Comparative trends in hospital expenses, finances, utilization, and inputs, 1970-81

by Jerry Cromwell, Helene T. Hewes, Nancy L. Kelly, and Saul Franklin

Introduction

For 15 years after the introduction of Medicare and Medicaid in 1966, health costs were rising at an annual rate of more than 12 percent. Expenditures for the hospital sector alone were climbing at approximately the same rate. Health spending, which claimed 6.2 percent of the gross national product in 1965, took up 8.9 percent of the national product in 1980. Both private and public health spending reflected this growth, with Medicare and Medicaid costs rising from $1 billion to $2 billion initially to nearly $50 billion in 1981 (Freeland and Schendler, 1981) while private spending quadrupled over the same period.

Over the 10-year period of the 1970's, total Medicare enrollees grew by more than 7 million, a 3.4 percent annual compound growth (Muse and Sawyer, 1982). Payments, however, grew almost five times faster, or 15.8 percent. Thus, program enrollment growth explained only about one-fifth of Medicare program cost inflation.

Focusing more directly on hospital care, total Medicare discharges grew 5.6 percent annually between 1970 and 1978, or 2.1 percent on a per enrollee basis (Muse and Sawyer, 1982). Total days of care grew much more slowly, however, producing a slight decline in days per enrollee, -0.4 percent annually. Length of stay fell 2.1 percent annually, or 2 days in 8 years. Hospital payments per enrollee grew 11.6 percent annually over the decade, two points higher than on a per discharge basis (9.5 percent).

The 1980's ushered in a new era of slower growth, attributable in significant part to Medicare's innovative prospective payment system (PPS), which limits the rate of increase in payments to hospitals.

Medicare hospital outlays rose by only 5.5 percent in fiscal year 1983, the smallest rate of increase in the history of the program (U.S. Department of Health and Human Services, 1986). Medicare days of care, which fell by less than one-half a percentage point a year in the 1970's, fell 10.5 percent in the first year of the PPS and 13.0 percent in the second year (U.S. Department of Health and Human Services, 1986). Such remarkable reversals in historical trends demand explanation. In particular, how much of the decline in the utilization of and cost inflation in hospitals can be explained by the switch from retrospective to prospective payment for Medicare?

In answering this question, it is valuable to look back and describe in some detail the experience of the previous decade. Existing literature and data on many aspects of hospital performance are surprisingly limited—surprising given the plethora of data available from annual surveys of the American Hospital Association (AHA). What is missing is hospital-specific information on revenues, financial status, Medicare costs and utilization, and assets and investment that would permit comparative trends in utilization, expenses, finances, and inputs by urban-rural location, bed size, teaching status, and ownership. This article contains such information based on heretofore unpublished Medicare cost report data, showing where the hospital industry was in 1970 near the beginning of Medicare and Medicaid and how it evolved over the decade. The data were collected as part of a 6-year longitudinal study of prospective rate setting in 15 States funded by the Health Care Financing Administration (HCFA).

Important decadal trends are highlighted in this article. A more extensive set of tables and discussion are available in Cromwell, et al. (1986).

The rest of the article is in six sections. First, the data sources, sampling methods, and mode of presentation are discussed. This is followed by a set of...
descriptive results grouped into the following four areas:

- Revenues, expenses, and financial status.
- Utilization (including admissions and lengths of stay).
- Assets, investment rates, and age of capital stocks.
- Employees and salaries.

In the concluding section, a few comparisons of the 1970's experience with that of the post-PPS world are made.

**Data sources and methods**

**Sample frame**

The sample frame for this descriptive analysis of the 1970's relied on the hospital year as the unit of observation, based on a list of all short-term general hospitals that responded to the AHA annual survey in any year between 1969 and 1976, inclusively. A one-quarter random sample of all U.S. short-term general hospitals was drawn, resulting in a full sample of between 1,300 and 1,400 hospitals per year, with observations covering all or part of the 1969-81 period. The year 1969 was excluded from the analysis as the Medicare cost reports did not extend back to that year. For some variables (e.g., hospital revenues, financial status, and investment), Medicare cost report data for the early 1980's were unavailable, limiting analysis of these variables to the 1970-79 period.

**Data bases**

The hospital file was constructed from two sources: AHA Hospital Annual Survey Statistics and the HCFA Medicare Cost Reports.

AHA Survey Statistics tapes provided information on bedsize, ownership, teaching status, and facilities and services. These data are well known and require no additional elaboration. This leaves the Medicare cost reports, a source much less familiar to the average researcher.

The Medicare cost report (MCR) is completed annually by all Medicare-participating hospitals for purposes of Medicare reimbursement. These detailed statistical and financial reports are audited by Medicare's fiscal intermediaries to assure that the amounts paid to each hospital compensate for services provided to patients covered by the Title V, XVIII, and XIX programs. Reports were collected for approximately 2,500 hospitals annually from 1970 to 1981 as part of the HCFA-funded National Hospital Rate Setting Study, approximately one-half coming from the one-quarter random national sample described above and the other one-half coming from a supplement in 15 rate-setting States. Only data on the one-quarter sample are presented in this article.

From its inception in 1966, the cost report has evolved from a rather simple report of about 10 pages to a much more complicated document of over 40 pages. Needless to say, many problems had to be overcome in acquiring and cleaning such a data series.

Flexible coding procedures were required to allow for several levels of aggregation of assets, fund balances, inpatient and outpatient costs, etc. Once the data were computerized, extensive editing, cleaning, and replacement algorithms were undertaken to address such problems as inaccurately reported revenue, utilization, asset, and balance sheet totals, coding and key punching errors, inconsistent aggregation and accounting methods, and completely missing MCR's for a particular hospital.

The abstracting and editing process involved three steps. First, direct supervision by a technically skilled person with a master's degree in business administration was used to assist coders in abstracting the data on the spot. Second, extensive computerized accounting and temporal edits were made to insure that items added up and that they did not jump up and down in meaningless patterns. Third, a visual inspection and hand correction of the remaining outliers for difficult-to-clean data series such as capital investment was undertaken.

To test the quality of data from the Medicare Cost Reports (MCR's), a further comparison was made with data from the AHA's annual survey of hospitals. Comparisons were limited to those variables defined the same way in each of the two sources: total expenses per hospital, total admissions, total discharges, total inpatient days, mean length of stay, average cost per admission, and average cost per inpatient day. Comparisons based on region, urban or rural location, teaching status, ownership, and bed size were made using 1981 unweighted data from the two sources.

In general, there were no significant differences between the 1981 AHA and MCR values for total expenses, total admissions, total discharges, total inpatient days, mean length of stay, average cost per admission, and average cost per inpatient day. Comparisons based on region, urban or rural location, teaching status, ownership, and bed size were made using 1981 unweighted data from the two sources.

Comparing MCR and AHA data for total inpatient days revealed greater differences by hospital characteristic. The AHA length-of-stay value of 6.98 days exceeded the MCR value of 6.56 days by 6 percent. Conversely, the MCR value for costs per inpatient day was 6 percent more than the 1981 AHA value. More caution should be applied, therefore, to any per diem comparisons.

**Weighting for nonresponse**

A complicated, variable-specific weighting scheme was designed to adjust for nonresponse. Data for each...
variable (over 60 variables in all) were disaggregated into 1,440 cells as follows:

- 12 years—1970-81.
- Four regions—Northeast, North Central, South, and West.
- Three ownership categories—State and local government, proprietary, and private voluntary.
- Five bed-size categories—less than 50 beds, 50-99, 100-199, 200-399, and 400 beds or more.
- Teaching status—nonteaching hospitals versus hospitals with any type of medical school affiliation.

Weights were calculated based on the inverse of the ratio of reporting hospitals to the total number of hospitals present in each cell. For any given cell, the weight for each reporting hospital is the same. Data in those cells with high nonresponse rates, therefore, were weighted more heavily.

This weighting method adjusts for nonresponse within bed-size category, but not for bed-size differences in the data themselves. No further weighting is made by hospital bed size, number of admissions, days, or discharges. Each hospital’s statistics are treated equally (i.e., unweighted) given the focus is on the hospital as the unit of analysis rather than on the patient.

