

# An Analysis of Hospital Costs by Cost Center, 1971 Through 1978

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*Hospital cost analyses generally have not used costs broken down by hospital department or function due to the unavailability of appropriate data. The Medicare Cost Reports display direct cost by cost center, and the Health Care Financing Administration (HCFA) funded a project to abstract, edit, and categorize these data from a sample of 457 hospitals into meaningful groups. The author used the resulting data base to analyze trends in hospital costs, with cross tabulations by a hospital's teaching status, type of control, and bed size class, from 1971 through 1978. The author also used this data base to preliminarily assess whether introduction of the Medicare Section 223 reimbursement limits altered cost center growth trends.*

*The study found that the largest cost increases occurred among Ancillary Services. It also found slightly higher than average increases in Inpatient Services (concentrated in Special Care Units), and General Services increased at a below average rate. Outpatient Service costs escalated rapidly in absolute terms but rose much more slowly in per unit terms. The fastest growing cost quantity in the study was Other Ancillary Services, a miscellaneous group encompassing many of the new advanced technology services, which increased at a rate of 24 percent per year between 1973 and 1978. The study found costs per unit of output to be positively associated with bed size across all cost center categories, including General Services, where some evidence of economies of scale might have been expected.*

*The study found no evidence that the Section 223 limits affected cost growth longitudinally, but an understanding of the impact of these limits will require considerably more study.*

## Introduction

Retrospective analyses of hospital costs for research, planning, and public policymaking purposes have been limited, in large part, to the use of aggregate cost measures. Inpatient and outpatient cost measures are often the extent of disaggregation employed for such purposes, and many studies, including those attempting to analyze costs by a hospital's bed size, teaching status, and type of control, have used only total hospital costs.<sup>1</sup>

<sup>1</sup>Representative examples of such studies are Salkever (1979), Massel and Williams (1977), Payne (1979), and Sloan (1979).

The problem in obtaining national scale measurements of cost broken down by specific departments or functions is the absence of uniform accounting or uniform reporting requirements. The only national data collection initiative that places significant emphasis on uniform cost reporting by functional category is the Monitrend program operated by the American Hospital Association (AHA). While average cost data from this voluntary reporting service are published semiannually, trend analysis is inhibited by the lack of a consistent sample over time, and the data sets are generally not made available to outside researchers for reasons of subscriber confidentiality.

In the public sector, the annual reports required of all Medicare-participating hospitals represent the only national source of data by cost center. While the Medicare Cost Report (MCR) forms establish a reasonably comprehensive set of categories for the reporting of direct costs, the Health Care Financing Administration (HCFA) has thus far not strictly required hospitals to recast costs for reporting purposes from the "responsibility" cost centers developed for their own management purposes into the uniform "functional" cost centers of the report forms. Not only do the cost elements organized within the standard cost centers undoubtedly differ from institution to institution, but hospitals routinely substitute cost center titles, add cost centers to the basic form, combine cost centers and, in fact, substitute forms which display more than twice as many cost centers as shown on the HCFA forms.<sup>2</sup>

While aggregate cost measures are adequate for some analytical purposes, the lack of data broken down by cost center has inhibited analysis of trends in hospital costs as treatment modes and levels of care change and as new technology is implemented. National scale analysis of the effects of public programs and policies that may affect costs differently by cost center and long-range planning efforts for specific services have also been quite difficult to achieve. A review of the literature revealed completed national-scale hospital cost analyses, with uniform functional breakdowns, only in foreign countries where national reporting systems are more advanced than in this country.<sup>3</sup>

A national program that may affect hospital costs differently by cost center is the set of limits placed upon reimbursement for routine inpatient costs under the Medicare program (authorized under Section 223 of P.L. 92-603, the Social Security Amendments of 1972). It has been hypothesized that one response of hospitals to being penalized by these limits is to shift cost elements away from inpatient routine care cost centers. The recipient cost centers may be special care units, which are not covered by the limits, or ancillary and general service departments where the Medicare allocation system will allocate the costs to outpatient and special care units (and hospital-affiliated home health agencies and skilled nursing facilities, as applicable), in addition to routine care units. An in-depth understanding of the impact of the Section 223 limits on hospital cost performance demands the ability to go beyond measurement of routine inpatient costs to a breakdown of all hospital costs into meaningful functional categories.

As part of a support contract with HCFA's Office of Research and Demonstrations, Applied Management Sciences developed a data base of hospital financial and statistical data from the Medicare Cost Reports

of a nationally representative sample of nonfederal short-term hospitals. As part of this effort, direct cost data were collected for a number of HCFA standard cost centers. The primary purpose of this study was to develop data editing and computational methods permitting reliable tabulation of costs for select cost centers and cost center groupings, and then to document trends in these cost categories over the 1971 to 1978 period. A secondary purpose was to compare the inflation of inpatient routine costs to the inflation of other cost variables in an attempt to gain preliminary insight into the effects of the Section 223 limits.

