

EXECUTIVE SUMMARY

The societal benefits of environmental regulations and programs are typically manifested by the reduction in adverse health effects. These reductions are associated with decreased exposure to environmental agents. Ideally, valuation of these human health benefits would include all costs to society associated with the benefits, including medical costs, work-related costs, educational costs, the cost of support services required by medical conditions, and the willingness of individuals to pay to avoid the health risks. These factors can be referred to in aggregate as society's total willingness to pay to avoid an illness. Many of these categories of information are difficult to obtain. In particular, obtaining an accurate measure of a society's total willingness-to-pay to avoid illnesses is often not possible. Consequently, analysts often use alternative measures of the costs saved when illnesses are avoided. Direct medical costs, which measure non-subjective aspects of an illness — the expenditures on medical care — are often used as a lower-bound estimate of avoiding an illness.

This handbook, developed by the U.S. Environmental Protection Agency, provides direct per capita incremental medical costs of illnesses associated with environmental pollutants.¹ The handbook was developed in response to the Agency's desire to provide information on the benefits associated with disease avoidance resulting from environmental programs or regulations. The data can be used in economic analyses, policy development or evaluation, and various decision-making activities. Improvements in human health frequently constitute a major portion of the benefits resulting from environmental regulations. While there are a variety of approaches to estimating the value of these benefits, one of the more straightforward approaches is to calculate the medical and related costs avoided. The medical costs in this handbook provide a relatively simple and efficient lower-bound estimate of the costs of illnesses.

The cost of illness data provided in this handbook include some, but not all components of the total benefit of avoiding a disease. Those outside the scope of this analysis are direct *non*-medical costs, the opportunity costs of patients, family members or other unpaid caregivers, and what the patient and others would be willing to pay to avoid the anxiety, pain, and suffering associated with the illness. Due to the seriousness of most illnesses in this handbook, these components may be substantial. The

¹ This handbook was developed by the Office of Pollution Prevention and Toxics under the direction of Dr. Nicolaas Bouwes (EPA WAM) by Abt Associates, Cambridge, Massachusetts (Dr. K. Cunningham, Project Manager).





values reported in this handbook must therefore be viewed as partial estimates of the economic costs, and are useful primarily as lower-bound estimates of cost.

EPA selected diseases for inclusion in this handbook based on the known or anticipated need for disease cost estimates for regulatory or policy activities and a review of the environmental health literature. Estimates of medical costs are provided for the following illnesses (click on the illness name to link to the relevant chapter; click on the section numbers to reach the introductory chapters):

Section II: Cancers²

- stomach cancer
- breast cancer
- kidney cancer
- lung cancer
- skin cancer
- colorectal cancer
- bladder cancer

Section III: Developmental Illnesses and Disabilities


-  low birth weight
-  cleft lip and palette
- limb reductions
-  cardiac abnormalities
-  spina bifida
- cerebral palsy
- Down syndrome
- high blood lead levels

Section IV: Respiratory Diseases

- asthma
- acute respiratory illnesses
- middle ear infections

Section V: Symptoms

- symptom groups

The diseases are organized into handbook sections with similar types of diseases, as shown in the list above. Each chapter contains background information in the illness, method used to estimate medical costs, and present value cost estimates discounted at zero, three, five, and seven percent of  the duration of the disease. Costs are provided which were current in the year in which the chapter was written or revised (1996 and

²Bone and liver cancer costs are also briefly discussed in the introductory cancer chapter (Chapter II.1).

forward). The costs can be updated to the current year using the Consumer Price Index (CPI) Medical Services inflation data provided in Appendix A: Inflation and Discounting Factors.

Link to Appendix A

Matrices with preliminary information on environmental agents that may be associated with cancer and birth defects are provided in the chapters that introduce each of those disease categories. Each chapter also discusses causality and especially susceptible subgroups of the population.

A core of information is provided in each chapter on the methodology, costs, sources of uncertainty, and background information on the illness. The handbook was developed over many years, and the cost estimates for each illness were developed to address specific program requirements within the Agency. Consequently, the type of information provided and level of detail involved in the analyses vary among the illnesses.

The direct medical costs incurred as the result of an illness were estimated for the duration of the illness, i.e., from diagnosis to cure or patient death. Expected costs are estimated for each year post-diagnosis until cure or death, incorporating information on the likelihood and timing of receiving specific treatments, as well as survival data, information on the age of onset of the disease, and life expectancy data. Medical cost estimates are subject to advances in medical practice and changes in the costs of both services and materials. Most cost estimates are based on recent evaluations of medical practice; the handbook provides dates when cost and treatment data were obtained and descriptive information regarding disease definition and treatment. The user should consider changes in practice over time, however, if recent advances or changes in treatment have been reported.

The goal of the handbook is to provide cost estimates that are generalizable to any area of the United States. To obtain cost data representative of the nation as a whole, standard disease treatment methods, using generally acceptable practices, and the average patient experience regarding prognosis and survival (e.g., life expectancy) were used in cost estimates.

As noted above, the costs provided in this handbook do not include many non-medical costs, which may be substantial and should be included in a comprehensive benefit evaluation. Although non-medical costs may be an important component of overall benefit, direct medical costs are likely to comprise a substantial portion of the cost to society for the diseases included in this handbook. Thus, the medical cost estimates provided in the handbook offer reasonable lower-bound estimates for many illnesses of environmental concern.

It is anticipated that the contents will continue to be supplemented with new illnesses, and with revisions to illnesses currently included in the Handbook. In addition, links will be made to other sources of information on this topic. EPA welcomes the submission of new data, comments, and recommendations from users of this Handbook.