### Adjusting for outpatient activity

When hospital statistics are presented on a per admission or per inpatient day basis, they have been adjusted for outpatient activity. Generally, expenses, revenues, and other cost report data apply both to inpatient and outpatient services, requiring an adjustment in the inpatient utilization statistic for interhospital comparability. The AHA applies a ratio of inpatient to outpatient revenues in making an adjustment for outpatient (OPD) activity, but it treats skilled nursing facility (SNF) days as inpatient equivalents. Ideally, SNF and outpatient activity should be weighted by their unique contribution to marginal costs. To determine such weights, a dynamic cost function was estimated in a first stage, producing marginal costs for SNF and OPD activity. These estimates were then inserted into a second-stage output equation, giving the following adjusted admissions (ADJADMS) and inpatient days (ADJ DAYS) expressions:

\[
\begin{align*}
\text{ADJADMS} &= \text{ADM}(1 + \text{SNFID}/\text{ADM})^{0.06303} \\
&\quad \times (1 + \text{OPV}/\text{ADM})^{0.0298} \\
\text{ADJ DAYS} &= \text{IPD}(1 + \text{SNFID}/\text{ADM})^{0.06303} \\
&\quad \times (1 + \text{OPV}/\text{ADM})^{0.0298},
\end{align*}
\]

Where ADM = raw inpatient admissions, SNFID = hospital-based SNF days, OPV = outpatient clinic visits, and IPD = raw inpatient days. Where SNFID and/or OPV are zero, reported and adjusted figures are assumed identical.

The AHA assumes that four outpatient visits are equivalent to one inpatient day. This is a far higher equivalency than for weights derived from a marginal cost regression, where eight outpatient visits are estimated to be equal to one inpatient day. Using the 4 to 1 relative charges as weights, the AHA measures of unadjusted versus adjusted output imply that outpatient visits alone raise the level of national hospital total output by 13.5 percent. Using weights derived from a short-run cost function, with output adjusted for both outpatient visits and SNF inpatient days, outpatient visits raise output only 6 percent. And although AHA average revenue versus marginal cost-weighted output levels are correlated .98, year-to-year changes in output are correlated only .56, attributable primarily to the much lower weight given to volatile outpatient activity using short-run cost weights.

The effect of adjusting for both SNF and outpatient clinic activity is to lower the per admission and per day cost statistics by raising the denominator wherever SNF or OPD activity is positive. Hospitals showing rapid SNF or OPD visit growth will also exhibit slower cost inflation on an adjusted output basis although not as slow as when the AHA’s 4 to 1 inpatient day-outpatient visit ratio is used. A detailed discussion of the derivation of the SNF and OPD adjustment methodology can be found in Appendix A in Coelen, et al. (1985).

### Method of tabular presentation

All variables are presented in similar fashion employing the following three-way tables:

- Urban or rural location by year.
- Teaching status by year.
- Ownership by year.

Teaching status is defined by AHA-reported affiliation with a medical school. Ownership is defined as non-Federal private voluntary, public (State, city, and county), or proprietary.

### Sample sizes and statistical reliability

There were a total of 1,388 U.S. short-term non-Federal hospitals in the sample in 1970, with 712 hospitals located in urban areas and 676 in rural areas. The total number of sampled hospitals peaked at 1,413 in 1974, falling to 1,329 by 1981. In many instances, however, not all of these hospitals reported a particular item, so the actual number reporting is usually smaller. As a standard practice, where 75 percent (or more) nonreporting exists for a specific cell, an asterisk is shown instead of an estimated value. Where hospitals did not report Medicare admissions, they were excluded from the sample only for the relevant variables.

Because the statistics presented in this article are based on a one-quarter random sample, their reliability must be considered. T-tests of mean differences involving two independent samples from
normal populations can be calculated using the following formula:

$$Z = \frac{\bar{x}_1 - \bar{x}_2}{\sigma_1^2 / n_1 + \sigma_2^2 / n_2}$$  

(2)

where the $Z$ statistic's confidence level can be determined from the usual $t$ table, and $\bar{x}_1, \bar{x}_2$ = means of the two sample cells, $\sigma_1^2, \sigma_2^2$ = variances of the two samples, and $n_1, n_2$ = number of reporting hospitals in the cells. Both the means and standard deviations have been weighted for nonresponse.

To provide the reader with a general feeling for the statistical significance of observed differences, a few $Z$ statistics are calculated from Table I for total hospital expenses per adjusted admission. For 1981, the mean urban and rural figures were $2,443 and $1,490, respectively, with standard deviations of $1,233 and $618. The $Z$ statistic is 14.4, which is significant at the 99-percent confidence level. Other $Z$ statistics for 1981 include teaching versus nonteaching, $t = 9.8$; private voluntary versus proprietary, $t = 0.2$; and the change from 1980 to 1981, $t = 3.0$.

As a general rule, the more aggregate comparisons (e.g., all urban versus all rural) will more often prove statistically significant. Furthermore, significance levels will vary by variable, depending on the underlying degree of natural variation.

## Trends in hospital finances

### Expenses

The rapid growth in Medicare hospital outlays can be explained almost entirely by the industry's burgeoning cost structure. Total hospital expenses per adjusted admission grew 12 percent annually from 1970 through 1981 (Table 1). On a per diem basis, the rate was 1 1/2 percentage points higher (13.5 percent) because of the falling average length of stay. Ancillary expenses grew considerably faster than routine (16.8 versus 12.3 percent, respectively), so that by 1979 the two accounted for nearly equal shares of hospitals' costs: 47 percent ancillaries; 53 percent routine.

Rapid cost inflation in the 1970's permeated the industry, as evidenced by the similar growth rates across hospital characteristics in expenses per adjusted admission or day. Interestingly, proprietary hospitals exhibited the fastest growth per adjusted admission (13.3 percent), over two points higher than for teaching hospitals. Of course, the latter were twice as expensive at the beginning of the decade. Both teaching and nonteaching hospitals' costs grew more slowly than the national average, the difference was attributable to a rising proportion of expensive teaching hospitals in the sample as nonteaching hospitals closed or merged with teaching institutions.

Although one might have expected Medicare Part A expenses (payments) per admission to rise faster than total costs, such was not the case. According to data in Table 2, between 1970 and 1979, Part A expenses per admission grew 10.5 percent annually, a rate 1 1/2 percentage points below the average rate of cost inflation. Nonetheless, even with the slower payment growth per Medicare admission, the industry became increasingly dependent on Medicare reimbursement. By 1979, one of every three of the average hospital's dollars came from the program, up slightly from 30.7 percent in 1970. This is explained by the relatively rapid growth in Medicare admissions, as shown later.

Rural hospitals have always been more dependent on Medicare, although the urban-rural gap narrowed somewhat in the 1970's. At the same time, teaching hospitals, which operate mainly in urban areas, also became much more dependent on Medicare. Over the decade, Medicare's share of expenses in teaching hospitals rose from 22 to 30 percent, a rate far in excess of that in nonteaching hospitals. Finally, even though Medicare patients are often considered unprofitable, proprietary hospitals depended on the program as much as public or private voluntary institutions did throughout the decade, in some cases, even more so.

### Revenues

Lines 1 through 8 of Table 3 provide corresponding trends in net patient service revenues per adjusted admission. Net revenues are monies left after bad debts and contractual disallowances are subtracted from gross revenues, and patient-service revenues are charges only for patient care (excluding nonoperating income such as investments, for example). Net patient revenues were not only consistently less than total hospital expenses, they also grew more slowly, 11.4 versus 12.0 percent annually between 1970 and 1979, respectively, on a per admission basis.

Expenses outstripping revenues implies declining financial ratios, as evidenced by the operating and total margin trends in Table 3. Hospital operating margins, defined as net operating income over total patient income, were negative throughout the decade, ranging from a high of -0.50 percent in 1970 to a low of -3.41 percent in 1974. Finances then improved through 1979, but operating margins still averaged -1.79 percent. Only proprietary hospitals showed positive operating margins during the 1970's, with rural, teaching, and public hospitals losing the most.

Because it is standard operating practice among some hospitals (e.g., city and county) to subsidize operating costs with other revenues, total hospital margins are considered a more meaningful indicator of financial well-being. When all revenues are considered, including those from endowments, public treasuries, and other sources (e.g., real estate), total margins are uniformly positive, ranging from a high of 3.33 percent nationally in 1970 to a low of 1.36 in 1974. Total margin trends thus exhibited a U-shape in...
Table 1

