The Effects of the DRG-Based Prospective Payment System on Quality of Care for Hospitalized Medicare Patients

An Introduction to the Series

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In 1985, we began a 4-year evaluation of the effects of the diagnosis related groups–based prospective payment system on quality of care for hospitalized Medicare patients. This article provides an overview of the study's background, aims, design, and methods. We used a clinically detailed review of the medical record supplemented by data on postdischarge outcomes drawn from the files of the Health Care Financing Administration and fiscal intermediaries to (1) compare outcomes of care after adjustment for sickness at admission, (2) assess the process of in-hospital care and relationships between processes and outcomes, and (3) assess status at discharge for a nationally representative sample of patients hospitalized before and after prospective payment was implemented.

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THE HEALTH care costs of the Medicare program to the US government have risen substantially over the last 25 years. Under the retrospective payment system in effect during Medicare's first two decades, Medicare expenditures rose at a much higher rate than background inflation.1,2

In 1982, after review of the financial incentives associated with the retrospective payment system, the US Congress passed the Tax Equity and Fiscal Responsibility Act, which placed a prospective cap, beginning in October 1982, on annual operating revenues per inpatient Medicare case at each hospital. This was altered in October 1983 by the introduction of the present prospective payment system (PPS) in which hospitals are paid an amount based largely on flat rates per admission calculated for each of approximately 470 diagnosis related groups. At the same time, the current system of monitoring quality and appropriateness of care by professional review organizations was established.

The new payment system has been successful at slowing the upward spiral of Medicare costs.3 However, because prospective payment contains incentives to decrease length of stay and substitute lower-cost services and procedures, concern has arisen among patients, physicians, and policymakers that, despite the introduction of monitoring by professional review organizations, the quality of care offered to Medicare patients may have declined. Since 1985 we have been conducting a national study funded by the Health Care Financing Administration of the US Department of Health and Human Services to examine the effects of the PPS on quality of care for hospitalized Medicare patients.

We had two audiences in mind in developing this study: clinicians who would like to improve the quality of care for hospitalized patients and policymakers who wish to improve the health care system. The goals of our study were (1) to assess the quality of in-hospital care for Medicare patients aged 65 years and older prior to and subsequent to the implementation of the PPS, and (2) to estimate the effects of the PPS intervention on quality of care by comparing

METHODS

We were not able to conduct a prospective controlled trial of the effects of the PPS on quality of care since virtually the entire country was put on prospective payment at the same time. Instead, we designed a retrospective before-after study in which we contrasted data on 16,758 Medicare patients who were hospitalized in one of five states prior to and subsequent to 1983. We selected calendar years 1981 and 1982 as our pre-PPS study period and July 1985 to June 1986 as our post-PPS period, concentrating half of our sample in each of these periods.

How should quality of care pre- and post-PPS be measured? In looking for differences in quality of care across time periods or hospitals, it is natural to examine patient outcomes such as mortality. But patient sickness at admission also needs to be adjusted for in making outcome comparisons because changes in the burden of illness at admission could explain differences in outcome. Process—what clinicians do to patients—is also important. If outcomes adjusted for sickness at admission change and we do not examine the process of care, how will we know why the change occurred, and which aspects of care are now better and which are worse? Thus, we compared outcomes pre- and post-PPS after adjusting for
sickness at admission. We measured the quality of the process of care by means of explicit criteria and by implicit review by expert clinicians. We established process-outcome links in which better process of care was shown to be associated with better outcomes. Finally, because of the PPS incentive to reduce length of stay, we also measured patient mortality at discharge.

We based our evaluation of changes in quality of care on six diseases: congestive heart failure, acute myocardial infarction, pneumonia, cerebrovascular accident, hip fracture, and depression. In this series of articles we report on results from the first five of these diseases (sample size for the five diseases combined was 14,012); the analysis of the depression data (sample size 2,746) has not yet been completed.