Because the study represents an attempt to overcome some of the difficult data and computational problems of measuring hospital costs by cost center, this paper details the methodology used. This methodological discussion is divided into sections on data collection, development of the data base used for the analysis, and the cost measures employed. The paper then presents the results of the analysis, with separate sections addressing changes in hospital output statistics, changes in the proportion of hospitals reporting certain cost centers, and changes in reported costs by type of hospital control, teaching status, and bed size grouping. A discussion of possible effects of the Section 223 limits follows, and the paper ends with a summary of findings and conclusions.

## Methodology

### Data Collection

The data used in this study were hospital-reported direct costs after deletion of certain costs that are not allowable under Part A of Medicare. The two most common deletions are for: 1) remuneration of hospital-based physicians (which is reimbursed under Part B of Medicare), and 2) revenue offsets (for example, cafeteria costs offset by the amount of charges for meals provided to employees and visitors). The principal advantage of using these post-adjustment costs is that comparability is achieved in omission of the hospital-based physician payments. The cost center data before adjustment will reflect such costs when the services of hospital-based physicians are billed for by the hospital, but not when they are billed for by the physicians themselves.

Staff members classified all cost centers reported by the sample hospitals into one of the following five cost center groupings:

- *General Services*
- *Ancillary Services*
- *Inpatient Services*
- *Outpatient Services*
- *Other Cost Centers.*

<sup>2</sup>The Annual Hospital Report proposed by HCFA would alleviate many of these problems, but the timetable for its national implementation is uncertain at this time.

<sup>3</sup>Examples are Armstrong (1978) for Canada, and Debachere *et al.* (1977) for Belgium.

These groupings have been constructed in a comparable fashion since 1973, while collection of the specific cost center data was begun in 1971. In addition to the costs of all acute care units, the *Inpatient Services* grouping includes the direct costs of hospital-affiliated skilled nursing facilities and other long-term care units. The *Other Cost Centers* category includes a variety of non-reimbursable cost centers (private physician offices, gift shops, and so forth). The treatment of non-reimbursable costs in the Medicare adjustment process is inconsistent—some costs are subtracted out at this stage while others are carried forward for cost finding so that general services costs will be allocated to them before they are deleted from the reimbursable total. Therefore, while the *Other Cost Centers* variable is presented in this paper for completeness, little attention need be paid to the extreme variation it shows over the course of the analysis period and among hospital groups.

The abstracting process also involved the assignment of nonstandard cost center titles, as well as certain titles from outdated MCR forms, to the current MCR cost centers. An example is the *Administration and General* category, which entailed grouping a variety of titles ranging from common hospital departments (such as admitting, personnel, and data processing) to cost entries quite unlikely to be associated with distinct organizational units (such as stenography, board of trustees expenses, and legal fees). The staff compiled a dictionary of classification rules for several hundred titles to assure consistency in cost center assignments, and made clarifying calls to the sample hospitals when the nature of reported services was unclear.

While nearly all nonstandard cost center titles proved amenable to classification through this process, the abstracting staff also encountered frequent instances of hospitals combining the standard MCR cost centers. This problem could not be eliminated, but its contamination of the cost center data was minimized by: 1) limiting the scope of the study to services commonly organized by hospitals as separate departments; and 2) combining complementary MCR cost centers that were observed to have been combined frequently by the sample hospitals included in the study. The latter strategy resulted in the following combinations:

- *Dietary and Cafeteria*
- *Operation of Plant and Maintenance and Repairs*
- *Operating Rooms, Recovery Rooms, and Anesthesiology*
- *Diagnostic Radiology and Therapeutic Radiology*
- *Laboratory, Blood, and Blood Processing*
- *Emergency Rooms and Outpatient Clinics*
- *Adult and Pediatrics and Nursing Administration*
- *Intensive Care Units, Coronary Care Units and other Special Care Units.*

The combination of *Adult and Pediatrics and Nursing Administration* unfortunately crosses cost center grouping boundaries—the former being an *Inpatient Service* and the latter a *General Service*. While this has not been a problem in recent years, hospitals in the earlier years of the study period frequently reported inpatient direct costs in the *Nursing Administration* category.

