

CHAPTER 1

Introduction to respiratory medicine

The respiratory system is essential for gas exchange in a multicellular organism. The lungs are also important as a defence against infectious microorganisms. Worldwide, diseases of the respiratory system cause significant morbidity and mortality; this includes infectious diseases, malignancies, allergic diseases, autoimmune disorders, and occupational diseases. Diseases of other parts of the body, for example, rheumatological and renal conditions, often affect the lungs.

Respiratory diseases can present acutely with severe, life-threatening breathlessness, for example, when someone develops a pulmonary embolus or a pneumothorax, or more insidiously with a steady decline in lung function over time, as occurs in chronic obstructive pulmonary disease or parenchymal lung diseases. In the United Kingdom (UK), respiratory diseases account for one-third of acute admissions to hospitals and for more than a quarter of all deaths in hospitals. Respiratory tract infections are the commonest conditions seen in General Practice.

In the last half a century there has been a decline in the prevalence of certain diseases, such as pneumoconioses, and other occupational lung diseases because of the recognition of the harm caused by exposure to certain agents at work. The introduction of masks, better ventilation, and other safety measures at work, together with appropriate legislation, has been the key to this success.

In the next few decades it is likely that asbestos-associated diseases (asbestosis and mesothelioma) will reduce in incidence and prevalence in the UK because of the prohibition of the use of asbestos. Asbestos, however, is still used in several developing countries. The recognition that air pollution is responsible for respiratory diseases will, hopefully, lead to cleaner air, especially in urban areas.

However, there has been an increase in the prevalence of allergic asthma, and there are various hypotheses to explain this increase. *Mycobacterium tuberculosis* has still not been eradicated, resulting in millions of deaths across the globe. Tuberculosis, also called 'phthism', 'consumption', or the 'white plague', was found in the spines of Egyptian mummies dating back to 3200–2400 BCE and is associated with poverty and deprivation.

Respiratory diseases are managed jointly by respiratory physicians, specialist nurses, physiotherapists, and occupational therapists in a

multi-disciplinary way. Other specialists, including radiologists, pathologists, oncologists, thoracic surgeons, palliative care physicians, intensivists, and physiologists (for example, lung function technicians) are also essential in the management of patients with respiratory diseases. Patients who are acutely ill are managed in hospital, often on specialist respiratory wards, sometimes in single rooms if infectious, and in the Intensive Care Unit if respiratory support is required.

There has been increasing understanding of the physiology of the respiratory system and the pathophysiology of respiratory diseases in the last few centuries. Table 1.1 summarises some of the key developments in respiratory medicine.

About the book

Respiratory diseases are common, and this textbook offers a practical guide to those who care for patients with respiratory diseases. This textbook is aimed at medical students studying for their MBBS examination and postgraduate doctors of all grades, especially those studying for postgraduate examinations, including the MRCP examination. This book will also be useful for non-respiratory doctors, specialist nurses, physiotherapists, occupational therapists, pharmacists, respiratory physiologists, and physicians associates.

This text covers the entire respiratory curriculum and contains information that is useful and relevant to everyday clinical practice, with a focus on clinical presentation and management. Essential basic anatomy, physiology, pharmacology, and pathology are introduced to help understand the clinical presentation. A structured approach is taken to explain how to construct a sensible differential diagnosis of common respiratory conditions. There is a clear explanation of the common diagnostic tests required to make a diagnosis, including the interpretation of lung function tests. The mechanism of action of drugs commonly prescribed to treat respiratory diseases is discussed, with a description of their common side effects and interaction with other medications. The evidence-based management of common conditions is discussed with reference to the current British Thoracic Society (BTS) and National Institute for Health and Care Excellence (NICE) guidelines. Common pitfalls in diagnosis and management are highlighted.

Table 1.1 Brief history of respiratory medicine.

Year	Development	Scientist
Greece, 460–370 BCE	Beginning of modern medicine	Hippocrates
Greece, 304–250 BCE	Some understanding of the physiology of the lung	Erisistratus
Greece, 129–165 BCE	Anatomy of trachea, larynx, and lungs understood Believed air had substance vital for life	Galen
Egypt, 1210–1288	Some understanding of pulmonary circulation	Ibne Nafis
Italy, 1500	Understood anatomy and physiology of lungs Determined sub-atmospheric pressures inflated lungs	Leonardo da Vinci
Belgium, 1543	Tracheostomy used for ventilation	Andreas Vesalius
UK, 1700	Constructed first air pump for physiological research	Robert Hooke
France, 1778	Discovered role of oxygen	Antoine Lavoisier
France, 1816	Invention of stethoscope	René Laennec
Scotland, 1832	Invention of negative pressure tank-type ventilator	John Dalziel
Germany, 1882	Tuberculosis bacterium discovered	Robert Koch
Germany, 1895	First chest X-ray	Wilhelm Röntgen
UK, 1928	First non-invasive ventilation	Drinker-Shaw
USA, 1963	First human lung transplant	James Hardy
UK, 1972	First computed tomography scan	Godfrey Hounsfield

The book contains several boxes, tables, and algorithms set out in a clear, and concise way. It also contains several good quality colour photographs, and radiological and histological images to support the information in the text.

There are multiple choice questions which can be used by the reader to check their understanding, with a clear explanation of the correct answer. There is also a list of references for suggested further reading.

Supplementary material includes videos demonstrating how to take a history and conduct a clinical examination (http://www.wiley.com/go/Paramothayan/Essential_Respiratory_Medicine). There are also videos showing how to carry out common tests, such as peak flow, spirometry, the skin prick test, the Mantoux test, the shuttle test, and how to fit a patient for a sleep study.

