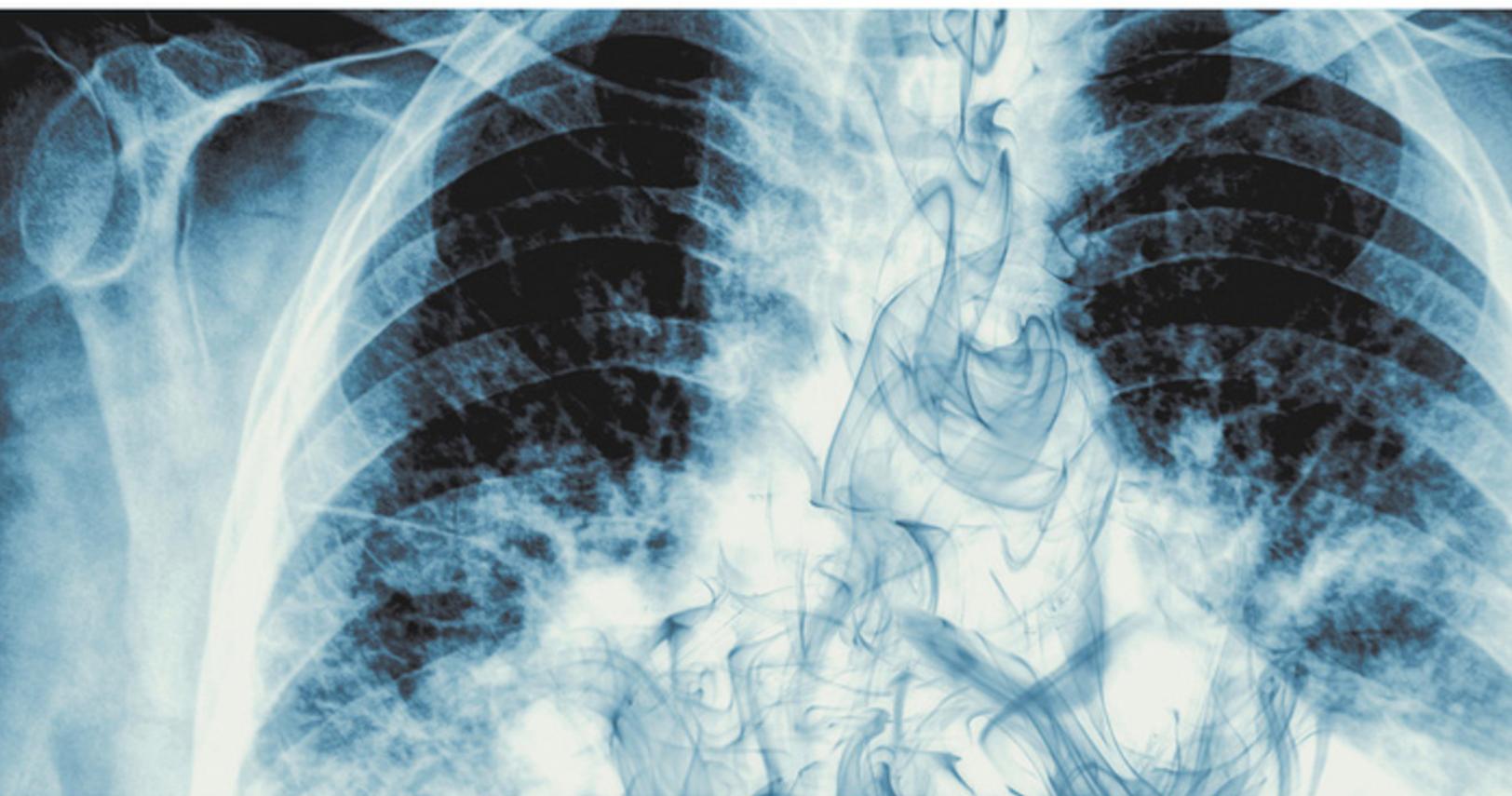


ABC of COPD

THIRD EDITION

Edited by Graeme P. Currie



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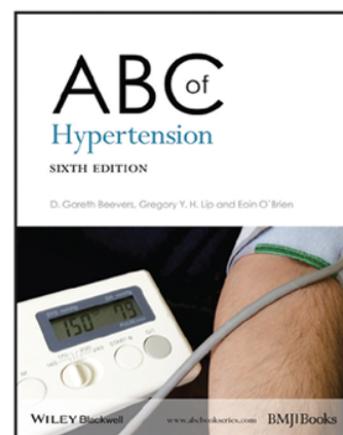
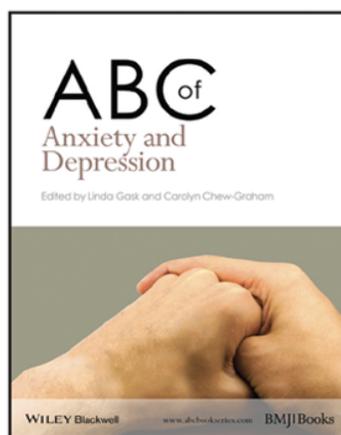
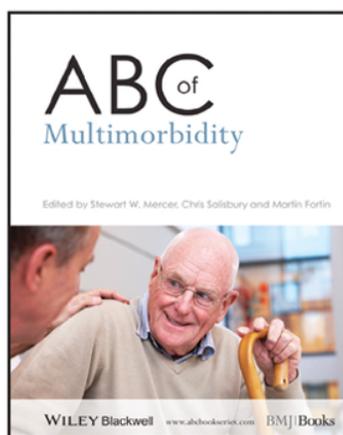
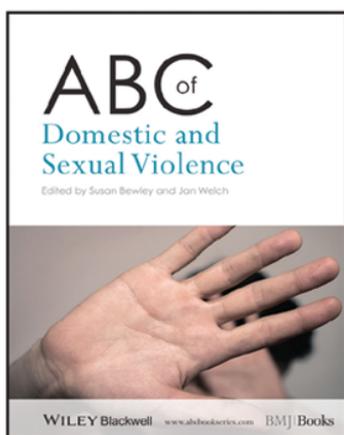
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EDITED BY

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Aberdeen, UK

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Foreword

Chronic obstructive pulmonary disease (COPD) continues to be a major global health problem. It is the fourth most common cause of death globally, and in industrialised countries like the UK, has now risen to the third most common cause of death. In the UK, the mortality from COPD in women now well exceeds that of breast cancer. COPD is also the fifth most common cause of chronic disability, increasing because of more prevalent cigarette smoking in developing countries and, most importantly, because of a rapidly ageing population. COPD now affects approximately 10% of individuals over 40 years and is equally common in women, reflecting the lack of gender difference in smoking. Acute exacerbations of COPD remain one of the most common causes of hospital admission. Because of this, COPD has an increasing economic impact, and healthcare costs now exceed those of asthma many times.

Despite these startling statistics, COPD has been relatively neglected and is still greatly underdiagnosed in general practice, where spirometry, needed to establish the diagnosis, is still very underused. This is in marked contrast to asthma which is now recognised and well managed in the community.

There are highly effective medications available for asthma which have transformed patients' lives. Sadly, this is not the case in