In addition to the eight cost center combinations just listed, four other single MCR cost centers were included in the study. These are:

- *Administration and General*
- *Housekeeping*
- *Inhalation Therapy*
- *Physical Therapy.*

To complement the direct cost data, four inpatient variables resulting from the Medicare allocation procedures were collected. These variables are:

- *Inpatient Routine Costs*
- *Special Care Unit Costs*
- *Inpatient Ancillary Costs*
- *Total Inpatient Costs.*

All four of these variables include a general services cost allocation. For example, the *Inpatient Routine Cost* variable includes the direct costs of the routine nursing care units plus the indirect costs of these units allocated from such departments as *Administration and General*, *Housekeeping*, and *Dietary*. *Inpatient Routine Costs* are comparable to the "Hospital Inpatient General Routine Operating Costs" that were subject to the Medicare Section 223 limits during the latter part of the analysis period, except that the 8.5 percent premium on nursing salary costs allowed under the Medicare program has been omitted.

The remaining data collected from the Medicare Cost Reports of the sample hospitals were admissions and inpatient days (hospital and affiliated long-term care unit), outpatient occasions of service, hospital bed size, and type of control. Data for a dichotomous teaching variable were obtained from AHA annual hospital survey files. To be considered a teaching institution, a hospital must have reported an affiliation with a medical school and had one or more interns and residents for every ten beds.<sup>4</sup>

## Development of the Data Base

After the initial abstracting process, several additional data problems had to be addressed. The most severe problem was the absence of requisite cost or

<sup>4</sup>For a more detailed discussion of the data available from the Medicare Cost Reports, the problems encountered in using them for research or planning purposes, and recommendations for selecting and editing specific data elements, see Ashby and Redwine, *et al.* (1977).

output data due to missing pages of cost reports, scattered data element omissions, incorrect reporting, and illegibility. While it is often impossible to differentiate an omission from an intended zero on an MCR, 17 data elements (nearly 70 percent of those used) were believed to require an entry in all cases. Therefore, a hospital was eliminated from the study sample if it did not have a valid nonzero entry for all of these data elements in all eight years of the analysis period. This process pared the sample from 1,174 hospitals to 457.

The requirement of a nonzero entry was not made for several of the patient service cost centers because the author assumed that some hospitals do not provide the services. These cost centers are: the *Operating/Recovery Rooms, Labor and Delivery Rooms, Inhalation Therapy, Physical Therapy, Special Care Units, and Outpatient Services.*

Table 1 compares the edited sample with the original sample and the universe of nonfederal short-term hospitals according to type of control and bed size categories. As Table 1 shows, the edited sample considerably overrepresents hospitals with 400 or more beds (which was done purposely in the original sample design to enhance analytical capabilities for that group) and underrepresents for-profit institutions. While the sample is certainly sufficient to gain insight into departmental cost trends, caution must be exercised in attributing national representativeness to the results.

**TABLE 1**

**Proportion of Total Hospitals by Type of Control and Bed Size Group in the Hospital Universe and the Study Samples**

Type of Control and Bed Size Group	Universe Represented	ORD Master File	Edited Sample
Non-Federal			
Government	30.2	25.5	31.1
Non-Government			
Non-Profit	57.0	66.4	62.6
For-Profit	12.8	8.1	6.3
	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>
1-99 Beds	48.4	30.7	33.5
100-399 Beds	42.4	38.4	35.7
400 or More Beds	9.2	30.9	30.8
	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Note: Data for the universe cover 5,881 community hospitals in 1977; obtained from *Hospital Statistics: 1978 Edition*, American Hospital Association. The Office of Research and Demonstrations (ORD) Master File contains 1,141 hospitals, of which 457 are represented in the edited sample.

The hospital selection process was intended to produce a single sample of hospitals for use across all cost variables. One exception to this approach had to

be made—the measurement of outpatient costs per occasion of service. Outpatient volume data are reported so poorly that fewer than 60 percent of the otherwise acceptable hospitals could pass an editing test requiring a valid occasions-of-service entry in all years when outpatient costs were reported.

Another data problem was presented by the construct of adjusted patient days (and adjusted admissions). The original formula for this combination inpatient/outpatient variable was as follows (American Hospital Association, 1976):

$$AD = ID + OV \frac{OR/OV}{IR/ID}$$

where:

- AD = Adjusted Patient Days
- ID = Inpatient Days
- IR = Inpatient Revenue
- OV = Outpatient Visits
- OR = Outpatient Revenue.

The study had to overcome two substantial problems with this formula.

- An output statistic was required that encompasses not only hospital inpatient and outpatient services, but hospital affiliated long-term care facility and home health agency services, and it would be virtually impossible to obtain adequate output data for all four of these service categories.
- Revenue data by type of service were not available.

The author handled the lack of revenue data by substituting cost measures, which should track fairly consistently over time with their revenue counterparts, and then adopted the following simple derivation which is mathematically equivalent to the original formula:

$$\text{Adjusted Patient Days} = \text{Hospital Inpatient Days} \times \frac{\text{Total Cost}}{\text{Hospital Inpatient Cost}}$$

with Total Cost including inpatient, outpatient, home health, and skilled nursing facility costs.

