

## Special Article

## THE ASSOCIATION BETWEEN FOR-PROFIT HOSPITAL OWNERSHIP AND INCREASED MEDICARE SPENDING

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**ABSTRACT**

**Background and Methods** The rate of conversion to for-profit ownership of hospitals has recently increased in the United States, with uncertain implications for health care costs. We compared total per capita Medicare spending in areas served by for-profit and not-for-profit hospitals. We used American Hospital Association data to categorize U.S. hospital service areas as for-profit (meaning that all beds in the area were in for-profit hospitals), not-for-profit (all beds were in not-for-profit hospitals), or mixed in 1989, 1992, and 1995. We then used data from the Continuous Medicare History Sample to calculate the 1989, 1992, and 1995 spending rates in each area, adjusting for other characteristics known to influence spending: age, sex, race, region of the United States, percentage of population living in urban areas, Medicare mortality rate, number of hospitals, number of physicians per capita, percentage of beds in hospitals affiliated with medical schools, percentage of beds in hospitals belonging to hospital chains, and percentage of Medicare beneficiaries enrolled in health maintenance organizations.

**Results** Adjusted total per capita Medicare spending in the 208 areas where all hospitals remained under for-profit ownership during the study years was greater than in the 2860 areas where all hospitals remained under not-for-profit ownership (\$4,006 vs. \$3,554 in 1989, \$4,243 vs. \$3,841 in 1992, and \$5,172 vs. \$4,440 in 1995;  $P < 0.001$  for each comparison). Mixed areas had intermediate spending rates. Spending in for-profit areas was greater than in not-for-profit areas in each category of service examined: hospital services, physicians' services, home health care, and services at other facilities. The greatest increases in per capita spending between 1989 and 1995 were for hospital services (a mean increase of \$395 in for-profit areas and \$283 in not-for-profit areas,  $P = 0.03$  for the comparison between for-profit and not-for-profit areas) and home health care (an increase of \$457 in for-profit areas and \$324 in not-for-profit areas,  $P < 0.001$ ). Between 1989 and 1995, spending in the 33 areas where all hospitals converted from not-for-profit to for-profit ownership grew more rapidly than in the 2860 areas where all hospitals remained under not-for-profit ownership (\$1,295 vs. \$866,  $P = 0.03$ ).

**Conclusions** Both the rates of per capita Medicare spending and the increases in spending rates were greater in areas served by for-profit hospitals than in areas served by not-for-profit hospitals. (N Engl J Med 1999;341:420-6.)

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**F**OR-PROFIT ownership of health plans, hospitals, and other health care facilities has grown dramatically in recent decades. Although for-profit hospitals are still in the minority, accounting for about 12 percent of all U.S. hospitals, 192 hospitals converted to for-profit ownership between 1990 and 1996, and half of these conversions occurred in 1995 and 1996.<sup>1-3</sup> The increasing role of for-profit firms in health care has sparked considerable debate, stemming largely from conflicting views on the theoretical effects of ownership status on organizational behavior. Some analysts fear that the obligation to maximize the shareholders' return on their investment will cause for-profit hospitals to eliminate necessary but unprofitable services and to reduce their provision of charity care.<sup>3</sup> Advocates of for-profit ownership of hospitals argue that greater responsiveness to the demands of the marketplace will lead to higher quality and lower costs to consumers.<sup>4,5</sup>

Information on the costs associated with for-profit hospital ownership, however, is limited. The results of previous studies may not reflect current organizational behavior.<sup>6,7</sup> Although the costs of services at for-profit hospitals have historically been higher<sup>7</sup> than those at not-for-profit hospitals, it is not clear whether this trend has continued in recent years. Several studies have found that services at for-profit hospitals are more costly than those at not-for-profit hospitals.<sup>6,8,9</sup> According to one report, however, services at for-profit hospitals are less costly.<sup>10</sup> The conflicting evidence may result from different definitions of cost. Most studies have focused on unit costs,<sup>6,8,9</sup> such as the cost of a hospital day or a hospital stay. Such studies cannot address two important questions. Are the lower costs of inpatient care counterbalanced by higher costs of other services, such as home health care or services provided in outpatient clinics or other facilities?<sup>11</sup> And does an increase in the overall volume

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of services lead to greater aggregate costs in the community served by the hospital?