Total hospital expenses per adjusted admission and per adjusted day, and ancillary services as a percent of total expenses, by area, teaching status, and type of hospital: 1970-81

| Area, teaching status, and type of hospital | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|-------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **Expenses per adjusted admission**       |     |     |     |     |     |     |     |     |     |     |     |     |
| Total                                     | $529 | $575 | $636 | $690 | $761 | $807 | $1,025 | $1,166 | $1,319 | $1,463 | $1,742 | $1,985 |
| Urban                                     | 544 | 665 | 781 | 848 | 966 | 1,116 | 1,267 | 1,442 | 1,619 | 1,821 | 2,077 | 2,443 |
| Rural                                     | 399 | 449 | 480 | 520 | 580 | 676 | 768 | 889 | 991 | 1,118 | 1,348 | 1,490 |
| Nonteaching                               | 500 | 537 | 592 | 625 | 707 | 825 | 936 | 1,065 | 1,208 | 1,357 | 1,602 | 1,816 |
| Teaching                                  | 931 | 1,043 | 1,175 | 1,287 | 1,433 | 1,626 | 1,779 | 1,913 | 2,106 | 2,383 | 2,736 | 3,158 |
| Private voluntary                         | 586 | 622 | 694 | 742 | 837 | 977 | 1,110 | 1,262 | 1,420 | 1,587 | 1,824 | 2,122 |
| Proprietary                               | 479 | 548 | 589 | 656 | 773 | 999 | 1,141 | 1,341 | 1,534 | 1,852 | 2,076 | 2,736 |
| State and local government                 | 428 | 491 | 539 | 604 | 675 | 772 | 871 | 981 | 1,005 | 1,252 | 1,528 | 1,669 |
| **Expenses per adjusted day**             |     |     |     |     |     |     |     |     |     |     |     |     |
| Total                                     | $595 | $79 | $89 | $99 | $114 | $134 | $153 | $175 | $199 | $226 | $260 | $303 |
| Urban                                     | 80 | 91 | 104 | 115 | 132 | 155 | 176 | 199 | 225 | 254 | 290 | 336 |
| Rural                                     | 57 | 66 | 73 | 79 | 93 | 112 | 129 | 149 | 172 | 196 | 226 | 266 |
| Nonteaching                               | 67 | 78 | 86 | 94 | 107 | 127 | 145 | 168 | 192 | 217 | 250 | 290 |
| Teaching                                  | 101 | 115 | 133 | 147 | 170 | 196 | 215 | 227 | 255 | 290 | 335 | 388 |
| Private voluntary                         | 73 | 82 | 92 | 101 | 116 | 136 | 156 | 178 | 202 | 228 | 262 | 308 |
| Proprietary                               | 73 | 84 | 94 | 106 | 124 | 145 | 162 | 191 | 222 | 250 | 289 | 324 |
| State and local government                 | 60 | 71 | 80 | 91 | 105 | 125 | 142 | 161 | 183 | 210 | 243 | 282 |
| **Ancillary services as percent of total expenses** |     |     |     |     |     |     |     |     |     |     |     |     |
| Total                                     | 38.7 | 39.2 | 40.3 | 41.8 | 45.2 | 44.2 | 45.0 | 46.1 | 46.7 | 47.0 | NA | NA |
| Urban                                     | 40.3 | 41.0 | 41.9 | 43.1 | 44.6 | 45.6 | 46.0 | 46.9 | 47.6 | 47.9 | NA | NA |
| Rural                                     | 37.1 | 37.4 | 38.5 | 40.4 | 41.8 | 42.8 | 43.9 | 45.2 | 45.7 | 46.0 | NA | NA |
| Nonteaching                               | 38.5 | 39.8 | 39.9 | 41.4 | 42.8 | 43.9 | 44.7 | 45.8 | 46.4 | 46.7 | NA | NA |
| Teaching                                  | 42.7 | 44.1 | 44.8 | 45.1 | 46.9 | 47.7 | 47.5 | 48.5 | 48.9 | 49.4 | NA | NA |
| Private voluntary                         | 38.8 | 39.7 | 40.6 | 42.1 | 43.5 | 44.4 | 45.3 | 46.4 | 47.0 | 47.4 | NA | NA |
| Proprietary                               | 40.8 | 40.0 | 41.5 | 43.1 | 44.5 | 45.4 | 46.7 | 47.7 | 48.7 | 48.7 | NA | NA |
| State and local government                 | 37.5 | 37.8 | 38.8 | 40.5 | 42.0 | 42.9 | 43.5 | 44.7 | 45.2 | 45.5 | NA | NA |

NOTES: Data are based on hospital averages not weighted by admissions, days, or bed size. NA is data not available.

SOURCES: Abt Associates, Inc.: National Hospital Rate-Setting Study. Contract No. 500-78-0036. Prepared for the Health Care Financing Administration. Cambridge, Mass.; Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.
deteriorating operating margins at the end of the decade. This was exhibited a pronounced left skew, with the vast majority of hospitals in the large "losers," i.e., those with margins plus or minus 1.5 percent and a steady through 1979. Operating margins showed a decrease in the 1970's, falling to a low in 1974, then rising fairly rapidly over time. In 1970, one in four hospitals had losses greater than 15 percent. The margins shown in Table 3 show less positive or even negative spread over time than those provided by the AHA (as found in the Federal Register, 1986). This is because the wider range of profitability in smaller hospitals is unweighted in our results versus the weighted ratios presented by the AHA. Nevertheless, the trend of decreasing profitability in the 1980's is a standard short-run liquidity indicator that provides "the first clue that something more basic is wrong" (Cleverley, 1978) with the firm's financial position. A ratio of 2.0 is common in other industries. Hospitals continually enjoyed rates far above this threshold, but the ratio fell from 3.67 in 1970 to 2.76 in 1979. Rural and public hospitals exhibited especially high current ratios but became more like urban and private hospitals over time. Trends for two additional financial variables—the current ratio and long-term indebtedness—are shown in Table 4. Calculated as the ratio of short-term (current) assets to current liabilities, the current ratio provides "the first clue that something more basic is wrong" (Cleverley, 1978) with the firm's financial position. A ratio of 2.0 is common in other industries. Hospitals continually enjoyed rates far above this threshold, but the ratio fell from 3.67 in 1970 to 2.76 in 1979. Rural and public hospitals exhibited especially high current ratios but became more like urban and private hospitals over time.

Finally, lines 9 through 16 in Table 4 show the growing indebtedness of the industry. In 1970, only 13.5 percent of net total assets were funded through long-term debt. By 1979, the percentage had almost doubled to over 25 percent. Thus, although revenues more or less managed to cover the rapid growth in expenses over the decade, internal capital sources (e.g., donations, Government grants) apparently were insufficient to meet perceived capital formation needs.

Table 2
Medicare Part A expenses per Medicare admission and as a percent of total expenses, by area, teaching status, and type of hospital: 1970-79

| Area, teaching status, and type of hospital | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 |
|-------------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Total                                     | $636 | $713 | $767 | $805 | $929 | $1,065 | $1,182 | $1,301 | $1,450 | $1,634 |
| Urban                                     | 800  | 903  | 974  | 1,067| 1,194| 1,378  | 1,529  | 1,680  | 1,876  | 2,124  |
| Rural                                     | 475  | 525  | 558  | 651  | 647  | 731   | 920   | 1,013  | 1,131  | 9.6   |
| Nonteaching                               | 601  | 671  | 721  | 761  | 850  | 976   | 1,081  | 1,151  | 1,310  | 1,476  |
| Teaching                                  | 1,105| 1,248| 1,323| 1,501| 1,611| 1,835  | 2,022  | 2,182  | 2,459  | 2,775  |
| Private voluntary                         | 702  | 784  | 846  | 904  | 1,004| 1,163  | 1,311  | 1,448  | 1,609  | 1,806  |
| Proprietary                               | 598  | 698  | 778  | 875  | 1,035| 1,172  | 1,253  | 1,390  | 1,560  | 1,798  |
| State and local government                 | 513  | 570  | 598  | 673  | 721  | 815   | 889   | 964   | 1,060 | 1,214  |

| Part A expenses as percent of total        |      |      |      |      |      |      |      |      |      |      |
|-------------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Total                                     | 30.7 | 30.5 | 30.1 | 30.1 | 31.2 | 31.4  | 32.2  | 32.5  | 33.4  | 34.0  |
| Urban                                     | 27.5 | 27.2 | 27.2 | 27.2 | 28.7 | 29.2  | 30.1  | 30.8  | 32.1  | 32.7  |
| Rural                                     | 33.8 | 34.0 | 33.1 | 33.1 | 33.8 | 33.8  | 34.3  | 34.2  | 34.8  | 35.4  |
| Nonteaching                               | 31.3 | 31.3 | 30.8 | 30.9 | 32.0 | 32.0  | 32.8  | 33.1  | 34.0  | 34.5  |
| Teaching                                  | 22.0 | 20.7 | 20.9 | 22.5 | 24.3 | 25.6  | 26.8  | 27.8  | 29.0  | 29.9  |
| Private voluntary                         | 28.9 | 28.7 | 28.7 | 28.8 | 30.1 | 30.7  | 31.5  | 31.8  | 32.7  | 33.4  |
| Proprietary                               | 31.9 | 32.8 | 31.5 | 31.5 | 33.0 | 32.7  | 32.9  | 33.3  | 35.3  | 34.7  |
| State and local government                 | 33.9 | 33.3 | 32.4 | 31.9 | 32.5 | 32.1  | 33.3  | 33.6  | 33.9  | 34.8  |

| Annual compound growth rate                |      |      |      |      |      |      |      |      |      |      |
|-------------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Total                                     |      |      |      |      |      |      |      |      |      |      |
| Urban                                     |      |      |      |      |      |      |      |      |      |      |
| Rural                                     |      |      |      |      |      |      |      |      |      |      |
| Nonteaching                               |      |      |      |      |      |      |      |      |      |      |
| Teaching                                  |      |      |      |      |      |      |      |      |      |      |
| Private voluntary                         |      |      |      |      |      |      |      |      |      |      |
| Proprietary                               |      |      |      |      |      |      |      |      |      |      |
| State and local government                 |      |      |      |      |      |      |      |      |      |      |

NOTE: Data are based on hospital averages not weighted by admissions, days, or bed size.