The author encountered one other noteworthy problem in the development of the data base. The sample hospitals used a variety of fiscal year reporting periods, and reports frequently covered other than a 12-month period due to fiscal year changes. The data used for this study were both standardized to a January to December year and annualized as necessary using monthly inflation indices derived from the AHA's monthly panel survey of hospitals.

## Cost Measures

Each cost variable used in the study was measured in four different formulations:

- Aggregate cost for all hospitals;
- Cost per patient day (for inpatient services), per occasion of service (for outpatient services), and per adjusted patient day (for general services, ancillary services, and total costs);
- Cost per admission and per adjusted admission; and
- Cost as a percentage of total direct costs.

The measurements of cost per unit of output were formulated as the sum of costs in all hospitals divided by the sum of output in all hospitals. Since all of the output measures are hospital-wide, changes in service mix and intensity of service (for example, hospitals introducing new patient services) will affect the measurements of cost growth.

## Results

Table 2 displays the trends in hospital output meas-

ures for the sample hospitals. These data are presented primarily as a context for the cost tabulations to follow. Both patient days and admissions increased through 1974, declined moderately over the next several years, and then turned upward in 1978. The same general pattern occurred nationally, although the total eight-year increase in volume was larger in the universe due to the addition of over 70 community hospitals across the country, while the sample remained constant (American Hospital Association, 1979).

For services which are not universally provided by the sample hospitals, Table 3 shows the percentage of hospitals providing each service, as evidenced by a nonzero cost entry on the MCR. The proportion of hospitals providing three of the patient services increased substantially over the period of investigation—from 90 to 97 percent for *Inhalation Therapy*, from 77 to 87 percent for *Physical Therapy*, and from 72 percent to 78 percent for *Special Care Units*. A decline in the proportion of hospitals operating *Labor and Delivery Rooms* (from 87 to 84 percent) began in 1974 in response to the national decline in birth rate.

TABLE 2

Percentage Change in Output Measures by Year

Output Measure	Fiscal Year Period						
	1971-1972	1972-1973	1973-1974	1974-1975	1975-1976	1976-1977	1977-1978
Inpatient Days	1.0	2.0	1.8	-0.1	-0.5	-1.0	1.6
Adjusted Patient Days	1.8	4.5	-0.8	1.1	1.3	-1.0	1.4
Admissions	1.6	4.3	2.4	-0.3	-0.6	0.6	1.3
Adjusted Admissions	2.5	7.0	-0.2	0.9	1.3	0.3	1.5

TABLE 3

Percentage of Hospitals Providing Select Services by Year

Output Measure	Fiscal Year							
	1971	1972	1973	1974	1975	1976	1977	1978
<u>Ancillary Services</u>								
Labor and Delivery Room	87.1%	87.5%	88.4%	86.7%	86.4%	86.4%	85.1%	84.2%
Inhalation Therapy	90.4	90.4	92.3	93.7	94.5	96.5	96.3	97.4
Physical Therapy	77.5	78.1	80.5	81.6	83.4	84.9	86.7	87.1
<u>Inpatient Services</u>								
Special Care Units	—	—	71.6	72.6	75.7	75.9	77.9	78.3
<u>Outpatient Services</u>								
Other Cost Centers	—	—	43.3	41.8	46.2	56.0	55.6	55.1

## Trends by Cost Center and Grouping

Table 4 displays the compounded annual change in cost during the period of investigation for the cost center groupings (Part A) and for specific cost centers (Part B). Growth trends in the five major groupings are displayed separately in this and several subsequent tables because the measurement covers a

five-year period (1973-1978), while a seven-year period (1971-1978) is covered for most of the specific cost centers. As explained in the methodology section, the shorter period of analysis for the major groupings, for the two *Inpatient Service* cost centers, and for the *All Other Ancillary Services* measure was necessitated by differences in the design of earlier versions of the MCR reporting forms.

**TABLE 4**  
**Compounded Annual Percentage Change in Cost and Cost Per Unit of Output—by Cost Center Group (Part A) and by Select Cost Center (Part B)**

Part A Cost Center Group	Time Period Covered	Aggregate	Cost Measure	
			Per Patient Day or Adjusted Patient Day	Per Admission or Adjusted Admission
General Services	1973-1978	14.2	13.8	13.3
Ancillary Services	1973-1978	17.9	17.4	17.0
Inpatient Services	1973-1978	15.7	15.3	14.9
Outpatient Services	1973-1978	16.7	11.1 <sup>1</sup>	—
Other Cost Centers	1973-1978	15.7	15.2	14.8
Total Direct Cost	1973-1978	15.5	15.1	14.6

<sup>1</sup>*Outpatient Services* calculated per occasion of service, using a 40 percent smaller sample than was used for all other services, due to under-reporting.

