

The Excess Cost of Acute Exacerbations of Chronic Bronchitis in Patients Aged 45 and Older in England and Wales

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ABSTRACT

Introduction: Chronic Bronchitis is a serious and costly health problem. Prevalence is estimated at 45 per 10,000 persons in the United Kingdom. Approximately £120,000 would be saved for every 100 hospital admissions avoided. A reduction in acute exacerbations of chronic bronchitis (AECB), treatment failures, and subsequent hospital admission could have a significant impact on the burden of AECB borne by secondary care facilities in the UK National Health Service (NHS).

Objective: The aim of this study is to provide an economic assessment of the direct cost to the health care system associated with the management of chronic bronchitis and its acute exacerbations.

Design: A prevalence-based, excess-cost-of-illness analysis is undertaken from the perspective of the UK NHS. Disease prevalence data, primary health care resource utilization, hospital inpatient and outpatient resource utilization, and costs of health care were taken from a variety of data sources, including a large UK national survey of general practice (GP) consultations, the General Practice Research Database, a survey from a single NHS hospital trust, and the national health-care resource and cost statistics.

Results: From 1994 to 1995, approximately 233,000 cases of chronic bronchitis were detected in the persons aged 45 and older in the United Kingdom. Prevalence peaked at 204 per 10,000 in the group of subjects aged 75 to 84 years. During that same period, the total excess cost of primary care associated with AECB was calculated at £35.7 million. The largest component of primary care costs was the excess cost of all prescription medicines, which totaled £27.8 million. The excess cost attributed to antibacterial and respiratory prescription medications alone was estimated at £9 million. Excess costs attributed to GP consultations and hospital emergency room visits were £6.5 million and £1.3 million, respectively. The excess costs arising from inpatient hospital episodes included £8.3 million for hospital admissions, £660,000 for outpatient costs, and £225,000 for day care.

Conclusions: These results suggest that improving the management of AECB with the objective of reducing the number of AECB treatment failures and the associated hospital admissions could significantly reduce expenditures by the UK NHS.

Keywords: acute exacerbations of chronic bronchitis, chronic bronchitis, cost of illness, health economics.

Introduction

Chronic bronchitis, which forms part of the group of diseases classified as chronic obstructive pulmonary disease (COPD), is a major disease in its own right and has an estimated overall prevalence of 45 cases per 10,000 people in the United Kingdom. Prevalence increases with age, rising from approximately 7.5 per 10,000 in persons aged 25

to 44 years to over 65 per 10,000 in persons aged 45 to 64 years, and peaks at over 200 per 10,000 in persons aged 75 to 84 years. Although a 14% increase has been reported in the prevalence of all respiratory disorders during the 10-year periods from 1981/1982 to 1991/1992, the prevalence of chronic bronchitis has fallen by approximately 30% in males and approximately 10% in females [1]. Despite a decrease in prevalence, chronic bronchitis remains a serious health problem with a major economic impact on the health-care system.

The diagnosis of chronic bronchitis is based on history and clinical assessment. The disease is highly

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correlated with a history of cigarette smoking and previous bronchial infections. It is a chronic condition with recurrent exacerbations, the majority of which are caused by bacterial infection. Treatment of chronic bronchitis and the acute exacerbations of chronic bronchitis (AECB) is relatively straightforward, the first-line of treatment being antibacterial agents; however, increasing resistance to these agents has been noted [2]. Such resistance, which has been linked to the overall use of antibacterial drugs, can result in first-line treatment failure with a consequent impact on the management of AECB [3]. Possible causes of first-line treatment failure include inappropriate antibacterial treatment, either because an unsuitable antibiotic was chosen or an incorrect dosage was used. Treatment failure can lead to substantial health-care costs [4].

There have been few economic studies of lower respiratory tract infections (LRTIs), of which AECB is an important contributor, along with community-acquired pneumonia. Data published on the health economics of AECB are even more limited. One prevalence-based burden-of-illness study estimated direct National Health Service (NHS) costs of community-acquired LRTI at £1364 million, or approximately 0.5% of the NHS budget, incurred in treating 16.3 million cases in 1992–1993 [5]. Bronchitis alone accounted for approximately 30% of this cost. Backhouse et al. [4] used a decision-analytic modeling approach to study the cost-effectiveness of alternative antibiotic regimens in the treatment of AECB. Given the shortcomings of the data, extensive sensitivity analysis was undertaken. The analysis determined that the main cost drivers were the cost of the drug therapy and the cost of treatment failure, in terms of additional use of the health service.

The aim of this study is to provide a more complete economic assessment of direct costs to the health-care system for management of AECB and the consequences of treatment failure. To do so, an excess-cost-of-illness analysis was undertaken from the perspective of the UK NHS [6].

Methods

Cost-of-Illness Analysis

Two main methods can be used to calculate the cost of illness: The “top-down” approach uses aggregate data on hospital admissions, outpatient clinics, general practice (GP) consultations, and other readily available national data that can be attributed to the disease under study. The second,

or “bottom-up” approach uses prevalence data combined with data on disease and treatment probabilities to construct an estimate of the annual volume of treatments and resultant costs.

Cost-of-illness studies are a means of calculating the resource impact of a disease on a population, and the analysis can be undertaken on a prevalence or incidence basis. A prevalence approach, which focuses on the average number of cases treated during a given time interval—1994–1995 in this case—was adopted for this analysis. Cost-of-illness studies based on incidence of a disease are able to show the consequences of changes in the incidence of the disease. This type of study is best used when investigating a preventive measure wherein the benefits can be measured in terms of numbers of cases avoided. Cost-of-illness studies, based on disease prevalence, estimate the total annual health-care expenditure and are relevant for chronic diseases for which treatment is needed over long periods of time. This consideration led us to use the prevalence-based approach in this study.

The current analysis is mainly concerned with the excess cost of primary-care treatment and the costs of treatment failure. The concept underlying this approach is that the true burden of a disease is the excess burden imposed on society by that disease. This excess burden results from increased use of health-care resources, which exceeds use of such resources by the general population. This is most important in instances where, for example, diagnosis is difficult or where attribution of the health-care services used to the disease under study is not straightforward. Under such circumstances, it may be misleading to identify only recorded cases of the disease for the purposes of a cost-of-illness analysis. It is more justifiable, in the sense that it is more inclusive, if the excess rate of health-care utilization is identified. In this analysis, the diseased population is identified and compared with an equivalent healthy population and excess likelihood of health-care utilization is calculated.

Given that the authors are particularly concerned with the management of chronic bronchitis and its acute exacerbations, as well as with treatment failure, we make use of a variant of the “bottom-up” approach. We identified the health-care resources used in treatment and management of chronic bronchitis and AECBs and obtained costs for the identified resources. The prevalence of chronic bronchitis is taken from a large national study of GP consultations, and this information allowed us to identify our population of interest [1]. The prevalence rate is based on individuals who consulted a GP practice at

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