COPD where treatments are less effective while no treatment has so far been shown to slow the relentless progression of the disease. However, important advances have been made in understanding the underlying disease and in managing patients with COPD. Of particular importance has been the introduction of several new long-acting bronchodilators (β -agonists and muscarinic antagonists) and their combinations, which have been found to be the most effective way to reduce symptoms and prevent exacerbations, particularly in those with severe disease.

In this new edition of the ABC series on COPD, Graeme Currie and colleagues provide an update on diagnosis, pathophysiology and modern management of COPD. There have been important advances since the first edition of the book over 10 years ago. Once the disease is recognised, pharmacological and non-pharmacological treatments are able to greatly improve the quality of life of patients with COPD. It is important that COPD is recognised and treated appropriately in general practice where most of these patients are managed and this book provides an easy-to-read overview of the key issues in this important disease.

Peter J. Barnes FRS, FMedSci

CHAPTER 1

Definition, Epidemiology and Risk Factors

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OVERVIEW

- Chronic obstructive pulmonary disease (COPD) is defined by relatively fixed airflow obstruction.
- The number of individuals diagnosed with COPD is far less than the actual number thought to be affected. Prevalence increases with age and socioeconomic deprivation.
- Globally, COPD is projected to be the third leading cause of death by 2030 with the majority of deaths likely to be in low-/middle-income countries.
- The impact of COPD, particularly exacerbations, on health service resource is considerable.
- Risk factors for COPD include cigarette smoking, indoor air pollution (particularly close and regular exposure to combustion of biomass fuels), outdoor air pollution, occupational exposure to some dusts, vapours, irritants and fumes and α 1-antitrypsin deficiency.