SOURCES: Abt Associates, Inc.: National Hospital Rate-Setting Study. Contract No. 500-78-0036. Prepared for the Health Care Financing Administration. Cambridge, Mass.: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.
| Area and teaching status, and type of hospital: 1970-79 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 |
|-----------------------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Urban and local government total margins             | -0.50| -0.67| -1.80| -3.14| -3.41| -2.28| -1.62| -1.43| -2.44| -1.79|
| Urban Total margin                                   | 0.23 | 0.63 | -0.85 | -2.32 | -2.34 | -1.28 | -0.83 | -1.09 | -0.64 |
| Rural Total margin                                   | -1.21| -1.95 | -2.73 | -3.98 | -4.50 | -3.28 | -2.94 | -2.03 | -3.78 | -2.94|
| Nonteaching Teaching Total margin                    | -0.21| -0.44 | -1.60 | -2.87 | -3.29 | -1.96 | -1.33 | -1.06 | -2.28 | -1.66|
| Teaching Total margin                                | -4.65| -3.70 | -4.40 | -5.81 | -4.53 | -5.32 | -4.28 | -3.62 | -2.84 |
| Private voluntary Proprietary Total margin           | -0.46| 4.01 | -3.00 | -0.40 | 3.86 | -3.62 | -1.48 | 3.48 | -5.25 | -2.41|
| Proprietary Total margin                             | 2.10 | 2.54 | 2.98 | 2.41 | 1.79 | 1.13 | 0.99 | 1.32 | 1.94 | 1.98|
| State and local government Total margin              | 3.33 | 2.92 | 2.12 | 1.43 | 1.36 | 1.75 | 2.44 | 2.30 | 2.09 | 2.54|
| Urban State and local government operating margin     | 3.69 | 3.43 | 2.45 | 1.72 | 1.72 | 2.18 | 2.93 | 2.62 | 2.59 | 2.78|
| Rural State and local government operating margin     | 2.98 | 2.41 | 1.79 | 1.13 | 0.99 | 1.32 | 1.94 | 1.98 | 1.59 | 2.30|
| Nonteaching Teaching State and local government       | 3.45 | 1.61 | 2.98 | 2.12 | 2.13 | 1.89 | 1.43 | 1.46 | 1.34 | 1.57|
| Teaching State and local government                   | 3.45 | 1.61 | 2.98 | 2.12 | 2.13 | 1.89 | 1.43 | 1.46 | 1.34 | 1.57|
| Private voluntary Proprietary State and local government | 3.47 | 5.38 | 1.93 | 3.09 | 5.28 | 1.31 | 2.44 | 3.51 | 0.73 | 0.48|
| Proprietary State and local government                | 3.47 | 5.38 | 1.93 | 3.09 | 5.28 | 1.31 | 2.44 | 3.51 | 0.73 | 0.48|
| State and local government State and local government | 3.47 | 5.38 | 1.93 | 3.09 | 5.28 | 1.31 | 2.44 | 3.51 | 0.73 | 0.48|

NOTE: Data are based on hospital averages not weighted by admissions, days, or bed size. Sources: Abt Associates, Inc., National Hospital Cost-Spending Study; Contract No. 79-015-0036. Prepared for the Health Care Financing Administration. Cambridge, Mass.; Health Care Financing Administration, Bureau of Data Management and Strategy. Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.

Table 3
Figure 1
Percent of hospitals, by operating margin per hospital: 1970 and 1979

NOTE: Net operating income shown as percent of patient income.

SOURCES: Abt Associates, Inc.: National Hospital Rate-Setting Study, Contract No. 500-78-0036. Prepared for the Health Care Financing Administration, Cambridge, Mass. Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.
Figure 2
Percent of hospitals, by total margin per hospital: 1970 and 1979

NOTE: Net total income shown as percent of total income.

SOURCES: Abt Associates, Inc.: National Hospital Rate-Setting Study. Contract No. 500-78-0036. Prepared for the Health Care Financing Administration. Cambridge, Mass. Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.
### Table 4
Hospital current ratio and long-term indebtedness, by area, teaching status, and type of hospital: 1970-79

| Area, teaching status, and type of hospital | 1970  | 1971  | 1972  | 1973  | 1974  | 1975  | 1976  | 1977  | 1978  | 1979  | Annual compound growth rate |
|-------------------------------------------|------|------|------|------|------|------|------|------|------|------|----------------------------|
| Current ratio                             |      |      |      |      |      |      |      |      |      |      |                            |
| Total                                     | 3.67 | 3.70 | 3.66 | 3.46 | 3.31 | 3.29 | 3.27 | 2.97 | 2.87 | 2.78 | -3.2                       |
| Urban                                     | 3.06 | 3.00 | 2.91 | 2.77 | 2.66 | 2.55 | 2.48 | 2.40 | 2.29 | 2.19 | -3.2                       |
| Rural                                     | 4.30 | 4.42 | 4.43 | 4.16 | 3.97 | 3.62 | 3.50 | 3.46 | 3.31 | 3.24 | -3.1                       |
| Nonteaching                               | 3.72 | 3.76 | 3.73 | 3.59 | 3.40 | 3.18 | 3.12 | 3.05 | 2.94 | 2.83 | -3.0                       |
| Teaching                                  | 2.95 | 2.84 | 2.80 | 2.18 | 2.55 | 2.34 | 2.28 | 2.27 | 2.37 | 2.25 | -3.0                       |
| Private voluntary                         | 3.53 | 3.52 | 3.36 | 3.13 | 3.04 | 2.87 | 2.73 | 2.67 | 2.62 | 2.53 | -3.7                       |
| Proprietary                               | 2.61 | 2.87 | 2.67 | 3.01 | 2.56 | 2.52 | 2.44 | 2.42 | 2.07 | 2.33 | -1.3                       |
| State and local government                | 4.51 | 4.50 | 4.70 | 4.36 | 4.24 | 3.86 | 3.92 | 3.83 | 3.71 | 3.42 | -3.1                       |
| Long-term indebtedness                    |      |      |      |      |      |      |      |      |      |      |                            |
| Total                                     | 13.5 | 16.0 | 16.4 | 17.4 | 19.0 | 20.6 | 21.5 | 23.1 | 23.5 | 25.3 | 7.0                        |
| Urban                                     | 17.1 | 19.8 | 20.7 | 23.2 | 25.3 | 28.4 | 27.2 | 28.7 | 29.1 | 31.0 | 6.8                        |
| Rural                                     | 10.1 | 12.0 | 12.1 | 11.6 | 14.7 | 15.3 | 15.8 | 17.4 | 18.4 | 19.6 | 7.4                        |
| Nonteaching                               | 13.4 | 16.1 | 16.3 | 17.3 | 19.2 | 20.6 | 21.1 | 22.8 | 22.7 | 24.4 | 6.7                        |
| Teaching                                  | 14.8 | 14.7 | 16.6 | 18.2 | 17.0 | 20.4 | 24.7 | 25.6 | 29.2 | 31.7 | 8.5                        |
| Private voluntary                         | 15.4 | 18.6 | 18.1 | 19.3 | 20.5 | 22.6 | 22.8 | 24.7 | 25.0 | 26.3 | 8.8                        |
| Proprietary                               | 16.9 | 20.9 | 23.4 | 25.3 | 30.0 | 31.9 | 35.2 | 35.6 | 35.8 | 34.9 | 8.1                        |
| State and local government                | 7.9  | 7.8  | 9.2  | 9.5  | 10.1 | 10.7 | 12.1 | 14.0 | 15.1 | 15.2 | 7.3                        |

**NOTE:** Data are based on hospital averages not weighted by admissions, days, or bed size.

**SOURCES:** Abt Associates, Inc.: National Hospital Rate-Setting Study. Contract No. 500-78-0036. Prepared for the Health Care Financing Administration. Cambridge, Mass.; Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.

### Figure 3
Percent of hospitals, by long-term indebtedness: 1970 and 1979

**NOTE:** Long-term debt shown as percent of net total assets.

**SOURCES:** Abt Associates, Inc.: National Hospital Rate-Setting Study. Contract No. 500-78-0036. Prepared for the Health Care Financing Administration. Cambridge, Mass.; Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.
National trends in hospital utilization

Utilization growth contributed in only a minor way to the observed expense growth, as shown in Tables 5 and 6. Total inpatient admissions per hospital grew only about 2 percent annually; and inpatient days grew only 1.2 percent, as overall length of stay fell a full day from 7.52 to 6.54 days. At most, admissions growth explained only one-sixth (2%/12%) of the 12 percent annual expense growth over the period. Admissions to proprietary hospitals grew over twice as fast (4.6 percent) as the national average, and those to State and local hospitals grew hardly at all (1 percent annually).

