

Identifying Patients With Undiagnosed Chronic Conditions: An Examination of Patient Costs Before Chronic Disease Diagnosis

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Abstract

Purpose: Identifying chronic conditions at earlier stages could produce dramatic savings to the health care system. This study sought to determine whether patients with chronic conditions experienced higher medical costs and imaging costs than patients with nonchronic conditions before the onset of chronic disease.

Methods: This retrospective study linked 2004–2012 Medicare Chronic Conditions Warehouse data to Medicare fee-for-service claims data, to examine whether elderly patients that have chronic conditions experienced higher overall medical costs, imaging costs, and imaging share of costs before their diagnosis, compared with patients who have nonchronic conditions, during the same period. Student's *t* tests were conducted comparing the mean annual costs and imaging share for patients with chronic conditions and patients with nonchronic conditions, for the six years before their diagnosis and two years afterward.

Results: Imaging costs for patients with chronic conditions were 9 times higher ($P < .001$) for 6 years before they were diagnosed with a chronic condition; overall medical costs were 18 times ($P < .001$) higher than those for patients with nonchronic conditions. A significant ($P < .001$) but small difference was found between the mean imaging share for patients with, versus without, a chronic condition, up until two years before diagnosis, at which point overall medical costs, imaging costs, and imaging share dramatically increased.

Conclusions: Overall medical costs and imaging costs for patients with chronic conditions are significantly and substantially higher than those for patients with nonchronic conditions for many years before they are diagnosed with chronic conditions. Tracking health care expenditures may identify patients with chronic conditions sooner, potentially producing large savings within the health care system.

Key Words: Chronic conditions, imaging, health care expenditures

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INTRODUCTION

Approximately 157 million Americans are expected to have at least one chronic condition by 2020—an 18% increase from the 133 million Americans diagnosed as chronically ill in 2005 [1]. Expenditures related to chronic conditions currently represent three-quarters of all US health care spending [2] and are widely cited as a critical

driver of overall Medicare costs [3–5]. Given that the risk of chronic conditions increases with age and longevity, Medicare expenditures are expected to grow with the shift toward an aging population [6–9]. Most elderly Americans have more than one chronic condition [4,9], with 23% of Medicare recipients having five or more conditions [6]. As chronic conditions often become more costly the later they are identified [10–12], identifying chronic conditions at earlier stages could produce dramatic savings to the health care system, with some estimates as high as \$1.1 trillion annually [13].

CMS has attempted to address the need to identify the onset of chronic disease quickly, along with greater overall care coordination, by extending coverage to both an initial “welcome to Medicare” wellness visit [14] and

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an annual wellness visit [15]. However, many chronic conditions, such as chronic bronchitis [16], chronic kidney disease [17,18], chronic obstructive pulmonary disease (COPD) [19,20], and diabetes [12,21,22] may be difficult to diagnose in the elderly population, and many patients go undiagnosed or misdiagnosed until they manifest acute symptoms.

Previous studies have found that patients who have chronic conditions experience elevated health care costs compared with patients who have nonchronic conditions for extended periods of time before the diagnosis of chronic bronchitis [16] or COPD [19,20]. Although these studies evaluated multiple costs, such as inpatient, outpatient, and outpatient pharmacy costs, no studies, to our knowledge, have examined potential differences in imaging use between patients who have chronic versus nonchronic conditions before a chronic-condition diagnosis. Although the role of medical imaging varies, depending on the disease, on alternative diagnoses being considered, and on downstream complications, imaging is often important for correct patient diagnosis and treatment. Given the importance of medical imaging, we examine whether imaging costs are similarly elevated for patients who have chronic conditions before diagnosis and subsequent treatment for chronic disease.

We hypothesize that patients who have chronic conditions may experience higher costs several years before diagnosis due to the underlying chronic condition to the degree that these costs can be used to direct physician or payer attention to these patients as potential chronic condition patients. As we use Medicare claims data, we are able to focus on the elderly population that drives much of the cost of chronic care. Similarly, by exploiting data from the CMS Chronic Conditions Warehouse (CCW), we can examine a broad range of chronic conditions. With a retrospective evaluation of claims data, we examine costs for chronic condition patients with nonchronic condition patients, and find evidence supporting our hypothesis.

METHODS

The ACR's institutional review board waived this retrospective study from the requirement for review. Using the 2004-2012 Medicare CCW files, we constructed two cohorts of patients: a cohort with chronic conditions (CCC) and a cohort without chronic conditions (NCCC). The CCC contained all patients

diagnosed during 2010 with any of the 27 chronic conditions in the CCW (ie, these patients were not identified as having a chronic condition at any point before 2010).

A list of the 27 chronic conditions included in the CCW is available online [23]. We define this year as the chronic index year. We excluded any patients from this cohort that were identified as not having a chronic condition in either 2011 or 2012, to exclude patients who were originally miscoded as having a chronic disease. The NCCC contained all patients who were not diagnosed with a chronic condition across the study period. After linking these data to the Medicare 5% "beneficiary summary files," patients were excluded from both cohorts if they were not continuously enrolled in Medicare Part A and Part B from 2004 to 2012, or were indicated as being deceased at any point in the study period.

The two patient cohorts were linked to 2004-2012 Medicare 5% "research identifiable files" (RIFs), which contain all final-action fee-for-service claims associated with a 5% random sample of Medicare enrollees. Using the 5% RIF inpatient files, outpatient files, and carrier claims files, the total cost of care was calculated for each patient in each cohort by summing the allowed charges on all inpatient, outpatient, and Medicare "physician fee schedule" (henceforth denoted "physician") claims, as follows. For patients in the CCC, total costs of care were summed in 12-month increments, from before and after the date they were initially reported as having a chronic condition in the CCW files. Using these increments, we determined the total costs, inpatient costs, outpatient costs, and physician costs for six years before each patient's identification as a chronic patient, and two years afterward. For patients in the NCCC, the annual costs were summed for each full calendar year, effectively treating January 1, 2010 as the diagnosis index date. Thus, annual costs for the NCCC for 2010 and 2011 were used as control groups for the one-year and two-year annual costs after a chronic-condition diagnosis; 2004-2009 annual costs were used as control groups for the 12-month increments (six in all) before the index year of the chronic-condition diagnosis.

Imaging costs were calculated in similar 12-month increments for patients in both cohorts by summing all the costs for carrier claims that reported a Berenson-Eggers service code that began with "I." The annual imaging share was calculated by dividing the total imaging costs for each patient by the total cost for each

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