

# Preface

*The air must be pure, habitable, and bright, It should be neither  
contaminated nor smell of the sewer*

(Regimen Sanitatis Salernitanum)

The lungs are the major interface between humans and the environment. We inhale environmental substances in the forms of particles, fibers, and gases every day. While many may be relatively harmless, others have a potential to cause acute or chronic lung diseases. The close and continuous interactions between the lungs and our environment support the observations over centuries that these exposures may participate in the pathogenesis of many diseases. Specifically, exposures can result in most types of lung disease, including those that are currently considered idiopathic. Estimates indicate that up to 15 % or more of adult-onset asthma and COPD cases are due to occupational exposures. The overall burden of all lung disease related to occupational or environmental exposures is unknown but likely represents a significant global burden.

Occupational and environmental lung diseases continue to be a major challenge for physicians. Many clinicians consider occupational and environmental lung diseases complex and time-consuming to diagnose and sometimes “a disease of the past.” While certain occupational exposures, such as asbestos, silica, and coal dust, have decreased, lung diseases related to these exposures continue to be observed, with the recognition of a number of new disease manifestations with modified utilization in the workplace. In addition, there has been increased awareness in the past 10 years of other occupational and environmental exposures that can cause lung disease. We now understand more about these diseases and, over the last few years, several evidence-based guidelines were introduced to guide healthcare providers to their appropriate management. It is essential that clinicians are familiar with not only the “old diseases” but also the “emerging conditions” so that they can diagnose these diseases and provide the best clinical and preventive care to their patients.

The aim of this book is thus to deliver a concise clinical guide to the diagnosis and management of occupational and environmental lung diseases, incorporating evidence-based guidelines where available. Each chapter of the book will provide an updated review and a practical approach to occupational and environmental lung diseases. Our target readers are practicing clinicians including internists, pulmonologists, and primary care personnel. Other readers who will find this book of use include industrial hygienists and environmental regulators.

The book starts with a historical perspective from Dr. Blanc that defines the various features that have led to recognition of occupational lung disease. It introduces the readers to important personages in this field and outlines how technological advancements can introduce novel exposure and new risk of diseases. This is followed by a comprehensive discussion of history taking, a key component for effective detection and management of occupational and environmental lung diseases by Dr. Mohr in Chap. 2. Chapters 3 and 4 discuss commonly used laboratory tests, including methacholine challenge test as reviewed by Drs. Malo in Chap. 3. In Chap. 4, Dr. Goodman provides a complete description of the imaging of occupational and environmental pulmonary diseases including the utility of B reading, a standardized assessment used to quantify lung disease associated with particle and fiber exposures.

Chapters 5, 6, 7, 8, 9, 10, 11, 12, 13, and 14 cover traditional and common occupational and environmental lung diseases with a focus on a twenty-first century update. Drs. Riberio and Tarlo review the many environmental and occupational exposures that result in asthma in Chap. 5, while Drs. Ho and Kuschner provide a review of the agents resulting in hypersensitivity pneumonitis, the evaluation of patients suspected of having this disease, including the lack of definitive diagnostic criteria and a comprehensive treatment approach in Chap. 6. In Chap. 7, Drs. Huang and Volker delineate the relationships between air pollution and respiratory disease. The contributions of ozone, particulate matter, nitrogen oxides, carbon monoxide, and sulfur oxides are specified. Dr. Banks answers pivotal questions regarding asbestos exposure in Chap. 8. Included among these and of critical importance to the practicing clinician are the issues of what is a clinically significant exposure to asbestos, does a patient need to have asbestosis prior to diagnosis of an asbestos-related lung cancer, and what chest imaging is recommended for individuals with significant fiber exposure. In Chap. 9, Dr. Ghio reviews the older occupational lung diseases, silicosis, coal workers pneumoconiosis, and asbestosis, reminding us that the diagnosis of these diseases is a clinical one, not requiring pathology, although there are specific criteria for particular compensation programs. In Chap. 10, Drs. Prezant, Smith, and Mohr clarify what the clinician must consider in the diagnosis and treatment of lung disease after exposure to irritant toxic gases and smoke inhalation. Drs. Lam, Kurmi, and Ayres identify the problem of measuring chronic obstructive pulmonary disease in nonsmokers. They further characterize the associations with occupational exposures, burning of biomass, environmental tobacco smoke, and outdoor air pollution. In Chap. 11, Drs. Takada and Moriyama discuss hard metal lung disease, one of the few occupational lung diseases with characteristic pathological findings, giant cell pneumonitis, and the improved method of detect-

ing cobalt, the culprit metal for hard metal lung disease. In Chap. 12, Drs. Ferguson, Mroz, and Maier examine berylliosis, a chronic lung disease mimicking sarcoidosis with a focus on recent advances in understanding of gene–environment interactions contributing to risk of this disease. Drs. Yu, Tse, and Qiu then review lung cancer caused by exposures to occupational and environmental hazards in Chap. 13. This review is most pertinent to nonsmoking patients who develop lung cancer, an entity prevalent in certain parts of the world (e.g., south and pacific northeast Asia). That nonsmokers can also develop chronic lung diseases traditionally associated with cigarette smoking is further highlighted in Chap. 14 by Drs. Lam, Kurmi, and Ayres, who reviewed environmental and occupational risk factors for COPD in non-smokers. To remind us of the need to consider exposures in the cause of lung diseases, Dr. Huang specifically discusses emerging conditions caused by new agents and new route of exposure to old agents in Chap. 15. Finally, as the diagnosis of an occupational or environmental lung disease may result in the need to assist the patient in the undertaking of compensation and other administrative issues, in Chap. 16 Dr. Cowl discusses the assessment of disability, a topic that is considered most cumbersome to many clinicians. The book ends with a discussion on global burden of occupational and environmental exposure in developing and industrialized countries by Dr. Christiani in Chap. 17.

In summary, exposure to many ambient environmental agents, occupational or nonoccupational, will impact the health of human body, especially the lung. With the rapidly changing technology, new conditions and exposures will undoubtedly emerge. Clinicians need to remain vigilant about assessing the potential link between lung diseases and environmental exposures, and this book provides a practical guide to recognize, diagnose, and prevent occupational and environmental lung diseases.

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