Part B Cost Center	Time Period Covered	Aggregate	Cost Measure	
			Per Patient Day or Adjusted Patient Day	Per Admission or Adjusted Admission
<b>General Services</b>				
<b>Operation and</b>				
Maintenance of Plant	1971-1978	16.6	15.3	14.5
Administration and General	1971-1978	13.6	12.3	11.5
Housekeeping	1971-1978	11.1	9.8	9.0
Dietary and Cafeteria	1971-1978	9.5	8.2	7.5
<b>Ancillary Services</b>				
<b>Operating Room, Recovery</b>				
Room, and				
Anesthesiology	1971-1978	14.7	13.4	12.6
Labor and Delivery Room	1971-1978	10.9	9.7	8.9
Radiology	1971-1978	16.1	14.8	13.9
Laboratory	1971-1978	14.0	12.7	11.9
Inhalation Therapy	1971-1978	20.5	19.1	18.3
Physical Therapy	1971-1978	14.7	13.4	12.6
All Other	1973-1978	24.6	24.2	23.7
<b>Inpatient Services</b>				
<b>Adult and Pediatrics and</b>				
Nursing Administration	1973-1978	11.5	11.1	10.7
Special Care Units	1973-1978	21.3	20.8	20.4
Total Direct Costs	1971-1978	14.1	12.8	12.0

Expenses rose 14.1 percent per year for "Total Direct Cost" over the 1971-78 analysis period. The average cost increases were lower calculated per adjusted patient day and per adjusted admission (12.8 and 12.0, respectively), due to net increases in the volume of patient services during the period. Since the study used hospital-wide output measures for all departmental cost measurements, this same relationship among the three cost growth formulations will be observed throughout the study results.

The study found the largest cost increases among the *Ancillary Services*, where all cost centers examined, with the exception of *Labor and Delivery Rooms*, grew at a faster pace than overall hospital costs. The highest growth department was *Inhalation Therapy* (19.1 percent increases annually measured per adjusted patient day), undoubtedly resulting from greatly expanded use of the service. The next highest service was *Radiology*, with 14.8 percent compounded annual growth, probably attributable in large part to expanded use of new procedures such as CAT scans. The most dramatic increases, however, were observed in the sum of ancillary costs other than those of the six specific services analyzed. This category grew at a rate of 24.2 percent per year, suggesting continued development and evermore widespread use of new forms of diagnostic and therapeutic technology.<sup>5</sup>

The *Inpatient Services* as a group showed approximately average cost increases, but this moderation was limited entirely to the routine care units (*Adult and Pediatrics*). These units, measured per patient day, increased an average of 11.1 percent per year, in contrast to 20.8 percent for *Special Care Units*. This

<sup>5</sup>Among the many "All Other Ancillary Services" reported by the sample hospitals were Audiology, Cardiopulmonary Resuscitation (CPR) Team, Clinical Physiology, Electrocardiology, Electroconvulsive Therapy, Electroencephalography, Electromyography, Fluid Therapy, Gastroenterology, Hyperbaric Lab, Infusion Therapy, Laser Therapy, Orthotics, Otology, Recreational Therapy, Renal Dialysis, Somatic Therapy, Sonography, Spinal Therapy, Stress Therapy, Thermography, and Weight Control Counseling.

very substantial difference in cost growth appears to have resulted primarily from a major shift of patients from routine to special care treatment.

*Outpatient Services* costs in aggregate increased by more per year than total costs increased (16.7 and 15.5 percent, respectively, over the last five years), but increased only 11.1 percent per year on a per occasion of service basis. This latter result could indicate returns to scale from expanded outpatient activity, as well as cost restraint in units that traditionally have not returned revenue equal to associated costs. However, another factor may be non-comparability in some cases between outpatient department direct costs and output counts that include both outpatient department encounters and separate ancillary service encounters. The observed results would be consistent with the reasonable hypothesis that visits for patients obtaining ancillary services without being examined in an outpatient department have been increasing faster than clinic and emergency room visits.

The *General Services* grew at a slower than average pace. This result might well be expected since the support departments within this grouping are: 1) subject to the most direct administrative control; and 2) generally affected the least by intensity-of-service changes. This latter factor is illustrated by the *Dietary and Cafeteria* cost center, which at 8.2 percent per year had the lowest growth in costs per day or adjusted day of any of the services within the study. None of lower lengths of stay, a shift toward greater use of special care units, or greater use of ancillary services, would be expected to significantly affect this department. The one *General Service* higher than average in cost growth was the *Operation of Plant and Maintenance* category (15.3 percent per year on an adjusted patient day basis), which probably reflects a combination of rising energy costs, increasingly stricter life/safety code requirements, and the maintenance requirements of complex new medical equipment.

