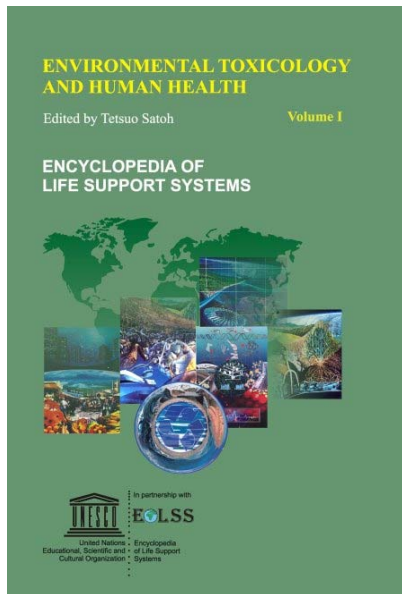


CONTENTS

ENVIRONMENTAL TOXICOLOGY AND HUMAN HEALTH



Environmental Toxicology and Human Health - Volume 1

No. of Pages: 360

ISBN: 978-1-84826-251-5 (eBook)

ISBN: 978-1-84826-701-5 (Print Volume)

Environmental Toxicology and Human Health - Volume 2

No. of Pages: 268

ISBN: 978-1-84826-252-2 (eBook)

ISBN: 978-1-84826-702-2 (Print Volume)

For more information of e-book and Print Volume(s) order, please [click here](#)

Or [contact : eolessunesco@gmail.com](mailto:eolessunesco@gmail.com)

CONTENTS

VOLUME I

Environmental Toxicology and Human Health **1**

Tetsuo Satoh, *Biomedical Research Institute and Chiba University, Chiba, Japan*
 Salmaan H. Inayat-Hussain, *Department of Biomedical Science, Faculty of Allied Health Sciences, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia*

1. Introduction
2. Environmental Exposure
 - 2.1. Air Pollution
 - 2.2. Radiation
 - 2.3. Routes of Absorption
 - 2.4. Distribution
 - 2.5. Metabolism
 - 2.6. Excretion
3. Biological Agents in the Environment
4. Risk assessment and Risk Management
 - 4.1. Anthrax
 - 4.2. Virus Induced Diseases
5. Toxic Chemicals in the Environment
 - 5.1. Specific Toxicity or Target Organs of Chemicals
 - 5.2. Prevention
6. Occupational Exposure
7. Ecotoxicology
8. Conclusion

Health Effects from Exposure to Acute Levels of Industrial Chemicals **43**

Arito, Heihachiro, *National Institute of Industrial Health, Kawasaki, Japan*

1. Introduction
2. What is Acute Toxicity?
3. Occurrence of Acute Poisonings in Industries
4. Non-regular Work as a Causative Factor of Acute Poisoning
5. Occupational Exposure Limits and Acute Effects
6. Acute Exposure Guidelines
7. Acute Toxicity of Dioxins

Health Effects from Exposure to Chronic Levels of Industrial Chemicals **57**

Y. Takeuchi, *Research Center for Radiation Emergency Medicine, National Institute of Radiological Sciences, Chiba, Japan*

1. Definition of Chronic Toxicity
2. Specific Toxicity or Target Organs of Chemicals
 - 2.1. Neurotoxicity
 - 2.2. Reproductive Toxicity
 - 2.3. Carcinogenicity of Chemicals
 - 2.4. Immunotoxicity
3. Cases of Chronic Occupational Poisoning
 - 3.1. Polyneuropathy Due to n-Hexane
 - 3.2. Reproductive Disorders Due to 2-Bromopropane
 - 3.3. Leukemia Due to Benzene
4. Prevention
 - 4.1. Hygienic Standard to Prevent Chronic Occupational Poisoning

4.2. Extrapolation from Data of Animal Experiment to Humans

Control Strategies**69**M. Ikeda, *Kyoto Industrial Health Association, Kyoto, Japan*