Medicare admissions per hospital, in distinct contrast, grew much faster, 5.7 percent annually. In one decade, Medicare’s share of the typical hospital’s admissions went from one-quarter to one-third (Table 5). This trend extended to all hospital groups, including proprietaries. The growing dependency of teaching hospitals on Medicare admissions is particularly noteworthy. More important, though, was the 2-day decline in Medicare length of stay, which saved several hundred dollars per stay in routine care alone across all hospitals. Nevertheless, at late as 1981, Medicare’s average length of stay (9.3 days) was 43 percent longer than that for the hospital as a whole (including Medicare patients).

Total hospital days grew very slowly between 1970 and 1981 because of shorter stays (Table 5). At the same time, average bed size grew (Table 7), putting additional downward pressure on occupancy rates. By 1981, the (unweighted) hospital occupancy rate had fallen to 66 percent from a high of 72 percent in 1970 (Table 6). On a typical day at the end of 1970’s, one of every three short-term hospital beds went unused. After levelling off in 1978, this downward trend in capacity utilization accelerated once again in the 1980’s with the introduction of Medicare’s prospective payment system. By 1984, the rate was below 64 percent (American Hospital Association, 1985).

Trends in hospital capital formation

Hospital growth is shown in yet another way, by the beds, buildings, and equipment employed (Tables 7 and 8). Hospital bed size grew steadily over 1970-81 from 146 to 176 beds, an addition of 30 beds per hospital on the average. A detailed bed-size breakdown can be found in Cromwell, et al., 1986. Although significant in itself, the book value of undeflated net fixed assets, net of accumulated depreciation, grew many times faster. In 1971, the first year fixed asset data were collected in the study, the average hospital reported slightly over $3 million in net buildings, land, and fixed and movable equipment. By 1979, the figure had more than doubled to $7,343,000. After factoring out the growth in bed size (values not shown), net fixed capital per bed almost exactly doubled from $17,367 to $35,440, a compound growth of nearly 9 percent annually. On a per admission basis, see bottom of Table 7, the rate of growth was only slightly lower (8.2 percent annually).

The frequency distribution of net total fixed assets per hospital in constant 1969 dollars is shown in Figure 4. The bars for 1979 show the distribution at the end of the decade, factoring out the inflation in construction and equipment costs, making the 1971 and 1979 figures comparable in real terms. Only 1 of every 25 hospitals (4 percent) had real net assets of over $13.5 million in 1971. By 1979, this frequency had risen to one of every seven (14 percent). This increase occurred in essentially all but the very small hospitals.

Deflating the change in net fixed assets provides a rough measure of real capital formation on an annual basis (Table 8). Capital formation in the hospital industry peaked in the mid-1970’s at $467,000 per hospital (in 1969 dollars), then fell back to rates observed at the beginning of the decade. If the 1971 nominal fixed asset figure of $3 million is taken as the base, then the price-adjusted real capital formation rates range between 4.3 (1971) and 10.6 (1976) percent of the base, itself adjusted upwards annually only for real capital additions. These are relatively high investment rates compared with other U.S. industries and are indicative of the major expansion in the sector over the last 10-15 years.

Rates of real capital formation varied significantly across the years, as well as by hospital location, teaching status, and ownership. Teaching hospitals invested roughly six times as much annually as nonteaching hospitals, and urban hospitals invested about four times as much as their rural counterparts. The typical short-term hospital added $2.66 million in real plant and equipment between 1971 and 1979. This varied from teaching hospitals, which invested over $10 million, to the small rural hospitals, which added less than $1 million. Proprietaries and public hospitals

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4Over the 1969-79 period, construction prices rose 14.4 percent, and the professional and scientific equipment index rose 73 percent.
each invested about $1.5 million in real terms over the decade.

The 9-year gross investment in real movable equipment was $1.26 million, or $139,000 annually per hospital. The rate peaked in 1978 at $193,000 per hospital (in 1969 dollars). Teaching hospitals in that year averaged $733,000 in new equipment compared with only $58,000 among rural hospitals. When cumulated over the entire 1971-79 period, the average teaching hospital purchased nearly $5 million in new equipment versus less than $1 million for those without a teaching affiliation. The typical rural hospital spent only $436,000 over the entire decade for equipment, which is only 60 percent of what the average teaching hospital spent in 1978 alone. The typical proprietary and public hospital spent roughly $600,000 each on equipment over the 1970's, which was only about one-third the rate for private voluntary hospitals.

With such high rates of real capital formation, it is not surprising that the average age of hospital capital remained relatively constant. This is indicated by the last eight lines of Table 8 that show the average percent of building and fixed equipment assets that had been depreciated on the hospitals' books. (Movable equipment has been removed because of its far shorter economic lifetime.) The national figures fall in the narrow range of 32-35 percent, implying that roughly one-third of the useful building lifetime had been depreciated, or 8-10 years on a 25-30-year base. Only a slight aging in the stock is observed in 9 years, regardless of location or ownership.
Table 5
Number of Inpatient admissions, percent Medicare admissions, and number of Inpatient days, by area, teaching status, and type of hospital: 1970-81

| Area, teaching status, and type of hospital | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|-------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Inpatient admissions per hospital         |      |      |      |      |      |      |      |      |      |      |      |      |
| Total                                     | 5,196| 5,243| 5,366| 5,564| 5,731| 5,789| 5,902| 5,970| 6,072| 6,274| 6,488| 6,577|
| Urban                                     | 7,735| 7,757| 7,922| 8,182| 8,362| 8,459| 8,642| 8,759| 8,944| 9,106| 9,457| 9,519|
| Rural                                     | 2,638| 2,656| 2,724| 2,831| 2,894| 2,940| 2,999| 3,019| 3,044| 3,132| 3,087| 3,136|
| Nonteaching                               | 4,376| 4,371| 4,447| 4,590| 4,513| 4,580| 4,614| 4,519| 4,587| 4,729| 4,933| 5,024|
| Teaching                                  | 15,398| 15,982| 16,312| 16,305| 16,229| 16,272| 16,542| 16,432| 16,772| 17,085| 17,391| 17,327|
| Private voluntary                         | 6,405| 6,524| 6,679| 6,999| 7,246| 7,231| 7,348| 7,443| 7,549| 7,774| 8,013| 8,153|
| Proprietary                               | 2,815| 2,867| 3,006| 3,127| 3,360| 3,613| 3,990| 4,189| 4,387| 4,666| 4,855| 4,855|
| State and local government                 | 3,878| 3,772| 3,837| 3,893| 3,910| 3,967| 3,936| 3,916| 3,885| 4,132| 4,291| 4,336|
| Percent Medicare admissions                |      |      |      |      |      |      |      |      |      |      |      |      |
| Total                                     | 24.9 | 25.0 | 25.3 | 25.8 | 27.1 | 27.7 | 28.8 | 30.1 | 31.2 | 31.7 | 32.6 | 34.0 |
| Urban                                     | 21.3 | 21.4 | 21.6 | 22.3 | 23.6 | 24.1 | 25.3 | 26.9 | 28.1 | 28.4 | 28.8 | 31.0 |
| Rural                                     | 28.4 | 28.7 | 26.9 | 29.3 | 30.9 | 31.5 | 32.4 | 33.4 | 34.5 | 35.0 | 36.0 | 37.3 |
| Nonteaching                               | 25.4 | 25.6 | 25.9 | 26.5 | 27.8 | 28.3 | 29.5 | 30.9 | 32.1 | 32.5 | 33.5 | 35.0 |
| Teaching                                  | 17.6 | 17.5 | 18.2 | 19.2 | 21.3 | 22.1 | 23.0 | 24.3 | 25.4 | 25.6 | 26.7 | 27.4 |
| Private voluntary                         | 23.5 | 23.3 | 23.7 | 24.3 | 25.7 | 26.3 | 27.6 | 28.8 | 29.9 | 30.5 | 31.6 | 32.9 |
| Proprietary                               | 25.2 | 26.2 | 25.8 | 26.1 | 26.8 | 27.0 | 26.9 | 29.4 | 31.0 | 31.4 | 31.5 | 33.8 |
| State and local government                 | 27.8 | 27.9 | 28.4 | 28.6 | 30.1 | 30.7 | 32.0 | 33.1 | 34.1 | 34.1 | 35.2 | 36.3 |
| Annual compound growth rate                |      |      |      |      |      |      |      |      |      |      |      |      |
| Inpatient days per hospital               |      |      |      |      |      |      |      |      |      |      |      |      |
| Total                                     | 41,199| 40,789| 41,020| 41,836| 42,738| 42,892| 43,683| 43,929| 45,180| 46,502| 47,126| 47,126|
| Urban                                     | 63,763| 62,722| 63,068| 64,285| 65,508| 65,783| 66,923| 67,387| 68,141| 69,809| 70,896| 72,371|
| Rural                                     | 18,493| 18,175| 18,193| 18,418| 18,528| 18,499| 18,723| 18,751| 18,533| 18,846| 18,626| 18,626|
| Nonteaching                               | 32,922| 32,275| 32,303| 30,798| 31,523| 31,602| 31,726| 30,665| 30,741| 31,899| 33,032| 33,527|
| Teaching                                  | 144,499| 145,708| 144,831| 139,560| 139,447| 140,158| 140,941| 137,069| 138,397| 139,738| 141,106| 141,080|
| Private voluntary                         | 51,905| 52,016| 52,549| 54,131| 55,593| 55,362| 56,081| 56,336| 56,581| 58,189| 59,692| 60,648|
| Proprietary                               | 19,096| 19,204| 19,643| 20,467| 21,837| 23,316| 25,738| 26,011| 26,642| 27,956| 29,386| 30,009|
| State and local government                 | 30,122| 30,305| 27,940| 27,784| 27,710| 27,660| 27,032| 26,649| 28,590| 27,212| 28,195| 28,343|