Medicare accounts for 20 percent of health care spending in the United States.<sup>12</sup> In this population-based study, we compared annual per capita spending for Medicare beneficiaries in 1989, 1992, and 1995 according to the ownership status of the hospitals located within the hospital service areas where the beneficiaries resided. We examined total Medicare spending as well as spending for specific types of care. We also examined changes over time in per capita spending in areas in which hospitals converted to for-profit or not-for-profit ownership.

## METHODS

### Definition of Hospital Service Areas

Population-based studies of hospital care have long been based on empirically defined hospital service areas or markets.<sup>13,14</sup> We used the definitions developed for the *Dartmouth Atlas of Health Care*, which used 1992 and 1993 data on hospital discharges for Medicare enrollees 65 years of age or older to define 3436 non-overlapping hospital service areas for the 50 states.<sup>15</sup>

### Characteristics of Hospital Service Areas

Using the American Hospital Association's annual surveys for 1989, 1992, and 1995, we classified each hospital service area according to the type of hospital ownership as follows: for-profit (all beds in for-profit hospitals), not-for-profit (all beds in not-for-profit hospitals), or mixed. Hospitals under public ownership were classified as not for profit. We also determined the percentage of beds in each area that were in hospitals belonging to hospital chains and the percentage of beds in hospitals affiliated with medical schools.

On the basis of data and methods used in the *Dartmouth Atlas of Health Care*<sup>16</sup> and the Medicare administrative files, we determined the following characteristics of each hospital service area for the years 1989 and 1995: the number of staffed acute care hospital beds per capita, the number of physicians per capita, the percentage of Medicare beneficiaries enrolled in risk-based health maintenance organizations (HMOs), the number of hospital discharges for Medicare beneficiaries with fee-for-service coverage, and adjusted mortality rates for the Medicare-eligible population (persons 65 years of age or older). Mortality rates were adjusted for age, sex, and race, with the population of Medicare beneficiaries who were 65 years of age or older used as the standard population. Data from the 1990 U.S. Census were used to determine the percentage of persons in each hospital service area who lived in urban areas.<sup>17</sup>

### Study Population

The study population was drawn from the Continuous Medicare History Sample, a 5 percent sample of Medicare beneficiaries selected on the basis of the last two digits of the Social Security number. We restricted the study to Medicare beneficiaries 65 years of age or older who were eligible for Medicare Part A (hospital insurance) and who resided in one of the hospital service areas. Our primary analyses excluded all Medicare beneficiaries who were members of HMOs throughout the given year. For those who were HMO enrollees for part of the year, we included their fee-for-service costs and determined the contribution of these costs to the denominator of rates according to the number of months that they had fee-for-service coverage. We used the same procedure for beneficiaries who died during the year. The rates reported in our analyses represent the rates per person-year of enrollment in fee-for-service Medicare.

### Determination of Medicare Spending

Spending for each Medicare beneficiary was determined from the Continuous Medicare History Sample files, which summarize annual spending overall and according to category of service for each calendar year. We examined per capita spending for the following categories of service: total services (all expenditures), hospital services (acute care inpatient services and outpatient services combined), physicians' services and other Medicare Part B services, home health care services, and services provided by other facilities or programs (skilled-nursing facilities, other facilities providing nonacute care, and hospices). Spending rates for each hospital service area were calculated from the Continuous Medicare History Sample data and were adjusted for age, sex, and race, with the Medicare beneficiaries 65 years of age or older used as the standard population.<sup>16,18</sup>

Because it is more expensive to operate health care facilities in some areas of the country than in others (e.g., because of differences in the cost of labor), cost comparisons that do not account for such differences may lead to biased conclusions: hospital costs in more expensive areas will be greater, independently of any difference in organizational behavior. To adjust for such differences, we used the modification of the Geographic Practice Cost Index<sup>19</sup> that was developed for the *Dartmouth Atlas of Health Care*.<sup>16</sup> We used the Consumer Price Index<sup>20</sup> to adjust for changes in prices over time, so that our reported increases in spending reflect increases in health care costs or utilization above the rate of general inflation. All amounts are reported in 1995 dollars.

