. The degree of correlation between ambient exposure and personal exposure measurements is another question with wide-ranging implications.
- Validity of dose-response functions for transfer between same country cities and under changing socioeconomic conditions: Environmental and socioeconomic conditions, such as diet, lifestyle and income, may influence the development of dose-response relationships. The extent of the impact of regional and temporal change in these factors in application of dose-response functions needs to be explored (1) to assess the validity of using the relationships over the long-term and (2) to control for these changes.
- The role of selected survivor effects: The populations of the young and elderly who survive in developing countries may be more robust than those in countries with more advanced economies. In the latter, neonatology and geriatric medical support create populations that include proportionally more frail members. Methods for estimating the potential impact of changes in medical technologies and care need to be developed and validated.