NOTE: Data are based on hospital averages not weighted by admissions, days, or bed size.

SOURCES: Abl Associates, Inc.: National Hospital Rate-Setting Study. Contract No. 500-76-0036. Prepared for the Health Care Financing Administration. Cambridge, Mass.: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.
Table 6
Lengths of stay and occupancy rates, by area, teaching status, and type of hospital, 1970-81

| Area, teaching status, and type of hospital | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|-------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Length of stay in days                     |      |      |      |      |      |      |      |      |      |      |      |      |
| Total                                      | 7.55 | 7.73 | 7.65 | 8.49 | 8.33 | 8.13 | 8.37 | 8.34 | 9.02 | 8.67 | 8.42 | 9.55  |
| Urban                                      | 7.92 | 8.05 | 7.86 | 7.94 | 8.16 | 8.11 | 7.81 | 7.68 | 8.12 | 7.91 | 8.05 | 9.51  |
| Rural                                      | 7.12 | 6.68 | 6.66 | 7.46 | 8.93 | 7.15 | 7.68 | 8.62 | 8.09 | 7.86 | 8.57 | 9.57  |
| Non-teaching                               | 7.29 | 7.20 | 7.01 | 6.79 | 8.69 | 6.56 | 6.62 | 6.43 | 6.40 | 6.35 | 6.43 | 7.78  |
| Teaching                                   | 9.18 | 9.04 | 8.84 | 8.63 | 8.52 | 8.48 | 8.31 | 8.22 | 8.07 | 8.05 | 8.05 | -0.8 |
| Private voluntary                          | 7.77 | 7.64 | 7.48 | 7.31 | 7.21 | 7.11 | 7.10 | 7.05 | 6.99 | 6.94 | 6.90 | 6.91  |
| Proprietary                                | 7.05 | 6.86 | 6.61 | 6.55 | 6.50 | 6.42 | 6.30 | 6.24 | 6.36 | 6.34 | 6.77 | 6.31  |
| State and local government                  | 7.23 | 6.96 | 6.75 | 6.53 | 6.42 | 6.24 | 6.17 | 6.06 | 5.99 | 5.96 | 5.04 | 5.90  |

| Annual compound growth rate                |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Medicare length of stay in days           |      |      |      |      |      |      |      |      |      |      |      |      |
| Total                                      | 11.90| 11.53| 11.18| 11.60| 10.75| 10.94| 10.19| 9.85 | 9.85 | 9.52 | 9.45 | 9.93  |
| Urban                                      | 12.73| 12.38| 12.11| 11.99| 11.79| 11.56| 11.31| 10.96| 10.76| 10.69| 10.58| 10.47 |
| Rural                                      | 11.08| 10.67| 10.23| 9.96 | 9.63 | 9.23 | 9.01 | 8.71 | 8.52 | 8.31 | 8.17 | 8.08  |
| Non-teaching                               | 11.73| 11.34| 10.98| 10.72| 10.45| 10.12| 9.66 | 9.50 | 9.31 | 9.16 | 9.98 | -2.4  |
| Teaching                                   | 14.25| 13.91| 13.51| 13.58| 13.33| 13.15| 12.66| 12.46| 12.12| 12.08| 11.83| 11.80 |
| Private voluntary                          | 12.50| 12.16| 11.80| 11.67| 11.40| 11.10| 10.91| 10.59| 10.37| 10.20| 10.08| 10.04 |
| Proprietary                                | 10.91| 10.61| 10.58| 10.53| 10.26| 9.94 | 9.62 | 9.27 | 9.09 | 9.03 | 9.25 | 8.79  |
| State and local government                  | 11.13| 10.65| 10.18| 10.09| 9.69 | 9.33 | 9.01 | 8.53 | 8.46 | 8.38 | 8.28 | 8.20  |

| Occupancy rate                             |      |      |      |      |      |      |      |      |      |      |      |      |
|-------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Total                                      | 72   | 70   | 68   | 68   | 68   | 66   | 66   | 65   | 65   | 65   | 66   | 66    |
| Urban                                      | 77   | 75   | 73   | 73   | 73   | 72   | 71   | 70   | 70   | 71   | 72   | 73    |
| Rural                                      | 68   | 65   | 64   | 63   | 62   | 61   | 60   | 59   | 59   | 59   | 59   | 59    |
| Non-teaching                               | 72   | 69   | 67   | 66   | 65   | 65   | 64   | 63   | 63   | 63   | 65   | 64    |
| Teaching                                   | 82   | 81   | 80   | 79   | 81   | 80   | 79   | 78   | 78   | 78   | 80   | 80    |
| Private voluntary                          | 75   | 73   | 71   | 72   | 72   | 70   | 70   | 69   | 69   | 69   | 70   | 71    |
| Proprietary                                | 71   | 69   | 67   | 65   | 65   | 63   | 63   | 62   | 61   | 63   | 64   | 63    |
| State and local government                  | 68   | 65   | 63   | 62   | 61   | 60   | 59   | 58   | 58   | 59   | 59   | 59    |

NOTE: Data are based on hospital averages not weighted by admissions, days, or bed size.

SOURCES: Abt Associates, Inc.: National Hospital Rate-Setting Study. Contract No. 500-78-0036. Prepared for the Health Care Financing Administration, Cambridge, Mass.; Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.
Table 7

Number of hospital beds and net total fixed assets by area, teaching status, and type of hospital: 1970-81

| Area, teaching status, and type of hospital | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | Annual compound growth rate |
|--------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|-----------------------------|
| **Total**                                  | 146  | 148  | 151  | 155  | 158  | 161  | 164  | 168  | 170  | 173  | 173  | 176  | 1.7                         |
| Urban                                      | 217  | 218  | 222  | 226  | 230  | 236  | 240  | 246  | 251  | 254  | 252  | 255  | 1.5                         |
| Rural                                      | 72   | 74   | 75   | 77   | 79   | 80   | 81   | 83   | 83   | 83   | 81   | 85   | 1.5                         |
| Nonteaching                                | 120  | 119  | 122  | 118  | 121  | 124  | 124  | 124  | 126  | 128  | 128  | 131  | 0.8                         |
| Teaching                                   | 470  | 492  | 481  | 483  | 481  | 487  | 490  | 486  | 489  | 492  | 491  | 494  | 0.5                         |
| Private voluntary                          | 181  | 183  | 168  | 194  | 199  | 202  | 204  | 209  | 212  | 215  | 214  | 217  | 1.7                         |
| Proprietary                                | 72   | 74   | 75   | 86   | 91   | 99   | 107  | 110  | 113  | 119  | 119  | 121  | 4.7                         |
| State and local government                 | 112  | 111  | 113  | 111  | 111  | 112  | 112  | 112  | 114  | 115  | 115  | 117  | 0.4                         |