1. General Principle
2. Strategies in Occupational Health
 - 2.1. Walk-through Survey
 - 2.2. Chemical Identification
 - 2.3. Exposure Analysis
 - 2.4. Health Examination and Over-all Evaluation
 - 2.5. Counter Measures
3. Strategies in Environmental Health
 - 3.1. General Principle
 - 3.2. Special Consideration in Evaluating Toxicity of Chemicals in Environmental Health
 - 3.3. Pollutant Release and Transfer Registry
 - 3.4. Environmental and Biological Monitoring

Case Study of Air Pollution Episodes in Meuse Valley of Belgium, Donora of Pennsylvania, and London, U.K.**78**Kagawa, Jun, *Department of Hygiene and Public Health, School of Medicine, Tokyo Women's Medical University, Japan*

1. Meuse Valley Episode
2. Donora Episode
3. London episode
4. Conclusion

Case Study of the Bhopal Incident**81**Cullinan, P. *Department of Occupational and Environmental Medicine, Imperial College (NHLI), on behalf of the International Medical Commission on Bhopal, London, UK*

1. Introduction
2. Epidemiologic Study
 - 2.1. Union Carbide in Bhopal
 - 2.2. The Gas Disaster
 - 2.3. The International Medical Commission
3. Background
 - 3.1. Technique
 - 3.2. Findings
 - 3.2.1. Immediate Effects of the Disaster
 - 3.2.2. Toxicology of MIC: Experimental Studies
 - 3.2.3. Bhopal: Epidemiological Studies
 - 3.2.4. Attributing Disease to Gas Exposure
 - 3.2.5. Estimating Exposure
 - 3.2.6. Analogy
 - 3.2.7. Summary of Literature
4. Literature review
 - 4.1. Aims and Objectives
 - 4.2. Methods
 - 4.2.1. Survey Population
 - 4.2.2. Instruments
 - 4.2.3. Categorizing Exposure
 - 4.2.4. Data Storage and Analysis
5. Results

- 5.1. Response Rates
 - 5.1.1. Interviewed Subjects
 - 5.1.2. Subjects Undergoing Measurement of Respiratory Function
- 5.2. Survey and Clinical Measurements
 - 5.2.1. General Health
 - 5.2.2. Respiratory Symptoms
 - 5.2.3. Lung Function
 - 5.2.4. Respiratory Symptoms and Lung Function
6. Interpretation
 - 6.1. Respiratory Disease in Bhopal: Critique of the Epidemiological Study
 - 6.2. Survey Population
 - 6.3. Validity of Responses
 - 6.4. Confounding
 - 6.5. Attribution

Minamata Disease in Japan

105

Takizawa, Y. *National Institute for Minamata Disease, Environment Agency of Japan, Japan*

1. Introduction
2. Outbreak of Minamata Disease
 - 2.1. First outbreak of Minamata Disease in Kumamoto
 - 2.2. Outbreak of Second Type of Minamata Disease in Niigata
3. Medical Aspects of Minamata Disease
 - 3.1. Research on the Causative Agent of Minamata Disease in Kumamoto
 - 3.2. Determination of Methylmercury as the Causative Agent of Minamata Disease in Niigata
 - 3.3. Causes of Minamata Disease
4. Investigation of Cause of Minamata Disease in Two Areas
 - 4.1. Clinical Symptoms
 - 4.2. Pathology, Diagnosis and Treatment of Minamata Disease
5. Measures to Control Mercury Pollution
 - 5.1. Closing Down Pollutant Sources
 - 5.2. Industrial Effluent Control
 - 5.3. Restoration of Environment
 - 5.4. Restraint on Intake of Fish and Shellfish
6. Estimating Exposure in Consumption of Seafood and Risks of Mercury Poisoning
Relief of Minamata Disease Victims
 - 6.1. Relationship Between Mercury Intake and Disease Outbreak
 - 6.2. Tolerable Average Intake of Mercury
 - 6.3. Action Levels of Mercury in Seafood
7. Relief of Minamata Disease Victims
 - 7.1. Caring for Minamata Disease Patients in the Early Stage
 - 7.2. Relief Based on the Pollution-related Health Damage Compensation Law
 - 7.3. Solution by New Government-proposed Relief
8. Conclusion
9. A Short Guide for Further Study