### Statistical Analysis

The unit of analysis was the hospital service area. For the crude analyses, we calculated a simple average (weighted according to the Medicare population) of the age-, sex-, and race-adjusted spending rates in each of the 3421 hospital service areas for which we had 1995 data. Analyses of changes in spending over time were restricted to the areas where all hospitals remained under for-profit ownership (208 areas), not-for-profit ownership (2860 areas), or mixed ownership (193 areas) in all three years or to areas where all hospitals converted from not-for-profit to for-profit ownership (33 areas) or from for-profit to not-for-profit ownership (25 areas).

The simple weighted averages do not take into account other potential confounding variables. For example, if many for-profit hospitals were located in the Southeast and health care costs were growing at a more rapid rate in that region than in other regions for reasons unrelated to for-profit ownership, we would conclude incorrectly that for-profit hospitals were associated with greater growth in spending.

To correct for such potential biases, we used multiple linear regression<sup>21</sup> to estimate average expenditures (the dependent variable) in each year — 1989, 1992, and 1995 — according to ownership status, controlling for the following characteristics of the hospital service area: census region of the United States, percentage of population living in urban areas,<sup>17</sup> percentage of beds in hospitals belonging to hospital chains, percentage of beds in hospitals affiliated with medical schools, adjusted Medicare mortality rate, percentage of Medicare beneficiaries enrolled in HMOs, number of physicians per capita, and number of hospitals in the hospital service area. The independent variables included indicator variables for the ownership groups: stable for-profit ownership, stable mixed ownership, conversion to for-profit ownership, and conversion to not-for-profit ownership. Stable not-for-profit ownership was the reference category. The coefficient of each indicator variable represented the absolute dollar difference in spending (dependent variable) between the respective ownership category and stable not-for-profit ownership (the reference category). The P value for each coefficient of the indicator variables represented the level of significance for the difference in spending between the two ownership categories.

We used the "seemingly unrelated regression" model<sup>22,23</sup> to estimate average reimbursement rates in 1989, 1992, and 1995. As implemented in the Stata regression package,<sup>24</sup> the seemingly

unrelated regression model uses a generalized least-squares algorithm. This model accounts for the correlation of the error terms in each equation over time, thus providing efficient linear-regression estimation and hypothesis testing. Regression estimates, weighted according to the Medicare population for the hospital service area, are presented for comparison with the crude averages. (Nonweighted regressions produced similar results.) Estimates of average per capita expenditures were calculated from these models with the use of the average 1989 value for each independent variable across all areas.

**RESULTS**

**Characteristics of Hospital Service Areas**

Table 1 shows the characteristics of 3421 hospital service areas according to the ownership status of the hospitals in each area in 1995. The data are presented as means, with interquartile ranges provided as a measure of variability within each ownership group. Most areas (86 percent) were classified as not for profit; 7 percent were for profit, and 6 percent had mixed ownership. Although 31 states had at least one for-profit hospital service area, the for-profit areas were concentrated in the southeastern United States and in California.

On average, mixed hospital service areas had larger and more urban populations, with a greater number of hospitals within the area, than for-profit or not-for-profit areas. As compared with not-for-profit hospital service areas, for-profit areas had higher admission rates for acute care and the hospitals were more likely to be part of hospital chains but were less likely to be associated with medical schools.

**Total Spending**

Table 2 shows total per capita Medicare spending according to hospital ownership for hospital service areas where ownership status was stable during the study period. Crude average spending (adjusted only for differences in age, race, and sex) was consistently higher in for-profit areas than in not-for-profit areas, but in 1989 and 1992, crude per capita spending in mixed areas was greater than in for-profit or not-for-profit areas.

Table 2 and Figure 1 show per capita spending over time after adjustment for characteristics of hospital service areas that may influence costs. In 1989, the mean per capita expenditure (in 1995 dollars) was \$4,006 in for-profit areas and \$3,554 in not-for-profit areas, a difference of \$452 per capita ( $P < 0.001$ ). In 1995, the total per capita expenditure was \$732 higher in for-profit areas than in not-for-profit areas (\$5,172 vs. \$4,440,  $P < 0.001$ ). In 1989, 1992, and 1995, spending in the mixed areas was lower than in the for-profit areas and was significantly higher than in the not-for-profit areas ( $P < 0.001$  for each year).

