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The economic burden of chronic obstructive pulmonary disease (COPD) in a U.S. Medicare population ☆

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Summary
Rationale: Although the economic burden of COPD has gained attention in recent years, data on the costs of COPD among U.S. Medicare beneficiaries are lacking.
Methods: This study used administrative claims and eligibility records from a large U.S. multi-state Medicare managed care database. Study patients were 65+ years of age with paid claims during 2004. The COPD cohort comprised patients with 1+ inpatient/ER claims or 2+ outpatient claims (>30 days apart) for COPD (ICD-9-CM codes 491.xx, 492.x, 496). The comparison cohort included patients without COPD matched 3:1 to the COPD cohort on age, sex, enrollment months, and Medicare plan. Excess costs of COPD were estimated as the difference in overall health plan payments between the two cohorts during 2004. Attributable costs were calculated using medical claims with listed diagnoses of COPD or other respiratory-related conditions and pharmacy claims for respiratory medications.
Results: A total of 8370 patients were included in the COPD cohort and were matched to 25,110 comparison cohort patients. For both groups, mean (SD) age was 78 (8) years, 54% were female, and duration of eligibility was 11 (2) months. COPD patients were more likely to utilize healthcare services and had excess total healthcare costs about $20,500 higher ($P < 0.0001$) than the comparison cohort. Comorbidities were high in the COPD cohort, accounting for 46% of the observed excess cost. The attributable cost of COPD averaged about $6,300; other respiratory-related costs averaged about $4,400.

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Conclusion: In this U.S. Medicare managed care population, COPD posed a substantial burden in terms of both respiratory-related and total healthcare costs. A comparison of these cost-of-illness estimates to those for elderly COPD patients in other countries would be of great interest, given the increasing age of populations in most Western countries.
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Introduction

Chronic obstructive pulmonary disease (COPD) is a slow progressive disease characterized by airflow limitation and gradual loss of lung function that is not fully reversible.[1] It is estimated that over 12.1 million U.S. adults (4.3%) were diagnosed with COPD in 2001 and 24 million overall (8.5%) have evidence of impaired lung function.[2] According to the World Health Organization (WHO), at present, an estimated 80 million people worldwide have moderate to severe COPD.[3] The burden of COPD is increasing and this trend is expected to continue as the populations of many Western countries age.[1]

The term COPD includes chronic bronchitis and emphysema.[4] Symptoms of COPD include cough, sputum production, wheezing, and dyspnea, with the latter being the most prominent and disabling symptom and the most common reason patients seek medical care.[5] Diagnosis is usually made on the basis of medical history, physical examination, and results from pulmonary function testing.[4] Treatment options for COPD are largely aimed at symptom control and reducing acute exacerbations; these include inhaled and oral bronchodilators, anti-inflammatory drugs, and supplemental oxygen.[4]

COPD also poses a substantial economic burden. Several published studies have evaluated the mean per-patient cost of COPD from the perspective of national health authorities or specific payers. Cost estimates are available from the Confronting COPD Survey for seven major countries.[6] For the U.S., COPD cost information is available for Medicaid and commercial managed care, while other analyses have included all payers, using data from national surveys.[7–14] However, to the best of our knowledge, only one published study focused on the cost of COPD among Medicare beneficiaries.[8] That study used data that are more than a decade old, suggesting the need for analyses that reflect current medical practice.

The objective of the current study was to estimate the excess costs of COPD for patients enrolled in U.S. Medicare managed care plans and to place these findings in the context of international data. In the U.S., over 43 million persons are enrolled in Medicare, which primarily covers the aged (65 years and older) population, and which enacted a new program in 2006 to cover outpatient prescription medications.[15] Medicare spending accounts for over 20% of all U.S. national healthcare expenditures.[16]

Methods

Data source

The PharMetrics Patient-Centric Database was used for this cross-sectional study. This database contains complete healthcare information for approximately 55 million enrollees from 75 managed care organizations across each of the U.S. census regions (i.e., Northeast, South, Midwest, West). In addition, this database contains claims records for several million Medicare managed care enrollees and captures drug utilization covered under the health plans. A standard extract from the PharMetrics database was provided to us for analysis that included claims details along with eligibility data.

The claims file contained a number of specific elements for medical and pharmacy claims. Medical claims captured details regarding dates of service, place of service (e.g., hospital inpatient), physician specialty, up to 4 ICD-9-CM codes, procedure codes (in CPT-4, HCPCS level II, or revenue code format), charges, and health plan payments. Pharmacy claims included details on dispense date, National Drug Codes (NDC), quantity of medication dispensed, days' supply, and health plan payments. The eligibility file contained details on monthly medical and pharmacy eligibility, age, sex, and geographical region for individuals who were present in the claims file.

To ensure completeness of the data, records from Medicare risk plans that had known carve-outs for Medicare services (e.g., capitated skilled nursing facility and home healthcare coverage) were excluded from the final analytic database.

Patients

All patients were required to be at least 65 years of age as of January 1, 2004. Medicare beneficiaries were assigned to one of two study cohorts, as follows:

COPD cohort

Patients were eligible for the COPD cohort if they: (1) had 1 or more inpatient or emergency room claims, or 2 or more outpatient claims (separated in time by at least 30 days), with any listed diagnosis of COPD (ICD-9-CM codes 491.xx, 492.x, or 496) during 2004; and (2) were eligible for medical and pharmacy benefits in the Medicare risk plan during the month(s) of their COPD claim(s).

Comparison cohort

Patients were candidates for inclusion in the comparison cohort if they: (1) had no claims with a listed diagnosis of COPD in 2004, but had 1 or more medical claims with a valid ICD-9-CM diagnosis code for any other condition; and (2) were eligible for medical and pharmacy benefits in the Medicare risk plan during the month of their non-COPD claim.

Each COPD patient was matched to 3 patients from the comparison cohort based on age (within ± 2 years), sex, months of enrollment during 2004 (within ± 2 months), and the specific Medicare risk plan. One patient was

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