Mercury-Contaminated Grain in Iraq

130

Takizawa, Y. *National Institute for Minamata Disease, Japan*

1. Introduction
2. Dose-Response Relations in Iraq Methylmercury Poisoning
 - 2.1. Outbreak of Methylmercury Poisoning by Agricultural Chemicals
 - 2.2. Poisoning-Causing Agents and Exposed Population
3. Prenatal Exposure in Iraq
4. Treatment and Prognosis
5. Clinical Features of the Iraq Methylmercury Poisoning by Fungicide

- 5.1. Mercury Eliminators in the Early Stage
- 5.2. Treatments by Haemodialysis and Exchange Transfusion
- 5.3. Prognosis
6. Epidemic of Mercury Poisoning in Iraq
 - 6.1. Onset of Symptoms and Blood Levels of Methylmercury
 - 6.2. Estimated Threshold Body Burden
7. Solution to the Mercury Pollution by Mercurial Pesticides
8. Conclusion
9. A short guide for further preventive measures

Pediatric Lead Poisoning of Residential Origin

144

Rabinowitz, M. B. *Marine Biological Laboratory and Harvard Medical School, USA*

1. Introduction
 - 1.1. Background
 - 1.2. Overview
2. Plumbing as a Source of Poisoning
 - 2.1. Lead in Water
 - 2.2. pH Adjustments of Drinking Water
3. Lead Paint
 - 3.1. Paint Ingredients and Properties in General
 - 3.2. Lead Paint Ingredients and Properties
 - 3.3. Manufacturing Methods of Lead Pigments
 - 3.4. Historic Patterns of Usage of Lead Pigments
4. Health and Developmental Effects of Lead
5. Diagnosis of Lead Poisoning
6. Screening for Lead Poisoning
7. Prevalence of Childhood Lead Poisoning
 - 7.1. Record of Prevalence in the United States
 - 7.2. International Dimensions
8. Treatment of Lead Poisoning
9. Recurrences of Lead Poisoning
 - 9.1. Environmental Causes of Recurrence
 - 9.2. Physiological Causes of Recurrence
10. Prevention of Lead Poisoning
11. Detecting Lead Paint
12. Children are Especially Vulnerable
13. Individual Susceptibility
14. Lead and Nutrition
15. Exposure of Children to Lead Paint
16. Remediation of Lead Paint Hazards
 - 16.1. Remediation of Dwellings
 - 16.2. Regulations Regarding Lead Paint Abatement
 - 16.3. Paint Abatement Methods
 - 16.4. Soil Lead Abatement
 - 16.5. Dust Abatement and Control
17. Societal and Legal Responses

Insecticides

164

Savolainen Kai M. *Department of Industrial Hygiene and Toxicology, Finnish Institute of Occupational Health, Topeliuksenkatu, Helsinki, Finland*

Vähäkangas Kirsi, *Department of Pharmacology and Toxicology, University of Oulu, Finland*

1. Introduction
2. Organophosphate insecticides

- 2.1. Background
- 2.2. Mechanisms of Action
- 2.3. Signs and Symptoms of Organophosphate Poisoning
- 2.4. Delayed Effects of Organophosphate Exposure
- 2.5. Diagnosis and Treatment of Organophosphate Poisoning
- 2.6. Biological Monitoring of Exposure to Organophosphates
- 2.7. Other Effects
3. Carbamate Insecticides
 - 3.1. Mechanism of Action of Carbamate Insecticides
 - 3.2. Signs and Symptoms of Carbamate Poisoning, its Diagnosis and Treatment
 - 3.3. Biological Monitoring of Exposure to Carbamates
4. Pyrethroid Insecticides
 - 4.1. Mode of Action and Toxic Effects of Pyrethrin and Pyrethroids
 - 4.2. Biological Monitoring, Diagnosis and Treatment of Pyrethroid Intoxication
 - 4.3. Other Effects of Pyrethroids
5. Organochlorine Insecticides
 - 5.1. Background
 - 5.2. Mode of Action of Short-Term Exposure to Organochlorine Insecticides
 - 5.3. Symptoms and Signs of Exposure to Organochlorine Insecticides
 - 5.4. Diagnosis and Treatment of Poisoning Induced by Exposure to Organochlorine Insecticides
 - 5.5. Biological Monitoring of Exposure to Organochlorine Compounds
 - 5.6. Other Effects of Organochlorine Insecticides
6. Other Insecticides
7. Conclusions