**Components of Increased Spending**

Table 3 shows expenditures in the stable hospital service areas according to the category of Medicare service. For each category, absolute spending levels were greater in the for-profit areas than in the not-for-profit areas, with intermediate spending levels in the mixed areas. The greatest absolute differences in

**TABLE 1. CHARACTERISTICS OF 3421 HOSPITAL SERVICE AREAS IN 1995.**

| CHARACTERISTIC                                     | FOR PROFIT (N=256) | MIXED (N=221)               |                  | NOT FOR PROFIT (N=2944) |
|--|--------------------|-----------------------------|------------------|-------------------------|
|  |                    | mean (interquartile range)* |                  |                         |
| Population characteristics                         |                    |                             |                  |                         |
| Urban residents (%)                                | 49 (27-72)†        | 67 (48-91)†                 | 44 (23-64)       |                         |
| Medicare beneficiaries (no.)                       | 5882 (2220-6880)   | 40,264 (12,980-50,480)†     | 7408 (1700-8290) |                         |
| Medicare HMO enrollment (%)                        | 7.0 (0.01-4.8)†    | 10.2 (0.1-15.0)†            | 2.8 (0.01-0.8)   |                         |
| Deaths (no./1000 Medicare-eligible beneficiaries)‡ | 66 (53-77)         | 64 (57-69)                  | 64 (50-74)       |                         |
| Hospitals (% of beds)                              |                    |                             |                  |                         |
| Member of hospital chain                           | 62 (0-100)†        | 54 (28-82)†                 | 29 (0-94)        |                         |
| Affiliated with medical school                     | 2†§                | 33 (0-65)†                  | 11§              |                         |
| Health care resources and utilization              |                    |                             |                  |                         |
| Hospitals (no.)                                    | 1¶                 | 5 (2-7)†                    | 1¶               |                         |
| Acute care beds (no./1000 residents)               | 3.3 (2.6-4.5)      | 3.1 (2.5-3.5)               | 3.0 (2.6-4.4)    |                         |
| Discharges (no.)                                   | 348 (315-429)†     | 312 (284-362)               | 322 (290-381)    |                         |
| Physicians (no./100,000 residents)                 | 176 (144-196)      | 170 (144-187)               | 177 (147-194)    |                         |

\*The interquartile range (25th through 75th percentile values) is shown as a measure of the variability within groups. The distribution of some characteristics (Medicare HMO enrollment, medical school affiliation, and number of hospitals) is quite skewed, so the mean value is outside the interquartile range.

† $P < 0.05$  for the comparison with not-for-profit hospital service areas.

‡Data have been adjusted for age, sex, and race.

§Seventy-five percent of the hospital service areas in this group had no beds in hospitals affiliated with medical schools.

¶Seventy-five percent of the hospital service areas in this group had only one hospital.

TABLE 2. CRUDE AND ADJUSTED TOTAL PER CAPITA SPENDING RATES IN STABLE HOSPITAL SERVICE AREAS.\*

| AREA           | NO. OF HOSPITAL SERVICE AREAS | PER CAPITA SPENDING RATE (\$) |            |            |            |            |            |
|----------------|-------------------------------|-------------------------------|------------|------------|------------|------------|------------|
|                |                               | 1989                          |            | 1992       |            | 1995       |            |
|                |                               | Crude                         | Adjusted   | Crude      | Adjusted   | Crude      | Adjusted   |
| mean±1.96 SE   |                               |                               |            |            |            |            |            |
| For profit     | 208                           | 3,779±243†                    | 4,006±153† | 4,123±233† | 4,243±149† | 5,164±288† | 5,172±190† |
| Mixed          | 193                           | 4,018±293†                    | 3,870±67†  | 4,231±263† | 4,164±67†  | 5,148±341† | 4,899±86†  |
| Not for profit | 2860                          | 3,495±101                     | 3,554±37   | 3,793±96   | 3,841±37   | 4,417±105  | 4,440±49   |

\*Data are for all hospital service areas in which hospital-ownership status remained stable from 1989 to 1995. Crude rates have been adjusted for age, sex, and race. Adjusted rates have been additionally adjusted for the following covariates: region of the United States, percentage of residents in urban areas, percentage of beds in hospitals belonging to hospital chains, percentage of beds in hospitals affiliated with medical schools, adjusted Medicare mortality rate, percentage of Medicare beneficiaries enrolled in HMOs, number of physicians per capita, and number of hospitals in the hospital service area. All rates have been adjusted for inflation and are in 1995 dollars. SE denotes standard error.

