

# Preface

Polluted air and contaminated food and water are major causes of human health deterioration. Over the years, well-established relationships between human health effects and environmental pollution (focusing on air pollutants and chemicals) have formed. A population can be exposed to environmental pollution throughout their whole life span, which may increase during periods of particular vulnerability.

The relationship between health deterioration and environmental contamination has been studied for several decades. “Losses” to human health have been estimated in economic terms, as well as in terms of years of life lost. In addition, benefits due to the reduction of human exposure to pollution have also been assessed. In this context, various assessment methodologies have been developed and applied to quantify dose–response relationships for many pollutants. From these relationships, exposure research frameworks have been developed from: the identification of human exposure; the emissions derived from anthropogenic and natural sources; the development of policies and the assessment of cost of reduction of this exposure. This enables the evaluation of human health benefits from the reduction in the context of human welfare improvement. For this purpose, various models have been developed to evaluate the role of public health externalities on society.

During the last decade, several research programs and individual projects have been carried out on the aforementioned topics, including various EU Framework Programmes along the EU Environment and Health Action Plan to support the development of cost-effective policy measures against pollution-related diseases and their wider impacts. The purpose of this book is to summarize the research results from these programs, as well as projects carried out outside the EU region. The knowledge regarding environmentally induced human health problems is presented in a coherent and easy to understand way for the wider community. At present, an important task is to properly communicate the great risk for human health deterioration due to increasing environmental pollution on a local, regional, and even global scale. The book describes an ideal potential, the enhanced participation of the general public in current and future studies of environmental determinants of human health.

The scope of the book is to provide the reader with an assessment of emission sources and releases of various pollutants to the main environmental media and a discussion of exposure pathways and health end points for these pollutants. Dose–response relationships for selected pollutants (exposure–early effects relationship) are then assessed. Technological and non-technological solutions to reduce human exposure to pollutants are discussed, including the assessment of monetary and non-monetary benefits from exposure reduction. Macroeconomic impacts of human health deterioration are presented. Finally, risk communication and awareness are described, including public participatory approaches.

The book provides information about various pollutants, both inorganic and organic, in the context of their human health impacts. Methodological approaches are reviewed, such as various types of environmental models, life cycle assessment analysis, and human health scenarios in relation to environmental change at various scales. Challenges on how to translate contaminant concentrations measured in blood into the information useful for risk characterization are discussed. Monetary and nonmonetary approaches are presented for assessing the human health benefits in the context of human welfare improvement. The monitoring of environmental pollution in the context of human health is also discussed. Climate change and a future change in pollutant exposure will further complicate the assessment of human health deterioration due to the contamination of the environment, providing a good rationale to continue this monitoring, as concluded in the book. To this end, the transition to a low-carbon economy (and society) and its impacts on the health of the environment and humans are also discussed. A trend analysis of funding for environment and human health research may be of particular interest to regulatory authorities and policy makers.

Major features of the book include an assessment of environmental parameters (such as air quality, environmental emissions, etc.) in the context of human health deterioration and an improvement of knowledge on public health status as a component of human welfare. A presentation of solutions for a reduction of human exposure to environmental pollution is given in the context of environmental policy improvement. A presentation of the role of the public in monitoring the human exposure change due to environmental pollution is assessed in the context of risk communication. Hazard and risk assessment is approached in the context of consumer safety.

As the subject of health effects due to environmental pollution is extremely broad and multidimensional, it is not feasible in the frame of this book to provide a comprehensive picture of this burgeoning field of research, policy, and public health action. Therefore, where feasible, references are made to recent reviews of evidence, outcome documents of relevant professional conferences, and statements from expert communities, as well as major reports from the organizations and institutions involved in public policy on environment and population health.

This book is a crucial text for policy makers requiring scientific justification for the development of new environmental regulations and exposure reduction strategies;

scientists researching public health and environmental contamination; and members of the public interested in human health issues.

The editors thank all of the contributing authors contributing to this volume and are grateful to Norwegian Institute for Air Research (NILU) for the financial support during the preparation of this work.

Kjeller, Norway

Jozef M. Pacyna  
Elisabeth G. Pacyna

Environmental Determinants of Human Health

Pacyna, J.M.; Pacyna, E.G. (Eds.)

2016, XIV, 270 p. 32 illus., 15 illus. in color., Hardcover

ISBN: 978-3-319-43140-6