Herbicides**182**

Kramer, R.E. and Baker, R.C. *Department of Pharmacology and Toxicology, University of Mississippi Medical Center, U.S.A.*

1. Introduction
2. Chlorophenoxy Herbicides
3. Acetamide Herbicides
4. Glyphosate
5. Phenylurea Herbicides
6. Triazine Herbicides
7. Bipyridilium Herbicides

Rodenticides**241**

R. E. Kramer and R. C. Baker, *Department of Pharmacology and Toxicology, University of Mississippi Medical Center, U.S.A.*

1. Introduction
2. Fluoroacetate Derivatives
 - 2.1. Sodium Monofluoroacetate
 - 2.2. Fluoroacetamide
 - 2.3. 1,3-Difluoro-2-propanol
3. Bromethalin
 - 3.1. α -Naphthylthiourea (ANTU)
 - 3.2. Pyriminil
4. Thiourea Rodenticides
5. Norbormide
6. Scilliroside
7. Vitamin D-Based Rodenticides
8. Alpha(a)-Chlorohydrin
9. Thallium
10. Yellow Phosphorus

11. Zinc Phosphide
12. Strychnine
13. Anticoagulant Rodenticides

Index **301**

About EOLSS **305**

VOLUME II

Virus-Induced Diseases	1
Koros A. M. C. and Dantuluri H., <i>Department of Infectious Diseases and Microbiology, University of Pittsburgh, USA</i>	

1. Introduction
2. Viruses Which Affect Humans Indirectly
3. Viruses Affecting Humans Directly
 - 3.1. Virus Induced Diseases Which Have Useful Vaccines
 - 3.1.1. Smallpox
 - 3.1.2. Measles
 - 3.1.3. Rubella
 - 3.1.4. Mumps
 - 3.1.5. Varicella-Zoster
 - 3.1.6. Hepatitis B
 - 3.1.7. Hepatitis A
 - 3.2. Viruses That Do Not Have Useful Vaccines
 - 3.2.1. Hepatitis C
 - 3.2.2. Hepatitis D
 - 3.3. Herpes Viruses
 - 3.3.1. Herpes simplex
 - 3.3.1.1. HSV1
 - 3.3.1.2. HSV
 - 3.4. Cytomegalovirus
 - 3.5. Epstein-Barr Virus
4. Viruses Associated with Cancers
 - 4.1. Human T Cell Leukemia Virus
 - 4.2. Human Papilloma Virus
5. Viruses Associated with Major Epidemics
 - 5.1. HIV and Acquired Immune Deficiency Syndrome
 - 5.2. Influenza
6. Insect-Borne Diseases
 - 6.1. Yellow fever
 - 6.2. Dengue
7. Other Viruses
 - 7.1. Rabies
 - 7.2. Coxsackie Viruses
 - 7.3. Hanta Virus
 - 7.4. Hemorrhagic Fever Viruses

Case Study of Lyme Disease	15
Kawabata M., <i>ICMR, Kobe University School of Medicine, Japan</i>	

1. First case report of Lyme disease in East Asia

2. Epidemiology
3. Causation
4. Clinical manifestations
 - 4.1. Cutaneous manifestation
 - 4.2. Extracutaneous Manifestation
5. Diagnosis
6. Treatment and prevention

Case History: Ebola Hemorrhagic Fever in Zaire, 1995

27

Levitt, A. M., *National Center for Infectious Diseases, Centers for Disease Control and Prevention, USA*

