AN ANALYSIS OF HOSPITAL PRODUCTIVITY

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ABSTRACT

An 5-year long analysis of hospital’s productivity in delivering inpatient care was carried at the Istituto Dermopatico dell'Immacolata, a Research Hospital (335 beds) in Rome specialised in dermatology and vascular surgery. The study aimed at evaluating the impact of a new financing system for inpatient care based on cases treated as measured by DRG and implemented in January 1, 1995. Before this date, hospital activity was financed on the basis of beddays consume. Hospital performance is measured on the basis of the inputs required by the output of each hospital unit. Inputs (e.g. staff hours; supplies) are measured as costs adjusted to the inflation in the prices of hospital inputs. Output is measured as case-mix adjusted discharges. The production of the hospital discharges is then viewed as combining two components: days per discharge and inputs per day. The results show that the annual increase in inpatient costs per discharge has fallen dramatically in the first two years: - 26,2% in 1995 (as compared to 1994) and – 15,6% in 1996. The trend turned about in 1997 and 1998 with an annual percent increase of about 5 %. The average length of stay dropped during the first three years (-29%, -31%; and –11% respectively) and decreased slightly in 1998 (-1,8%). The change in the inputs used per day increased throughout the study period: 4,2% in 1994; 22,6% in 1995; 18,3% in 1997; and 7% in 1998. The differences among the annual changes in the three components of the model narrowed over time. The percent change in the values of the variables levelled off and came close to zero. The trend is toward a different hospital production function based on a considerably lower cost per discharge, a more than halved length of stay, partly offset by an increase in the intensity of service per day.

KEYWORDS: DRG, productivity, discharge abstracts.

BACKGROUND
The "backbone" of the Italian National Health Service Reorganisation Act can be identified in the new financing system of inpatient care implemented as from January 1, 1995 (1, 2). The unit of payment is derived from the 10th revision of the Health Care Financing Administration Diagnosis Related Groups, a patient classification system which measures case-mix according to 489 final groups (3,4). The financing system establishes a fixed reimbursement for each case (5, 6). This has led to an increase in the financial risk for providers because the amount of money is no more linked to hospital specific costs per case, but it varies according to the DRG assigned, the discharge status, and the length of stay. Before January 1, 1995 hospital activity was financed on the basis of historical expenditures for public hospitals and of beddays consumed for private hospitals.

OBJECTIVES

The aim of this study is to evaluate the impact of the new financing system on the hospital productivity, four years after its implementation.

METHODS

The study was carried out at the Istituto Dermopatico dell'Immacolata (IDI) - IRCCS, a private Research Institute in Rome having 335 beds, of which 245 assigned to Dermatology units, 60 to Vascular Surgery units and 30 to Plastic Surgery units. The analysis was performed using activity data available from the 67,438 Discharge Abstracts related to the patients discharged by the hospital departments and cost data available from the hospital accounting system (general ledger) from 1994 to 1998 (table 1). Information available from hospital discharge abstract included: district of residence; patient demographics; dates of admission and discharge; discharge status; principal diagnosis and up to three secondary diagnoses coded using the International Classification of Disease, 9th revision, Clinical Modification (ICD-9-CM); up to four surgical procedure codes assigned using ICD-9-CM. Information was available for the following cost baskets: drugs; medical and surgical supplies; hotel; radiology; laboratory; personnel; equipment; technical services; administrative. Health Care Financing Administration Diagnosis Related Groups (HCFA DRG), 10th version, have been utilised to measure case mix. Relative weights per DRG estimated by the Ministry of Health were used to standardise for resource consumption.

<table>
<thead>
<tr>
<th>Year</th>
<th>Crude figures</th>
<th>Weighted % difference</th>
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<tbody>
<tr>
<td></td>
<td>No. of cases</td>
<td>ALOS*</td>
</tr>
<tr>
<td>1994</td>
<td>7.187</td>
<td>15.7</td>
</tr>
<tr>
<td>1995</td>
<td>10.508</td>
<td>11.1</td>
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Hospital performance was measured as the inputs required to produce each unit of hospital output (7). Inputs (e.g. staff hours; supplies) were measured as costs adjusted for inflation in the prices of hospital inputs. Outputs were measured as case-mix adjusted discharges. The production of the hospital discharges was then viewed as the combination of two components: days per discharge and inputs per day. Year 1994 was used as the baseline; changes were estimated on an annual basis as percent differences from the previous year.

RESULTS

The results show that the inpatient costs per discharge has fallen dramatically in the first two years: - 26.2% in 1995 (as compared to 1994) and –15.6% in 1996 (figure 1). The trend turned about in 1997 and 1998, when we observed an annual percent increase of about 5%. If we compare 1998 and 1994 (i.e. the baseline), the percent increase equals –31.5%.

The average length of stay dropped during the first three years (-29%, -31%; and –11% respectively) and decreased slightly in 1998 (-1.8%). If we compare 1998 and 1994, the percent increase is –57.9%. The change in the inputs used per day increased throughout the study period: 4.2% in 1994; 22.6% in 1995; 18.3% in 1997; and 7% in 1998. The increase of that figure from 1994 to 1998 is 62.1%.
Discussion

As compared to the baseline, the trend seems to be toward a different hospital production function, based on a significant lower cost per discharge, a more than halved length of stay, partly offset by an increase in the intensity of service per day.

The differences among the annual changes in the three components of the model narrowed over time. The percent change in the values of the variables levelled off and got close to zero.

The new financing system had an impact on the hospital’s behavior in the delivery of health care; the responses to the financial incentives were directed toward the use of the same capacity – in terms of beddays – to provide health care to a twofold increased number of patients, with respect to those admitted in 1994. The average relative weight per patient – 0.87 in 1994 as compared to 1.02 in 1998 – seems to confirm that the threshold for admission did not lower.

However, these results should be interpreted cautiously because it was not considered in this study the potential effect of the changes observed in productivity on quality of care.

BIBLIOGRAPHY