Definition

Chronic obstructive pulmonary disease (COPD) is a progressive lung disease characterised by airflow destruction and destruction of the lung parenchyma. The widely used definition put forward by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) is that COPD is 'a common preventable and treatable disease characterised by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lungs to noxious particles or gases. Exacerbations and comorbidities contribute to the overall severity in individual patients'.

COPD is the preferred name for the airflow obstruction associated with the diseases of chronic bronchitis and emphysema (Box 1.1). A number of other conditions are associated with poorly reversible airflow obstruction, for example bronchiectasis and obliterative bronchiolitis. Although these conditions need to be considered in the differential diagnosis of obstructive airways disease, they are not conventionally covered by the definition of

COPD. Although asthma is defined by variable airflow obstruction, there is evidence suggesting that the airway remodelling processes associated with asthma can result in irreversible progressive airflow obstruction that fulfils the definition for COPD. Because of the high prevalence of asthma and COPD, these conditions co-exist in a sizeable proportion of individuals and can raise diagnostic uncertainty.

Box 1.1 Definitions of conditions associated with airflow obstruction.

- COPD is a common preventable and treatable disease characterised by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases. Exacerbations and co-morbidities contribute to the overall severity in individual patients.
- Chronic bronchitis is defined as the presence of chronic productive cough on most days for 3 months, in each of 2 consecutive years, in a patient whom other causes of productive cough have been excluded.
- Emphysema is defined as abnormal, permanent enlargement of the distal airspaces, distal to the terminal bronchioles, accompanied by destruction of their walls and without obvious fibrosis.
- Asthma is characterised by widespread narrowing of the bronchial airways which changes in severity over short periods of time, either spontaneously or following treatment.

Epidemiology

Prevalence

The prevalence of COPD varies considerably between epidemiological surveys. While this reflects the variation between and within countries, differences in methodology, diagnostic criteria and analytical techniques undoubtedly contribute to disparities among studies. There is no consensus as to the optimal metric of COPD prevalence. The lower estimates of prevalence are usually

based on self-reported or 'doctor-confirmed' COPD and are typically 40–50% of the rates derived when spirometry is used. The underdiagnosis of COPD probably arises because many individuals fail to recognise the significance of symptoms and present relatively late with moderate or severe airflow obstruction (Figures 1.1–1.3).

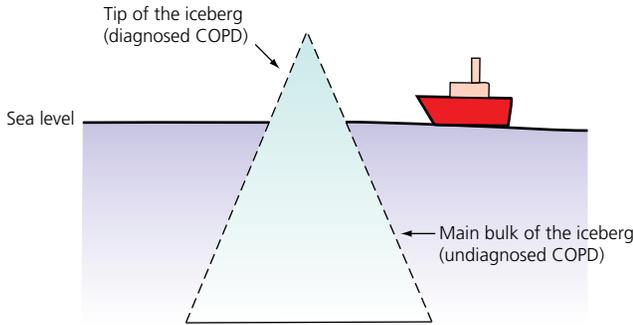


Figure 1.1 Known cases of COPD may represent only the 'tip of the iceberg' with many cases currently undiagnosed.

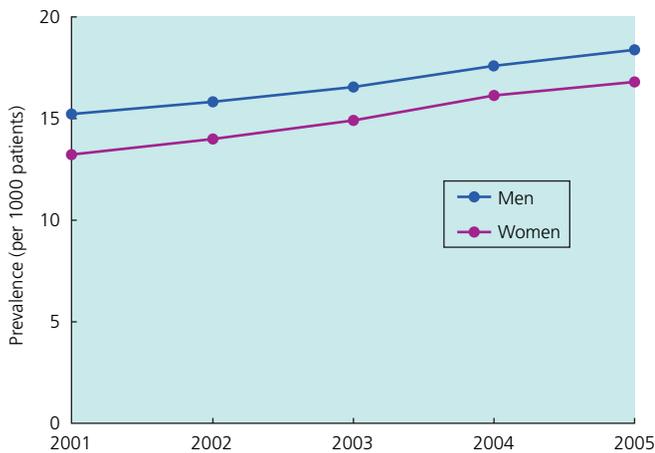


Figure 1.2 Lifetime prevalence of diagnosed COPD in males and females (per 1000) resident in England 2001–2005. Figure adapted from Simpson CR, Hippisley-Cox J, Sheikh A. Trends in the epidemiology of chronic obstructive pulmonary disease in England: a national study of 51 804 patients. *British Journal of General Practice* 2010; **60**(576): 277–284.