Part I: A Chronological Account

1. Diagnosis
2. Detection
3. Background on Filoviral Diseases
 - 3.1. Marburg virus
 - 3.2. Ebola virus
 - 3.2.1. Ebola-Reston
4. Genetic characterization of the 1995 isolate of Ebola virus
5. Mobilization of an International Outbreak Response
6. Providing Medical Care to EHF Patients
 - 6.1. Medecins Sans Frontieres
 - 6.2. The Zairian Red Cross
 - 6.3. Disinfecting the hospital
 - 6.4. Training, Equipping, and Augmenting the Hospital Staff
 - 6.5. Providing Help at Other Local Hospitals and Clinics
7. Disseminating Disease Prevention Information to the Local Population
8. The Epidemiological Investigation
 - 8.1. Case-finding
 - 8.2. Laboratory confirmation of EHF
 - 8.3. The course of the outbreak
 - 8.3.1. Final figures
 - 8.4. Transmission factors
 - 8.5. The source case: tracing the origin of the outbreak and the path of person-to-person transmission
9. The Search for the Zoonotic Host of Ebola Virus

Part II: Lessons Learned

10. Was the intervention successful?
11. Reasons for international concern
 - 11.1. Can a strain of Ebola become airborne?
12. Factors that encouraged the epidemic spread of EHF in Zaire
 - 12.1. Deterioration of the public health infrastructure
 - 12.2. Hospitals as Foci of Infection
13. Disease Spread Through Travel
 - 13.1. Preventing the Importation of EHF During the 1995 Outbreak
 - 13.2. Examples of Filoviral Disease Spread via Travel
14. Zaire's Request for International Assistance
15. International Cooperation
 - 15.1. Coordination by WHO
16. International Press Management
17. Scientific Lessons
 - 17.1. Characterization of the Virus
 - 17.2. An EHF Surveillance Kit
 - 17.3. Treatment
 - 17.3.1. Therapy Using Blood From Recovered EHF Patients
 - 17.4. Vaccines
18. The Aftermath

Case Studies of Anthrax Outbreaks

58

Uchida I, *National Institute of Animal Health, Japan*

1. Etiology
2. Distribution
3. Disease in Animals
4. Disease in Humans
 - 4.1. Cutaneous Anthrax
 - 4.2. Intestinal Anthrax
 - 4.3. Pulmonary (inhalation) Anthrax
 - 4.4. Other Forms of Anthrax
5. Vaccines and Treatment
6. The cases of large occurrence
 - 6.1. An Unusual Outbreak of Anthrax in Australia
 - 6.2. Human Anthrax in Zimbabwe
 - 6.3. The Sverdlovsk Anthrax Outbreak of 1979
 - 6.4. Outbreaks of Anthrax Zoonosis Occurred in Two Regions of France in 1997
7. Conclusion

Case Study of Health Effects of Cryptosporidium in Drinking Water

67

Smith, H.V., and Nichols, R.A.B., *Scottish Parasite Diagnostic Laboratory, Stobhill Hospital, Glasgow G21 3UW, UK.*

1. Introduction
2. The Genus *Cryptosporidium*
 - 2.1. Life cycle
3. Human cryptosporidiosis
 - 3.1. Clinical aspects
 - 3.2. Pathogenesis
 - 3.3. Immune response
 - 3.4. Seroprevalence
 - 3.5. Laboratory detection
 - 3.6. Infectious Dose
 - 3.7. Transmission Routes
 - 3.7.1. Transmission From Person to Person
 - 3.7.2. Transmission From Ingesting Oocyst-Contaminated Food
 - 3.7.3. Transmission From Inhaling Oocysts
 - 3.7.4. Transmission From Animals to Human Beings
 - 3.7.5. Transmission From Oocyst-Contaminated Water
 - 3.7.6. *C. parvum* Genotypes, Zoonotic and Anthroponotic Transmission Routes
4. Waterborne transmission
 - 4.1. Methods For Detecting Waterborne Oocysts
 - 4.2. Recovery Efficiencies
 - 4.3. Occurrence In The Environment
 - 4.4. Contributors of Oocysts to the Environment
 - 4.4.1. Human Sources
 - 4.4.2. Non-Human Sources
 - 4.4.3. Catchment Assessment and Analysis of Likely Risk
 - 4.5. Oocyst Viability
 - 4.5.1. Fluorogenic Vital Dyes
 - 4.5.2. Molecular Methods
 - 4.5.3. In vitro Infectivity
 - 4.6. Survival in the Environment and Potential for Waterborne Transmission
 - 4.6.1. Survival in the Environment and in Water Treatment
 - 4.6.2. Survival in Natural Still Mineral Waters

