

Contents

Chapter 1: Introduction and Summary	3
Chapter 2: The Respiratory System and Its Response to Harmful Substances	15
Chapter 3: Pulmonary Toxicology and Epidemiology	29
Chapter 4: Federal Attention to Pulmonary Toxicants	49

Boxes

Boxes

3-A—General Principles of Toxicology	30
3-B—The UCLA Population Studies of Chronic Obstructive Respiratory Disease	42

Figures

Figures

1-1—The Human Respiratory Tract	5
2-1—The Human Respiratory Tract	15
2-2—Branching of the Tracheobronchial Region (Human Lung Cast)	16
2-3—Alveoli	16
2-4—Gas Exchange in the Pulmonary Region	17
2-5—Ciliated Cells and Alveolar Macrophages	18
2-6—Effects of Emphysema on Alveolar Walls	20
3-1—Framework for Exposure Assessment	32
3-2—Integrated Approach to Identifying Pulmonary Toxicants	35
3-3—Spectrum of Biological Response to Pollutant Exposure	36

Tables

Tables

1-1—The Seventeen Chemicals of the 33/50 Program, 1989	7
2-1—Respiratory Tract Clearance Mechanisms	19
2-2—Causes of Occupational Asthma	21
2-3—Industrial Toxicants Producing Lung Disease	23
3-1—Defining Gases and Aerosols	33
3-2—Summary of Characteristics of Physiologic Assays	40
4-1—National Primary Ambient Air Quality Standards	50
4-2—Hazardous Air Pollutants Regulated Under the CAA Due to NonCancer Health Effects on the Pulmonary System	52
4-3—Pulmonary Toxicants Controlled Under EPA's Early Reduction and 33/50 Programs	54
4-4—Regulated Levels of Pulmonary Toxicants Under RCRA	55
4-5—Pulmonary Toxicants Regulated Under FIFRA	55
4-6—Air Contaminants Regulated by OSHA Because of Pulmonary Effects	56