†P<0.001 for the comparison with not-for-profit hospital service areas.

the increase in spending over time between for-profit and not-for-profit areas were for hospital services and home health care. The increase in spending for services provided by non-acute care facilities was also greater in the for-profit areas.

**Hospital Conversions**

In 33 hospital service areas, all the hospitals converted from not-for-profit ownership to for-profit ownership between 1989 and 1995, and in 25 areas, all the hospitals converted from for-profit to not-for-profit ownership during the same period. Figure 2 shows the growth in spending in areas where hospital ownership changed, as compared with the growth in areas where ownership remained stable. The increase in per capita spending between 1989 and 1995 was significantly greater in stable for-profit hospital service areas than in stable not-for-profit areas (P<0.001). Areas in which all the hospitals converted from not-for-profit to for-profit ownership also had a significantly greater increase in total per capita spending than stable not-for-profit areas (P=0.03). The increase in per capita spending in areas in which all hospitals converted from for-profit to not-for-profit status was smaller than in areas in which all hospitals remained for-profit, although the difference was not statistically significant.

We used cost data for 1989 and 1992 to determine whether conversion to for-profit ownership occurred in areas with higher underlying rates of increase in expenditures. For the 25 areas that converted to for-profit ownership after 1992, the increase in per capita spending between 1989 and 1992 (\$285) did not differ significantly from the increase in the stable not-for-profit hospital service areas (\$287, P=0.69).

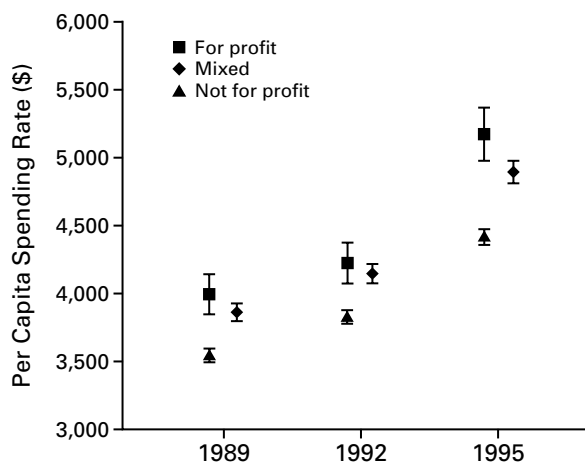


Figure 1. Adjusted Mean Per Capita Medicare Spending Rates in 1989, 1992, and 1995 According to Hospital Ownership.

In each year, total per capita spending was higher for both for-profit and mixed hospital service areas than for not-for-profit areas (P<0.001 for each comparison). All spending rates are in 1995 dollars. Rates have been adjusted for age, sex, race, region of the United States, percentage of the population living in urban areas, percentage of beds in hospitals belonging to hospital chains, percentage of beds in hospitals affiliated with medical schools, adjusted Medicare mortality rate, percentage of Medicare beneficiaries enrolled in HMOs, number of physicians per capita, and number of hospitals in the hospital service area. I bars represent 95 percent confidence intervals.