Net total fixed assets per hospital in undeflated dollars

| Area, teaching status, and type of hospital | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1981 |
|--------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| **Total**                                  | $3,099 | $3,404 | $3,815 | $4,201 | $4,781 | $5,545 | $6,402 | $7,343 | NA | NA | NA | 10.8 |
| Urban                                      | 4,921 | 5,411 | 6,107 | 6,743 | 7,742 | 9,043 | 10,481 | 11,462 | 12,130 | NA | NA | 11.3 |
| Rural                                      | 1,242 | 1,375 | 1,459 | 1,602 | 1,751 | 1,950 | 2,232 | 2,448 | 2,755 | NA | NA | 10.0 |
| Nonteaching                                | 2,289 | 2,564 | 2,624 | 2,677 | 3,348 | 3,619 | 3,958 | 4,510 | 4,783 | NA | NA | 9.3  |
| Teaching                                   | 13,266 | 13,502 | 15,100 | 16,333 | 17,949 | 21,857 | 24,437 | 24,790 | 26,279 | NA | NA | 8.5  |
| Private voluntary                          | 4,128 | 4,500 | 5,103 | 5,655 | 6,947 | 7,326 | 8,209 | 9,019 | 9,849 | NA | NA | 10.9 |
| Proprietary                                | 694 | 1,123 | 1,438 | 1,767 | 2,068 | 2,422 | 2,667 | 2,983 | 3,448 | NA | NA | 20.0 |
| State and local government                 | 2,157 | 2,260 | 2,410 | 2,574 | 2,602 | 3,638 | 4,521 | 4,623 | 4,093 | NA | NA | 8.0  |

Net total fixed assets per adjusted admission in undeflated dollars

| Area, teaching status, and type of hospital | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1981 |
|--------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| **Total**                                  | $1,718 | $2,025 | $2,339 | $2,859 | $3,391 | $4,014 | $4,812 | $5,719 | $6,719 | $7,819 | $8,919 | $10,019 | 13.8 |
| Urban                                      | 548 | 603 | 621 | 676 | 680 | 926 | 1,014 | 1,087 | NA | NA | NA | 8.6  |
| Rural                                      | 414 | 441 | 466 | 484 | 526 | 576 | 639 | 684 | 780 | NA | NA | 7.9  |
| Nonteaching                                | 462 | 506 | 509 | 558 | 626 | 668 | 717 | 788 | 864 | NA | NA | 7.5  |
| Teaching                                   | 777 | 770 | 770 | 800 | 880 | 1,001 | 1,176 | 1,356 | 1,477 | NA | NA | 7.9  |
| Private voluntary                          | 566 | 596 | 610 | 685 | 761 | 833 | 890 | 962 | 1,039 | NA | NA | 7.8  |
| Proprietary                                | 236 | 292 | 325 | 395 | 447 | 470 | 520 | 589 | 713 | NA | NA | 13.8 |
| State and local government                 | 451 | 484 | 502 | 538 | 572 | 614 | 715 | 776 | 851 | NA | NA | 7.8  |

NOTES: Data are based on hospital averages not weighted by admissions, days, or bed size. NA is data not available.

SOURCES: Abt Associates, Inc.; National Hospital Rate-Setting Study, Contract No. 500-78-0036. Prepared for the Health Care Financing Administration, Cambridge, Mass.; Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.
Table 8
Changes in hospital net total fixed assets and gross movable equipment and depreciation rates, by area, teaching status, and type of hospital: 1971-79

| Area, teaching status, and type of hospital | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 9-year total growth rate |
|-------------------------------------------|------|------|------|------|------|------|------|------|------|--------------------------|
| Change in net total fixed assets per hospital in deflated dollars |      |      |      |      |      |      |      |      |      |                          |
| Total                                      | $134 | $300 | $281 | $275 | $303 | $367 | $287 | $263 | $2684 |                          |
| Urban                                      | 211  | 494  | 483  | 423  | 525  | 301  | 608  | 299  | 4,395 |                          |
| Rural                                      | 57   | 103  | 74   | 121  | 79   | 124  | 135  | 103  | 170   | 966                      |
| Nonteaching                                | 71   | 247  | 202  | 220  | 190  | 225  | 183  | 192  | 254   | 1,774                    |
| Teaching                                   | 935  | 937  | 1,034| 774  | 1,440| 1,791| 807  | 329  | 10,616 |                          |
| Private voluntary                          | 199  | 341  | 381  | 347  | 446  | 487  | 465  | 323  | 545   | 3,534                    |
| Proprietary                                | 60   | 271  | 226  | 306  | 131  | 30   | 60   | 211  | 108   | 1,403                    |
| State and local government                 | 37   | 228  | 108  | 114  | 104  | 639  | 341  | 179  | -230  | 1,520                    |
| Change in movable equipment per hospital in deflated dollars |      |      |      |      |      |      |      |      |      |                          |
| Total                                      | $66  | $108 | $122 | $133 | $121 | $174 | $188 | $193 | $150  | $1,255                   |
| Urban                                      | 109  | 154  | 209  | 214  | 215  | 289  | 325  | 329  | 238   | 2,082                    |
| Rural                                      | 24   | 65   | 38   | 51   | 27   | 60   | 52   | 58   | 61    | 436                      |
| Nonteaching                                | 62   | 94   | 96   | 88   | 106  | 126  | 121  | 109  | 109   | 838                      |
| Teaching                                   | 121  | 273  | 732  | 477  | 626  | 761  | 681  | 733  | 453   | 4,847                    |
| Private voluntary                          | 91   | 125  | 168  | 185  | 170  | 252  | 242  | 259  | 201   | 1,693                    |
| Proprietary                                | 55   | 89   | 71   | 63   | 58   | 56   | 53   | 109  | 66    | 601                      |
| State and local government                 | 17   | 91   | 53   | 60   | 52   | 74   | 143  | 96   | 82    | 670                      |
| Depreciation rate                          |      |      |      |      |      |      |      |      |      |                          |
| Total                                      | 32.0 | 32.1 | 32.0 | 32.1 | 32.7 | 32.9 | 33.7 | 35.0 | 34.9  | 1.1                      |
| Urban                                      | 30.9 | 30.7 | 30.4 | 30.5 | 30.4 | 31.2 | 32.4 | 34.4 | 34.1  | 1.2                      |
| Rural                                      | 33.0 | 33.4 | 33.3 | 33.5 | 34.6 | 34.5 | 34.9 | 35.7 | 35.7  | 1.0                      |
| Nonteaching                                | 31.9 | 32.1 | 31.8 | 31.8 | 32.5 | 32.8 | 33.7 | 34.7 | 35.3  | 1.3                      |
| Teaching                                   | 34.0 | 32.1 | 33.2 | 35.7 | 34.4 | 33.8 | 33.3 | 37.9 | 32.0  | -0.8                     |
| Private voluntary                          | 32.0 | 32.7 | 32.5 | 33.1 | 33.0 | 33.2 | 33.8 | 34.8 | 34.4  | 0.9                      |
| Proprietary                                | 34.7 | 32.1 | 29.5 | 27.6 | 26.7 | 29.1 | 34.2 | 34.8 | 36.5  | 0.6                      |
| State and local government                 | 30.7 | 30.9 | 32.1 | 32.5 | 33.6 | 34.3 | 33.2 | 35.7 | 35.3  | 1.7                      |

NOTE: Data are based on hospital averages not weighted by admissions, days, or bed size.

SOURCES: Abt Associates, Inc.: National Hospital Rate-Setting Study. Contract No. 500-78-0026. Prepared for the Health Care Financing Administration. Cambridge, Mass.; Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.
Hospital employees and salaries

Labor input also grew significantly during the 1970's (Table 9). The number of full-time equivalent (FTE) employees per 100 admissions went from 5.28 in 1970 to 6.68 in 1981, a 2.1 annual percent change. This amounts to a 27-percent increase in the labor-output ratio in just 11 years. Teaching hospitals used roughly 50 percent more labor per admission in 1970 than nonteaching hospitals, but this gap narrowed to 40 percent by 1981. The labor-per-admission ratio grew fastest among proprietary hospitals (2.8 percent annually), although their 5.9 FTE's were still the lowest of any hospital group by 1981.

Salary expenses per FTE practically doubled over the 1970-79 period. Moreover, salary expenses per adjusted inpatient admission grew steadily from $296 in 1970 to $693 in 1979, an annual compound rate of growth of 9.5 percent. The more expensive mix of personnel in teaching hospitals is reflected in an average salary 34 percent above that in nonteaching hospitals, although the decadal inflation in salaries was very similar in both hospital types.

Discussion

As the data clearly indicate, the 1970's witnessed a major transformation of the hospital industry, primarily in response to expanding insurance coverage: not that admissions or inpatient days grew that fast with broader insurance, only 1-2 percent per year. Rather, intensity of care per admission mushroomed under the highly favorable climate of cost-based payment. Expenses per day grew a remarkable 13.5 percent per year, led by ancillary services that became almost one-half of all costs.

Such inflation over so short a time had profound effects on the ability of private citizens to purchase hospital services on their own. A day in the typical hospital, which cost only $70 in 1970, rose to $300 just 11 years later, and an entire admission averaged nearly $2,000. Care in a teaching hospital became even more unaffordable (over $3,000 per admission) without extensive insurance coverage.

Operating for the most part in a cost pass-through regime, the industry's labor-output ratio grew a steady 2 percent yearly; while at the same time, the capital-output ratio grew several times faster. The average hospital added over $2.5 million to its real assets on a base of just $3 million to begin the decade. At the extreme, teaching hospitals added over $10 million on a base of $13 million.