Table 5 summarizes the net effect of the differential rates of cost increase over the 1973-1978 period discussed previously. *General Services* have declined from 52.1 to 49.3 percent of total costs. *Ancillary Services* have risen from 24.1 to 26.7 percent of the total, while both the *Inpatient Services* and *Outpatient Services* have shown modest gains in proportion. The small overall increase in the *Inpatient Services* category nets the effect of expansion in special care treatment and relative contraction in routine care treatment.

TABLE 5

Percentage of Total Cost by Cost Center Group and Specific Cost Center in 1973 and 1978

Cost Center Group and Specific Cost Center	Percentage of Total- 1973	Percentage of Total- 1978
<u>General Services</u>	52.1	49.3
Operation and Maintenance of Plant	4.9	5.6
Administration and General	10.8	11.4
Housekeeping	3.4	3.0
Dietary and Cafeteria	6.0	4.7
<u>Ancillary Services</u>	24.1	26.7
Operating Room, Recovery Room, and Anesthesiology	5.9	6.0
Labor and Delivery Room	1.0	0.9
Radiology	4.0	4.4
Laboratory	6.6	6.5
Inhalation Therapy	1.3	1.5
Physical Therapy	0.7	0.7
All Other	4.6	6.7
<u>Inpatient Services</u>	19.9	20.1
Adult and Pediatrics and Nursing Administration	20.3	17.0
Special Care Units	2.5	3.2
<u>Outpatient Services<sup>1</sup></u>	2.6	2.8
<u>Other Cost Centers</u>	1.2	1.3

<sup>1</sup>*Outpatient Services* costs were measured using a 40 percent smaller sample than that used for other services, due to under-reporting.

The *Other Cost Centers* grouping grew from 1.2 to 1.3 percent of total costs between 1973 and 1978. Due to the small magnitude of these costs and problems in their measurement (discussed in the Methodology section), this grouping will not be discussed in the remainder of this paper.

Table 6 presents the growth in aggregate costs by year. Total cost changes were lowest in 1971-1972 (7.9 percent), during the first phase of the Economic Stabilization Program (ESP). They were highest from 1973 through 1976 and peaked at 19.2 percent in 1974-1975 when the ESP controls were first fully removed. Most of the cost centers show this same accelerating then decelerating growth pattern, but several growth spurts and marked growth rate declines occurred relative to the standard of change in total cost.

*Outpatient Services* showed a surge lasting from 1973 through 1976, followed by below-average increases over the last two years of the study. The pattern of growth in the *Inpatient Services* on the other hand, remained stable in relative terms. *Adult and Pediatrics* costs increased substantially less than total costs in all years of the study, and *Special Care Unit* costs consistently increased more than an average amount.

Among the *Ancillary Services*, it appears that the use of certain services was expanding in the earlier years of the analysis period and that average or below average growth rates in these services in the latter years signaled completion of this pattern of increasing service intensity. Under this hypothesis, *Laboratory and Physical Therapy* crested in 1974, *Radiology* in 1976, and *Inhalation Therapy* in 1977. The "All Other Ancillary Services" category, on the other hand, continued to expand in relative terms throughout the study period.



TABLE 6

## Annual Percentage Change in Cost by Cost Center Group and Specific Cost Center

Cost Center Group and Specific Cost Center	Fiscal Year Period						
	1971-1972	1972-1973	1973-1974	1974-1975	1975-1976	1976-1977	1977-1978
<u>General Services</u>	—	—	13.1	15.7	13.0	15.7	13.5
Operation and Maintenance of Plant	11.6	12.9	21.5	25.5	16.2	15.9	13.4
Administration and General	2.6	9.6	14.3	23.8	20.3	14.2	11.9
Housekeeping	5.6	10.0	14.7	17.0	9.9	9.5	11.1
Dietary and Cafeteria	4.2	13.1	13.4	14.2	5.3	6.9	9.7
<u>Ancillary Services</u>	—	—	18.0	23.2	20.3	14.7	13.3
Operating Room, Recovery Room, and Anesthesiology	9.4	14.3	18.1	17.9	14.3	16.2	12.7
Labor and Delivery Room	3.9	11.5	8.7	14.4	11.6	12.2	14.8
Radiology	11.2	14.4	22.7	21.7	17.0	13.2	12.7
Laboratory	7.8	15.3	19.8	19.3	14.3	12.0	9.9
Inhalation Therapy	19.6	20.9	28.4	25.2	19.4	20.4	10.2
Physical Therapy	4.6	20.4	24.8	16.4	11.1	12.4	14.2
All Other	—	—	9.6	40.9	41.0	16.6	18.3
<u>Inpatient Services</u>	—	—	22.9	21.7	11.5	16.1	7.0
Adult and Pediatrics and Nursing Administration	—	—	11.4	13.8	11.2	9.8	11.2
Special Care Units	—	—	32.1 <sup>1</sup>	23.3	18.5	17.1	15.9
<u>Outpatient Services</u>	—	—	20.6	20.2	17.8	12.5	12.9
<u>Other Cost Centers</u>	—	—	9.4	35.8	52.3	-22.9	18.6
<u>Total Direct Cost</u>	7.9	13.6	16.4	19.2	15.1	13.8	13.1