To identify comparable patients pre- and post-PPS, we defined each disease by International Classification of Diseases, Ninth Revision, Clinical Modification codes, so that patients who truly had one of the aforementioned six diseases in either period as the principal reason for admission should have been assigned one of our codes even if there were coding changes over time. We then used strict clinically detailed inclusion criteria to select patients within each disease category.

We used both explicit and implicit measures to assess the process of care. With explicit measurement, each patient's care was compared with predetermined criteria. With implicit measurement, each patient's medical record was assigned a quality of care rating based on a physician's judgment of the adequacy of the care.

After the data were collected, we used regression methods to construct sickness-at-admission scales and to adjust outcomes for sickness at admission. Clinical judgment and Likert scaling were used to construct explicit scales measuring the appropriateness of the processes of care and the level of instability at discharge. Some criteria that went into these scales were relevant to all patients and some only to subsets of patients depending on their clinical needs. We concentrated on aspects of care for which standards of good clinical practice were both unambiguous and stable over time from 1981 to 1986.

In every phase of the study we used a multidisciplinary approach. We drew on clinical expertise in general internal medicine, geriatrics, cardiology, pulmonary medicine, infectious diseases, neurology, orthopedics, and psychiatry. We enlisted physicians in each of our five study states, including physicians from both urban and rural hospitals.

This clinical perspective was complemented by expertise in statistics, psychometrics, economics, health policy, and evaluation sciences. The remaining seven articles in this series give additional details on our design, sampling, and fieldwork; the measurement of sickness at admission; the evaluation of process of care; the implicit measurement of process of care; patient status at discharge; patient outcomes before and after implementation of the PPS, and a summary of the effects of prospective payment and quality of care.

**REVIEW OF THE LITERATURE ON THE PPS EFFECTS**

When we began our study in 1985, little was known about the effects of the PPS on quality of care. Since then; however, other investigators have obtained results that serve as context for this series of articles.

Using a sample of 646 US nonfederal, short-term general hospitals from 1980 to 1985, DesHarnais et al. found that Medicare discharges and length of stay declined significantly after the implementation of the PPS, while use of skilled nursing facilities and home health care increased post-PPS. Mayer-Oakes et al. studying patients in the intensive care units of three hospitals, found a 31% decrease in the number of intensive care unit beds; for patients in the intensive care unit, they found no changes in either patient severity of illness or treatment intensity after the PPS was implemented. They found a reduction in length of stay, both for the overall hospitalization and for the use of the intensive care unit. Despite the reductions in length of stay, mortality in-hospital or at 6 months after hospitalization did not change. More recently, Sager et al. used age-specific national mortality data from 1981 through 1985 to report changes in the location of death after prospective payment; place of death for some patients had moved from the acute hospital to the nursing home. In 1988, Guterman et al. found a reduction in the number of Medicare short-stay hospital admissions, a reduction in length of stay, and an increase in use of discharges to skilled nursing facilities using the Health Care Financing Administration's Medicare Statistical System as a data source.

Fitzgerald et al. in their analyses of hip fracture patients in two large hospitals, reported a reduction in the number of physical therapy sessions and a reduction in length of stay. They found an increase from 38% to 60% in the proportion of hip fracture patients discharged to a nursing home, and an increase from 9% to 33% in the proportion of patients with continued nursing home care at 1 year after discharge. However, found no change in either the proportion of hip fracture patients in one hospital discharged to a nursing home or the proportion in a nursing home at 6 months. Gerety et al. studied hip fracture patients in a tertiary care setting and found shorter length of stay and decreased functional status at discharge post-PPS. Their assessment of outcomes at 1 year after hospitalization showed no difference pre- and post-PPS in the fraction of institutionalized patients. These results emphasize the need for generalizable evidence about the effects of the PPS on quality of care.