**TABLE 3.** ADJUSTED PER CAPITA SPENDING RATES IN 1989 AND 1995 IN STABLE HOSPITAL SERVICE AREAS, ACCORDING TO SERVICE CATEGORY.\*

| SERVICE CATEGORY             | PER CAPITA SPENDING RATE (\$) |           | INCREASE FROM 1989 TO 1995 | P VALUE† |
|------------------------------|-------------------------------|-----------|----------------------------|----------|
|                              | 1989                          | 1995      |                            |          |
|                              | mean±1.96 SE                  |           |                            |          |
| Hospital services            |                               |           |                            |          |
| For profit                   | 2,410±104                     | 2,805±120 | 395                        | 0.03     |
| Mixed                        | 2,359±45                      | 2,664±55  | 305                        | NS       |
| Not for profit               | 2,226±25                      | 2,509±31  | 283                        |          |
| Physicians' services         |                               |           |                            |          |
| For profit                   | 1,272±53                      | 1,393±59  | 121                        | NS       |
| Mixed                        | 1,221±24                      | 1,358±27  | 137                        | 0.02     |
| Not for profit               | 1,060±14                      | 1,174±26  | 114                        |          |
| Home health care             |                               |           |                            |          |
| For profit                   | 126±10                        | 583±43    | 457                        | <0.001   |
| Mixed                        | 108±4                         | 486±20    | 378                        | <0.001   |
| Not for profit               | 96±3                          | 420±11    | 324                        |          |
| Services at other facilities |                               |           |                            |          |
| For profit                   | 182±18                        | 367±29    | 185                        | 0.03     |
| Mixed                        | 180±8                         | 356±14    | 176                        | 0.004    |
| Not for profit               | 174±5                         | 324±8     | 150                        |          |

\*Data are for the 208 for-profit, 193 mixed, and 2860 not-for-profit hospital service areas in which hospital-ownership status remained stable between 1989 and 1995. All rates have been adjusted for inflation and are in 1995 dollars. SE denotes standard error, and NS not significant.

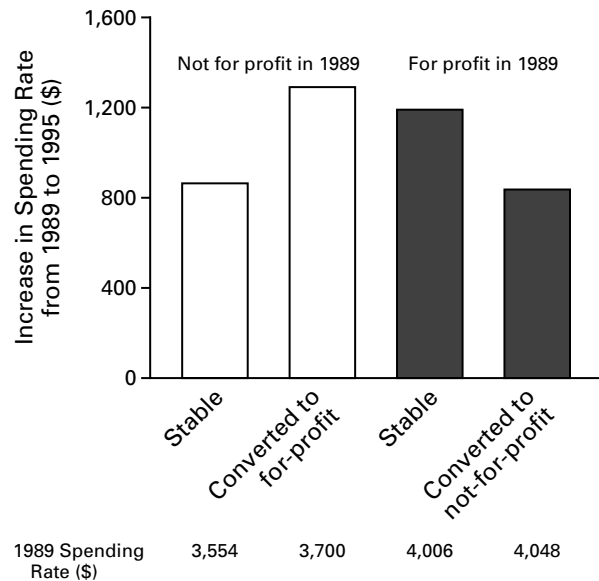
†P values are for the comparison with not-for-profit hospital service areas.

### DISCUSSION

We found that in 1989, 1992, and 1995, per capita Medicare spending in areas served by for-profit hospitals was higher than in areas served by not-for-profit hospitals. When we controlled for potential confounding factors, spending was greatest in areas in which all hospitals were under for-profit ownership, intermediate in areas with both for-profit and not-for-profit hospitals, and lowest in areas in which all hospitals were under not-for-profit ownership. Hospital service areas in which all hospitals converted from not-for-profit to for-profit ownership during the period from 1989 to 1995 had larger increases in spending than areas in which all hospitals retained their not-for-profit status. These larger increases in spending appeared to occur after conversion to for-profit ownership.

Three explanations for our findings must be considered. The higher costs in areas served by for-profit hospitals may be due to specific characteristics of the Medicare populations served by for-profit hospitals, to specific characteristics of hospital service areas that attract for-profit hospitals, or to the organizational behavior of for-profit hospitals.

Might unmeasured differences in the characteristics of Medicare populations in for-profit and not-for-profit areas account for our findings? For-profit hospital markets tend to have high percentages of HMO



**Figure 2.** Increase in Adjusted Mean Per Capita Spending Rate from 1989 to 1995, According to Whether Hospital Ownership Remained Stable or Changed.