Huge labor and capital needs had pronounced effects on the industry's operating and financial performance. Profit rates fell during the early 1970's as revenues lagged behind intensity growth, and indebtedness doubled to support the rapid bed expansion or renovation and even higher rates of equipment investment. Occupancy rates fell as beds outpaced utilization growth that never reached expected levels because of shorter stays.

Essentially all types of hospitals participated in this transformation: rural hospitals, teaching hospitals, public, and private hospitals. Indeed, with a few important exceptions, such as the continually positive profit rates of proprietary and the low indebtedness of publics, the similarity among hospitals is striking. All became far more intensive, all invested large sums in new buildings and equipment, and all hired many new employees to service patients and manage a much larger organization.

Proprietary hospitals were exceptional only in their aggressivity. Whereas average bed size grew 20 percent in 11 years, proprietary bed size grew 70 percent. Whereas the typical hospital added 85 percent to its real capital stocks, the average proprietary added 200 percent. Consequently, proprietarys surpassed public hospitals in size over the decade (although still only one-half the size of private voluntaries). Most of this expansion was justified, however, by utilization growth 2-3 times above average.

Thus, at the turn of the 1980's, Federal, State, and local policymakers had a very different industry to contend with, one that had become "big business" in local communities in terms of jobs, construction, and purchasing. Its cost structure had put its services beyond the means of uninsured individuals and made it almost totally dependent on third-party payers—and especially Medicare. Its bottom-line financial picture was definitely on the upswing, in no small part a result of growing sources of nonpatient care income.

A few disturbing vestiges of this transformation remained, however. For example, only two out of every three beds were in use on a typical day; and for rural and public hospitals, capacity utilization was even lower and falling rapidly. Lengths of stay varied systematically across large regions and hospitals in ways unexplained by epidemiological factors. Finally, huge investments in beds and equipment incurred in the 1960's and 1970's were coming up for renewal in the 1980's, necessitating even greater indebtedness and another round of cost passthroughs.

Simple, painless solutions were not obvious. Controlling economy-wide inflation would help, but at no point during the 1970's was it the driving force behind the industry's escalating costs. Depressed utilization among rural and public hospitals indicated the need for more closures and mergers, but which hospitals? Hospital planning had been more effective in keeping local institutions open than in making the tough choices of which to close. And the drastic differences in cost structures across hospitals pointed to waste and inefficient operations, but how could one distinguish slack from legitimate differences in area wages and case-mix severity?

Two approaches gained favor in the 1980's, both emanating from earlier cost control efforts. In the 1960's and 1970's, the health maintenance organization movement, with its capitated payment arrangement, had already proven its effectiveness in reducing costly inpatient admissions in a younger, working population (Luft, 1981). Whether it will have continued success on older, less well populations...
### Table 9

Number of hospital full-time equivalent (FTE) employees and salary expenses, by area, teaching status, and type of hospital: 1970-81

| Area, teaching status, and type of hospital | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 |
|---------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Total FTE employees per 100 admissions       |      |      |      |      |      |      |      |      |      |      |      |      |
| Total                                        | 5.28 | 5.19 | 5.38 | 5.35 | 5.48 | 5.61 | 5.70 | 5.87 | 5.96 | 6.10 | 6.16 | 6.68 |
| Urban                                       | 5.72 | 5.72 | 5.90 | 5.91 | 6.04 | 6.21 | 6.31 | 6.55 | 6.87 | 6.74 | 6.79 | 7.20 |
| Rural                                       | 4.81 | 4.64 | 4.82 | 4.75 | 4.86 | 4.97 | 5.04 | 5.12 | 5.20 | 5.40 | 5.44 | 6.09 |
| Nonteaching                                  | 5.07 | 4.96 | 5.14 | 5.05 | 5.17 | 5.30 | 5.37 | 5.53 | 5.62 | 5.77 | 5.81 | 6.37 |
| Teaching                                     | 7.90 | 7.97 | 8.13 | 7.97 | 8.09 | 8.23 | 8.40 | 8.28 | 8.39 | 8.57 | 8.82 | 8.84 |
| Private voluntary                            | 5.58 | 5.49 | 5.65 | 5.58 | 5.71 | 5.86 | 5.96 | 6.18 | 6.30 | 6.46 | 6.51 | 7.12 |
| Proprietary                                  | 4.36 | 4.30 | 4.40 | 4.50 | 4.73 | 4.80 | 4.93 | 5.04 | 5.15 | 5.38 | 5.39 | 5.92 |
| State and local government                    | 5.13 | 5.03 | 5.33 | 5.32 | 5.39 | 5.51 | 5.57 | 5.82 | 5.64 | 5.71 | 5.80 | 6.18 |
| Salary expenses per FTE                      |      |      |      |      |      |      |      |      |      |      |      |      |
| Total                                        | $5,389 | $5,811 | $6,204 | $6,495 | $6,940 | $7,654 | $8,251 | $8,913 | $9,721 | $10,542 | NA | NA |
| Urban                                        | 6,023 | 6,479 | 6,976 | 7,290 | 7,842 | 8,665 | 9,265 | 10,031 | 10,925 | 11,718 | NA | NA |
| Rural                                        | 4,600 | 5,061 | 5,369 | 5,630 | 5,968 | 6,562 | 7,185 | 7,707 | 8,405 | 9,234 | NA | NA |
| Nonteaching                                  | 5,304 | 5,694 | 6,060 | 6,271 | 6,710 | 7,426 | 7,964 | 8,596 | 9,354 | 10,150 | NA | NA |
| Teaching                                     | 6,557 | 7,207 | 7,611 | 8,638 | 8,958 | 9,732 | 10,703 | 11,236 | 12,330 | 13,395 | NA | NA |
| Private voluntary                            | 5,538 | 5,992 | 6,485 | 6,745 | 7,212 | 7,976 | 8,618 | 9,330 | 10,234 | 11,022 | NA | NA |
| Proprietary                                  | 5,665 | 6,156 | 6,483 | 6,788 | 7,421 | 8,224 | 8,460 | 9,045 | 9,643 | 10,660 | NA | NA |
| State and local government                    | 4,799 | 5,248 | 5,465 | 5,850 | 6,155 | 6,715 | 7,409 | 8,007 | 8,732 | 9,528 | NA | NA |
| Salary expenses per adjusted admission        |      |      |      |      |      |      |      |      |      |      |      |      |
| Total                                        | $296 | $326 | $352 | $368 | $402 | $449 | $487 | $556 | $623 | $693 | NA | NA |
| Urban                                        | 353 | 395 | 437 | 454 | 499 | 553 | 613 | 691 | 757 | 849 | NA | NA |
| Rural                                        | 232 | 250 | 260 | 275 | 299 | 338 | 375 | 414 | 458 | 525 | NA | NA |
| Nonteaching                                  | 277 | 302 | 324 | 328 | 357 | 405 | 445 | 497 | 558 | 623 | NA | NA |
| Teaching                                     | 553 | 632 | 685 | 736 | 796 | 857 | 930 | 992 | 1,098 | 1,202 | NA | NA |
| Private voluntary                            | 325 | 357 | 392 | 402 | 438 | 501 | 551 | 616 | 690 | 768 | NA | NA |
| Proprietary                                  | 252 | 278 | 300 | 310 | 351 | 381 | 412 | 461 | 526 | 598 | NA | NA |
| State and local government                    | 254 | 264 | 290 | 329 | 355 | 380 | 429 | 482 | 532 | 588 | NA | NA |

**Notes:** Data are based on hospital averages not weighted by admissions, days, or bed size. NA is data not available.

**Sources:** Abt Associates, Inc.: *National Hospital Rate-Setting Study*, Contract No. 500-76-0006. Prepared for the Health Care Financing Administration, Cambridge, Mass., Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare cost reports for a 25-percent sample of U.S. short-term non-Federal hospitals.
remains unknown. The novel Medicare prospective payment system, with its fixed payment per admission, also had empirical support from the many State rate-setting programs implemented in the previous decade (Coelen and Sullivan, 1981; Morrisey et al., 1982; Biles et al., 1980). Prospective payment per admission or per day was found effective in reining burgeoning intensity and in trimming waste in costly hospitals.

How well the new, very intensive and financially mature hospital industry of the 1980’s will respond to the simultaneous pressures of fewer admissions and less intensive care is the policy question of the 1980’s and 1990’s. Extending Medicare and Medicaid coverage to millions of Americans played a signal role in altering the mode of inpatient care, not to mention the way in which we all think and use our local hospitals. Services that were uncovered on an outpatient basis were covered if one was lying in an expensive hospital bed. Ironically, the predictable response of the industry to carte blanche insurance coverage has led, in a very short time, to yet another rethinking of the hospital’s role, one which focuses even more than in the past on truly acute, expeditious care for all illnesses for all patients with a greater emphasis on outpatient care of all kinds.

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