**GENERALIZING FROM OUR STUDY DISEASES**

In choosing our six study diseases, we developed the following selection criteria: high prevalence, high mortality (so that changes in quality of care leading to preventable death might be evident), well-defined diagnostic criteria that are readily accessible from data in the medical record, high likelihood of a strong process-outcome link (so that changes in outcome can be related to changes in process), and relative stability regarding what constitutes good care across the entire time period from 1981 to 1986. We also hoped to include medical, surgical, and psychiatric conditions. Four medical conditions (congestive heart failure, acute myocardial infarction, pneumonia, and cerebrovascular accident), one surgical condition (hip fracture), and one psychiatric condition (depression) were selected. The introduction in recent years of thrombolytic agents in the care of acute myocardial infarction may have altered its outcome and thus reduced its eligibility for inclusion in our study. However, the use of these agents in 1985 through 1986 was limited and their efficacy in reducing deaths in people over 65 years of age has not been demonstrated.

We can generalize our results to the population of all Medicare patients with one of our five nonpsychiatric diseases, a population that included 15% of all Medicare admissions and 22% of all deaths within 30 days of admission in fiscal year 1985. But to what extent do our results generalize to Medicare patients with other diseases?

In selecting our conditions, we picked diseases for which changes in process can affect mortality. We cannot comment on changes in quality of care produced by the PPS for patients with terminal conditions such as end-stage cancer. For such patients, quality of care would need to reflect the quality of...
the dying experience, and we did not measure this aspect of care.

Our results probably generalize more readily to other medical conditions than to other surgical and psychiatric diseases. In addition, insofar as we are able to show consistent changes in process of care across all of our conditions, generalization becomes more valid.

Finally, our selection of diseases makes possible a kind of upper bounding or a fortiori argument of the following form: by concentrating on conditions with high mortality and likely strong process-outcome links (i.e., mortality can be prevented), we chose diseases for which one has reason to think that, if quality of care has declined under the PPS and mortality has increased, this decline would be likely to manifest itself in either process or outcome changes. Therefore, if we do not see a deterioration in mortality statistics, the overall detrimental effects of the PPS aggregated across Medicare patients with other diseases cannot be extremely large.

CAVEATS ON THE INTERPRETATION OF OUR RESULTS

In addition to the above remarks about generalization from our diseases, three other major caveats are worth bearing in mind as this series of articles is read.

1. Our design involves a direct comparison between the quality of care given in 1981 through 1982 and in 1985 through 1986. We are able to associate changes in quality with the introduction of the PPS, but definitively identifying which of those changes were caused by the PPS is more difficult, since other aspects of medical care besides the PPS may also have changed from 1981 to 1986.28 We have attempted to confront this by measuring quality of care at multiple time points in both the pre- and post-PPS periods, so that secular trends in medicine that were in place before the PPS was implemented may be at least roughly estimated and removed. Our approach in this series of articles is to present straightforward pre- and post-PPS comparisons (i.e., associations) in all of the articles of this series, except the last one, and to sort out issues of trend and causality in the last article.29

2. We studied quality of care only for hospitalized patients and did not examine questions of access to hospitalization prior to or following the acute hospital stay.

3. Finally, our post-PPS data are from 1985 and 1986. Although all hospitals had changed to a PPS by 1985, payments were still determined in part by the hospital's own costs through 1986. During 1985 and 1986, most hospitals were still profiting under the PPS.

Since that time, PPS payments have been tightened, and yearly Medicare payment increases to hospitals are no longer keeping up with the inflation rate.4,29 On the other hand, changes in length of stay associated with the introduction of the PPS appear to have stabilized and have not continued to decline in recent years.29 Our results, therefore, may be suggestive of the state of affairs in 1990, but it seems wise to continue to collect clinically detailed data on monitor sickness at admission, process of care, and outcomes on a regular basis as long as prospective payment is in place.

This series presents the results of our analyses of the impact of the diagnosis related groups-based PPS on quality of care for hospitalized Medicare patients.

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References


