

Health Services Burden of Undiagnosed and Overdiagnosed COPD



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BACKGROUND: Misdiagnosis of COPD is common. The goal of this study was to quantify the health services burden of undiagnosed and overdiagnosed COPD in a real-world, North American population.

METHODS: A population-based cohort study was conducted. Presence of COPD using spirometry was ascertained in randomly selected adults aged ≥ 40 years from Ontario, Canada, who participated in the Canadian Obstructive Lung Disease study. The presence of physician-diagnosed COPD was ascertained for the same subjects by using linked health administrative data. Participants were then categorized into four groups: correctly diagnosed, undiagnosed, overdiagnosed, and no COPD according to either criteria. Age- and sex-standardized rates of hospitalizations, ED visits, and ambulatory care visits in each group were determined and compared.

RESULTS: Of 1,403 participants, 13.7% had undiagnosed COPD, 5.1% were overdiagnosed, and 3.7% had correctly diagnosed COPD. Subjects with overdiagnosed COPD had significantly higher rates of hospitalizations, ED visits, and ambulatory care visits, and subjects with moderate to severe undiagnosed COPD had higher rates of hospitalizations, than subjects in the non-COPD population.

CONCLUSIONS: Undiagnosed and overdiagnosed COPD contribute to significant health care burden. Given that misdiagnosed COPD was fivefold more common than correctly diagnosed COPD, these findings point to a substantial misdiagnosis-associated burden of disease that might be prevented, at least in part, with a correct diagnosis.

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KEY WORDS: COPD; health services use; overdiagnosis; underdiagnosis

ABBREVIATIONS: aRR = adjusted rate ratio; GOLD = Global Initiative for Chronic Obstructive Lung Disease

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COPD is the third leading cause of mortality globally, affecting about 10% of adults, and is a leading cause of hospitalization.¹⁻⁵ Worldwide, studies have shown that approximately 60% to 86% of people with COPD remain undiagnosed,⁶⁻⁸ which represents a missed opportunity to delay disease progression and improve health through tools such as smoking cessation support.³ Overdiagnosed COPD is also common, affecting about one-third of patients labeled with COPD in the primary care setting.⁹⁻¹¹ Such inaccuracy can lead to unnecessary COPD treatments with their attendant risks and costs, poor quality of life, and lost opportunity to treat other diseases.¹²⁻¹⁴

Little is known about the health-care burdens of individuals with undiagnosed or overdiagnosed COPD. Individuals with undiagnosed COPD might be misdiagnosed as having other conditions, such as recurrent pneumonias, incurring burdens that should be attributed to COPD and which might be reduced if COPD was identified and treated. Alternatively, overdiagnosed patients might carry burdens that could be reduced by identifying their real cause. A previous study, performed by members of our research group, reported that health services rates for respiratory events in subjects with undiagnosed COPD and diagnosed

COPD were comparable, thus concluding that the health service burden of undiagnosed COPD was considerable.¹⁵ There were, however, several limitations to the study. First, it was based on self-report, which is subject to recall bias.¹⁶ Second, the study only considered health services for respiratory events and not other conditions associated with COPD. Third, it examined rates in subjects with undiagnosed COPD after they had been correctly diagnosed. Finally, it was underpowered to detect significant differences in hospitalizations and ED visits. A study conducted in the United Kingdom confirmed that individuals with undiagnosed COPD used considerable health services but did not compare their use with that of the general population.¹⁷ We are not aware of any studies that have examined the all-cause health services burden of overdiagnosed COPD on a population level.

The present study was conducted to quantify and compare rates of all-cause health services in a large, population-based cohort of subjects with undiagnosed and overdiagnosed COPD, prior to them being correctly diagnosed. Previously, we had studied the same cohort of subjects to determine risk factors for overdiagnosed and underdiagnosed COPD.¹⁸ Some of these data were presented as an abstract.¹⁹

Subjects and Methods

Study Design

A population-based, longitudinal cohort study using clinical and health administrative data was conducted. Ethics approval was obtained from the institutional review board at Sunnybrook Health Sciences Centre; this approval included a waiver of informed consent.

Data Sources

The Canadian Obstructive Lung Disease (COLD) study is a population-based trial that prospectively gathered health information, including spirometry before and after bronchodilator administration, on a random population-based sample of adults aged ≥ 40 years

from Ontario (Toronto, Ottawa, and Kingston and their surrounding areas) between 2007 and 2011. Details of its design, which are similar to previously published Burden of Obstructive Lung Disease (BOLD) studies, can be found elsewhere.¹ The COLD data were linked on an individual level with the use of unique encoded identifiers to health administrative data from Ontario, Canada, a province with universal public health insurance that is the single payer of all medically necessary services across all providers and hospitals; the data were analyzed at the Institute for Clinical Evaluative Sciences. Four Ontario health administrative databases were used. The Ontario Health Insurance Plan database captures information on virtually all claims submitted by physicians. The Canadian Institute for Health Information Discharge Abstract Database and the National Ambulatory Care Reporting System Database contain information on all hospitalizations and ED visits, respectively. The Ontario Registered Persons Database collects and maintains demographic information and date of death. Details of these databases can be found elsewhere.²⁰

Study Groups

All participants in the COLD study from Ontario were included. All received spirometric assessment at study entry, which was their index date. Those who had incomplete spirometric data or whose data could not be linked to health administrative records were excluded. True COPD was determined, as in the previously published Burden of Obstructive Lung Disease (BOLD) studies,¹ using spirometry and the Global Initiative for Chronic Obstructive Lung Disease (GOLD) definition with a postbronchodilator fixed ratio of $FEV_1/FVC < 0.7$.³ Real-world physician-diagnosed COPD, an entity known to be imperfect, was determined from the health administrative data in the period of time prior to study entry using a

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