<sup>1</sup>This percent change is probably overstated by 7 to 10 percentage points, with a corresponding understatement in the *Adult and Pediatrics* cost of .5 to 1 point. In 1973, hospitals were directed for the first time to segregate special care unit direct costs from routine care unit direct costs, and there is evidence from the sample MCRs that a few hospitals failed to do so in the first year. Data for measurement of the proportion of hospitals offering special care service (Table 3) were obtained from another source within the MCR, and are not believed to be biased.

### Cost Center Trends by Type of Control

Table 7 presents compounded annual changes in cost per unit of output (per patient day, adjusted patient day, and occasion of service) by type of hospital control. The private nonprofit hospitals consistently registered the lowest overall annual increases. Over the full eight-year analysis period, the nonfederal government hospitals had the greatest cost increase, but the for-profit institutions showed the largest increase over the last four years. The sample for-profit institutions suffered a precipitous drop in inpatient volume during the 1974-1975 period which did not occur nationally, and as indicated earlier, these institutions were underrepresented in the sample. For these reasons, some of the trends and absolute values are likely to be underrepresentative of the nation's investor-owned hospitals, although comparisons of relative cost performance by cost center should be reasonably reliable.

The lower rates of growth in private nonprofit hospitals were spread quite evenly across the cost centers examined. This was not true, however, for the higher-than-average growth rates observed in government hospitals. The study found larger growth among several of the patient care departments, and the largest increase differentials were in *Labor and Delivery Rooms*, *Outpatient Services*, and *Special Care Units*. In all three of these cost centers, the differentials are explained at least in part by relative increases in the intensity of these services as represented by the proportion of hospitals providing them. The following data show that government hospitals were the least likely to offer special care services in 1973, but that the group made up some lost ground over the next five years.

TABLE 7

**Compounded Annual Percentage Change in Cost per Unit of Output by Type of Control—by Cost Center Group (Part A) and by Specific Cost Center (Part B)**

Part A Cost Center Group	Time Period Covered	Type of Control		
		Non-Federal Government	Non-Government Non-Profit	For Profit
General Services	1973-1978	14.3	13.5	16.7
Ancillary Services	1973-1978	18.1	17.2	20.0
Inpatient Services	1973-1978	17.4	14.8	11.4
Outpatient Services <sup>1</sup>	1973-1978	13.1	11.4	—
Other Cost Centers	1973-1978	26.0	9.0	14.8
<b>Total Direct Cost</b>	<b>1973-1978</b>	<b>16.0</b>	<b>14.7</b>	<b>16.7</b>

Part B Cost Center	Time Period Covered	Type of Control		
		Non-Federal Government	Non-Government Non-Profit	For Profit
<b>General Services</b>				
<b>Operation and Maintenance of Plant</b>				
Administration and General	1971-1978	14.6	15.5	13.8
Housekeeping	1971-1978	12.1	12.3	14.6
Dietary and Cafeteria	1971-1978	10.5	9.6	10.7
<b>Ancillary Services</b>				
<b>Operating Room, Recovery Room, and</b>				
Anesthesiology	1971-1978	8.4	8.2	9.1
Labor and Delivery Room	1971-1978	14.6	13.2	9.7
Radiology	1971-1978	13.2	8.6	11.0
Laboratory	1971-1978	15.0	14.7	15.4
Inhalation Therapy	1971-1978	14.4	12.2	11.7
Physical Therapy	1971-1978	21.6	18.3	21.7
All Other	1973-1978	14.3	13.0	18.5
<b>Inpatient Services</b>				
<b>Adult and Pediatrics and</b>				
Nursing Administration	1973-1978	11.3	11.0	10.3
Special Care Units	1973-1978	26.4	19.3	20.6
<b>Total Direct Cost</b>	<b>1971-1978</b>	<b>13.7</b>	<b>12.5</b>	<b>13.0</b>

NOTE: Cost is measured per patient day for *Inpatient Services*, per occasion of service for *Outpatient Services*, and per adjusted patient day for *General Services*, *Ancillary Services*, *Other Cost Centers*, and *Total Direct Cost*.