The increase in per capita spending was significantly larger in the 208 stable for-profit hospital service areas than in the 2860 stable not-for-profit areas (\$1,166 vs. \$866,  $P<0.001$ ). The increase in per capita spending in the 33 areas in which all hospitals converted from not-for-profit to for-profit ownership was also significantly greater than in the stable not-for-profit areas (\$1,295 vs. \$866,  $P=0.03$ ). The increase in per capita spending in the 25 areas in which all hospitals converted from for-profit to not-for-profit ownership did not differ significantly from the increase in the stable not-for-profit areas (\$837 vs. \$866,  $P=0.86$ ).

enrollees, and greater Medicare HMO enrollment is likely to be associated with a greater severity of illness among Medicare beneficiaries who continue to receive fee-for-service care.<sup>25,26</sup> Thus, the higher level of spending in for-profit areas may reflect the larger volume of services required by Medicare beneficiaries receiving fee-for-service care.

Differences in the characteristics of patients, however, are not likely to provide a full explanation for our findings, for several reasons. First, our primary analyses controlled for the percentage of Medicare beneficiaries enrolled in HMOs in each area. We also included the Medicare mortality rate for each area as a covariate to control for differences in health status. Second, as a further check, we repeated the analysis using the entire population of Medicare beneficiaries 65 years of age or older, including those enrolled in HMOs. Because HMO payments for individual enrollees are not included in the Continuous Medicare History Sample files, we estimated HMO payments for each HMO enrollee using methods of the Health Care Financing Administration. The results were similar to those we have presented. Third, the finding

that the growth in spending rates increased after conversion to for-profit status would be difficult to explain on the basis of changes in the health status of the populations in those areas.

The second possible explanation for our findings is that an attribute of the hospital, other than ownership, or of the area in which it is located led to the increased spending in for-profit hospital service areas. Our analysis took into account medical school affiliation, which is associated with increased costs of hospital care,<sup>27</sup> as well as membership in a hospital chain, which has been associated with lower costs.<sup>28</sup> We also controlled for the number of hospitals in the area, the number of physicians per capita, the degree of urbanization, and the region of the country. Most suggestive, however, is the finding that increases in spending in the areas in which hospitals converted to for-profit status appeared to be larger after the conversion. Although this analysis had limited statistical power because of the small number of areas involved, the results suggest that spending in areas in which hospitals converted to for-profit ownership was neither higher nor growing more rapidly before conversion.

Our findings are also consistent with the hypothesis that the organizational behavior of for-profit hospitals differs from that of not-for-profit hospitals and that these differences in behavior influence Medicare spending. Although not-for-profit and for-profit hospitals may both be sensitive to concern about profitability,<sup>29-31</sup> it appears that they may respond differently to the incentives of the Medicare program. For outpatient hospital services and home health care, there are clear financial incentives to increase utilization, since both types of care have been reimbursed on a fee-for-service basis with few restrictions.<sup>32</sup> We cannot, however, distinguish among several possible explanations for the higher per capita expenditures for inpatient care in for-profit areas, because our analyses rely on summary annual data for each patient rather than on individual billing records. Reports in the news media suggest that some for-profit hospital chains may have been "up-coding" diagnosis-related groups and thereby increasing the Medicare reimbursement,<sup>33,34</sup> but differences in the cost per admission or in admission rates may also play a part. Further research based on individual-level claims data and hospital-specific cost reports would be required to distinguish among these possibilities.

Several other limitations of our analyses deserve consideration. First, although the adjusted spending levels in mixed hospital service areas were intermediate between the levels in the other two ownership groups, we did not specifically determine how not-for-profit and for-profit hospitals may influence each other's behavior. Second, our study could not address possible differences in the quality of care or amenities provided to Medicare beneficiaries. Although oth-

er studies have found no systematic differences in quality according to hospital ownership,<sup>6,29</sup> it is possible that residents of for-profit areas benefit from the higher spending levels. Finally, our analysis was restricted to the Medicare population; for-profit hospitals may have different ways of managing the costs and utilization of services for privately insured patients under the age of 65 years.

Many factors must be taken into account as future conversions of not-for-profit hospitals to for-profit ownership are evaluated.<sup>7,35</sup> The direct costs to the community, however, remain an important consideration. At the very least, our data do not demonstrate any cost savings associated with for-profit ownership. Our findings are consistent with the possibility that for-profit hospital ownership itself contributes to higher per capita costs for the Medicare populations served by these hospitals.

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