5. Waterborne Outbreaks
6. Removal in water treatment
 - 6.1. Physical Removal
 - 6.2. Disinfection
7. Risk assessment
8. Water and the food industry
 - 8.1. Use of Potable Water in the Food Industry
 - 8.2. Bottled Waters
9. Regulatory Aspects
10. Current limitations and future developments
11. Role for education and effective interaction

Sportfish Consumption: Socio-Cultural and Economic Aspects, Ethnicity and Effectiveness of Health Advisories **99**

Fan Anna M., *Pesticide and Environmental Toxicology Section, California Environmental Protection Agency, California, USA*

1. Introduction
2. Ethnicity/Social-cultural considerations of fish consumption
3. Economics of fishing and fish consumption
4. Effectiveness of health advisories
5. Compliance with advisories and public perception
6. Impact of compliance with advisories and reality
7. Public awareness of advisories
8. Communication and outreach
9. California experience
10. Conclusion and recommendations

Impact of Socioeconomic Factors on Residential Indoor Air Quality and Human Health **126**

A. Arcus-Arth, R. Broadwin, and R. Lam, *Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, Oakland, CA, USA*

1. Introduction
2. Socioeconomic Factors and their Influence on the Association Between Indoor Exposures and Human Health
3. Selected Important Indoor Exposures
 - 3.1. Lead
 - 3.2. Environmental Tobacco Smoke (ETS)
 - 3.3. Radon
 - 3.4. Pollutants from Indoor Combustion Activities
 - 3.5. Volatile Organic Compounds
 - 3.6. Formaldehyde
 - 3.7. Pesticides
 - 3.8. Indoor Biological Contamination
4. Important Building Characteristic Affecting Indoor Exposures: Ventilation
5. Conclusions
6. Future Perspectives

Social Concerns for Environmental Exposures to Toxic Substances **154**

Kyle Amy D., *School of Public Health, University of California, Berkeley, USA*

1. Assessing and Communicating Risks from Environmental Exposures
 - 1.1. Technical Risk Assessment for Environmental Agents
 - 1.2. Challenges to the Technical Paradigm
 - 1.2.1. Psychosocial Research

- 1.2.2. Cultural Theories of Risk
- 1.3. Issues for Decision-Making
- 1.4. Integrating Technical and Social Perspectives
- 2. Equity, Health Disparities, and Environmental Justice
- 3. Policy Approaches for Global Challenges
 - 3.1. Sustainability
 - 3.2. Precautionary Principle
 - 3.3. Consumption
- 4. Conclusion

Environmental Justice as a Component of Environmental Decision-Making **178**
 Michael J. DiBartolomeis, *Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, USA*

- 1. Introduction
- 2. Existing Framework for Environmental Decision-Making
 - 2.1. Risk Assessment
 - 2.2. Social Welfare Assessment
 - 2.3. Economics
 - 2.4. Pollution Prevention
- 3. Environmental Justice Perspective on Environmental Decision-Making
 - 3.1. Critique of Risk Assessment
 - 3.2. Population Compared to Individual Risk Measures
 - 3.3. Hot Spots of Multiple, Cumulative, and Synergistic Risks
 - 3.4. Empowering the Public through Education
- 4. Incorporating Environmental Justice into Environmental Decision-Making
 - 4.1. Public Participation
 - 4.2. Right-to-Know
 - 4.2.1. Proposition 65
 - 4.2.2. Toxic Release Inventory (TRI)
 - 4.3. Sub-populations and Ecosystems at Risk
 - 4.4. Pollution Prevention
- 5. Conclusions and Recommendations

Index **207**

About EOLSS **211**