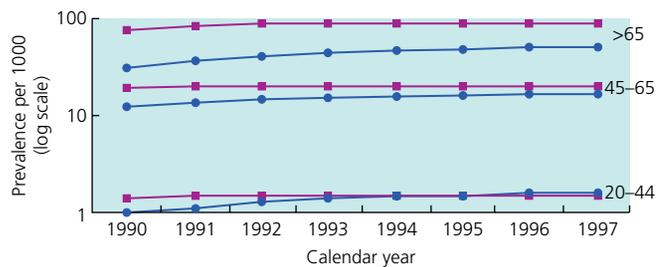


Figure 1.3 Prevalence (per 1000) of diagnosed COPD in UK men (■) and women (●) grouped by age, between 1990 and 1997. Reproduced from Soriano JB, Maier WC, Egger P et al. *Thorax* 2000; **55**: 789–794, with permission of BMJ Publishing Group.

Globally, the World Health Organization (WHO) estimates that 65 million people have moderate to severe COPD. In the UK, a national study reported that 10% of males and 11% of females aged 16–65 had an abnormally low FEV₁. Similarly, in Manchester, non-reversible airflow obstruction was present in 11% of subjects aged >45 years, of whom 65% had not been diagnosed with COPD. In the UK, an estimated 3 million individuals have COPD but only 1.2 million have a formal diagnosis. In the US, an estimated 24 million have evidence of impaired lung function consistent with COPD, while 12.7 million US adults have diagnosed disease. In a study of 12 countries in Europe, North America, China, Australia, South Africa and the Philippines, the prevalence of COPD in those over the age of 40 years based on lung function criteria was 10.1%, being more common in males (11.8%) than females (8.5%). The prevalence of COPD increases with age, almost doubling with each decade from the age of 40 years. In the UK, the lifetime prevalence of diagnosed COPD has been reported to be increasing and is more common in males than females. In contrast, in the US the prevalence of COPD has been reported to be stable, with the disease being more common in females. COPD is associated with socioeconomic deprivation. In a systematic review, individuals from the lowest socioeconomic strata were at least twice as likely to have COPD when compared with more affluent individuals, regardless of the population studied, metric of socioeconomic status or COPD outcome investigated (Figures 1.4, 1.5).

Mortality

Globally, COPD was ranked sixth as the cause of death in 1990, but with the ageing of the world population, the epidemic of cigarette smoking in developing countries and reduced mortality from other currently common causes of death (e.g. ischaemic heart disease and infectious diseases), it is expected that COPD will become the third leading cause of death worldwide by 2030. In 2012, an estimated 6%

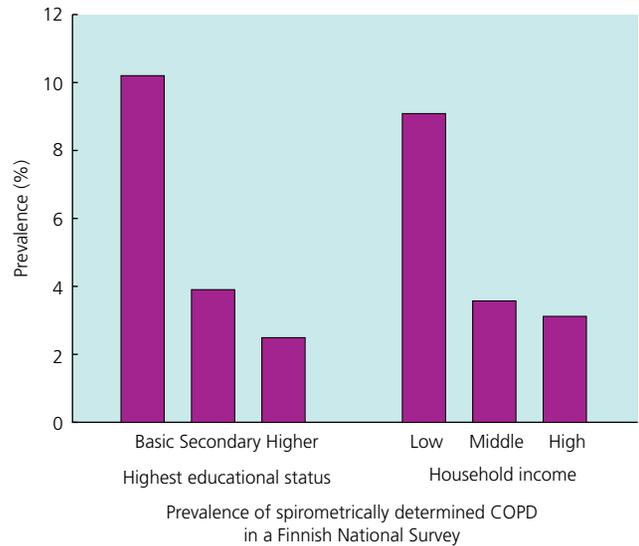


Figure 1.4 Prevalence of COPD confirmed by spirometry in a Finnish National Survey: association with metrics of socioeconomic status. Figure derived using data from Kanervisto M et al. Low socioeconomic status is associated with chronic obstructive airway diseases. *Respiratory Medicine* 2011; **105**: 1140–1146.