<sup>1</sup>*Outpatient Services* costs are measured using a 40 percent smaller sample than used for all other services due to under-reporting—omitted for profit-making hospitals due to an unacceptably small sample.

Proportion Offering Special Care Services	Government Hospitals	Nongovernment Hospitals
1973	55.9%	78.3%
1978	66.9%	85.1%
Change in Proportion	+ 19.7%	+8.7%

*Outpatient Services and Labor and Delivery Room Services* tend to be important service components of many government hospitals (particularly those located in inner-city areas). The following table shows that the sample government hospitals were more likely to begin or to continue offering these services between 1973 and 1978.

Proportion Offering Outpatient Services Through an Organized Department	Government Hospitals	Non-Government Hospitals
1973	95.1%	96.8%
1978	98.6%	97.1%
Change in Proportion	+ 3.5%	+ .3%

  

Proportion Offering Labor and Delivery Services	Government Hospitals	Non-Government Hospitals
1973	93.7%	86.0%
1978	91.5%	81.2%
Change in Proportion	- 2.3%	- 5.6%

The higher-than-average cost increases in investor-owned hospitals were concentrated in the *General Services* and *Ancillary Services* (which comprise about 75 percent of *Total Direct Costs*), while *Inpatient Services* costs rose at a lower rate. While one might expect for-profit hospitals to achieve the best cost performance in those services most subject to administrative control, only one of the four *General Services* departments analyzed, *Operation and Maintenance of Plant*, grew at a lesser rate than in the sample as a whole.

While a comparison of absolute costs between for-profit and nonprofit hospitals might be biased by bed size differences and other factors, the following data compare ratios of cost per unit of output by type of service between these groups.

Ratios of Cost per Unit of Output Between For-Profit and Non-Profit Hospitals	1973	1978
General Services	.75	.91
Ancillary Services	.84	1.00
Inpatient Services	.97	.79
Total Direct Costs	.79	.91

These ratios suggest that any cost advantage that for-profit hospitals had in 1973 was likely to be found in the *General Services* departments, but that by 1978 the relative advantage had shifted to the *Inpatient Services*. The majority of the *Inpatient Services* cost growth differential occurred in the *Adult and Pediatrics* category, which suggests that staffing economies may have been a key factor. Less shifting of patients to special care units does not appear to have been a substantial factor, since costs in these units rose only .2 percent less per year than in all other hospitals.

### Cost Center Trends by Teaching Status

Table 8 shows that teaching hospitals have managed to constrain total costs per unit of output relative to nonteaching facilities. This outcome was aided, however, by a 4 percent increase in patient days over the course of the analysis period, in comparison to a .1 percent drop in inpatient volume for nonteaching hospitals. The difference in growth rate was quite substantial in the *General Services* category (10.5 percent per year for teaching hospitals compared to 14.7 percent per year for nonteaching hospitals between 1973 and 1978), encompassing all four of the specific departments analyzed.

The study found lower cost growth in teaching hospitals in four of the six *Ancillary Services* departments studied, with the widest differentials shown in *Physical Therapy* and *Inhalation Therapy*. As detailed below, in both of these departments, teaching hospitals were much more likely to have offered the service towards the beginning of the analysis period so that intensity-of-service change was much less of a cost-influencing factor for them.

Proportion of Hospitals Offering Inhalation Therapy	Teaching Hospitals	Non-Teaching Hospitals
1973	97.4%	91.9%
1978	97.6%	97.3%
Change in Proportion	+ .2%	+ 5.9%

  

Proportion of Hospitals Offering Physical Therapy	Teaching Hospitals	Non-Teaching Hospitals
1972	92.5%	76.7%
1978	92.9%	97.3%
Change in Proportion	+ .4%	+ 26.9%

TABLE 8

**Compounded Annual Percentage Change in Cost per Unit of Output  
by Teaching Status—by Cost Center Group (Part A) and by  
Specific Cost Center (Part B)**

Part A Cost Center Group	Time Period Covered	Teaching Status	
		Teaching	Non-Teaching
General Services	1973-1978	10.5	14.7
Ancillary Services	1973-1978	16.9	17.4
Inpatient Services	1973-1978	18.2	14.4
Outpatient Services <sup>1</sup>	1973-1978	11.3	10.8
Other Cost Centers	1973-1978	9.8	19.0

Part B Cost Center Group	Time Period Covered	Teaching Status	
		Teaching	Non-Teaching
<u>General Services</u>			
<u>Operation and Maintenance of Plant</u>			
Maintenance of Plant	1971-1978	12.4	16.0
Administration and General	1971-1978	9.5	13.0
Housekeeping	1971-1978	9.1	9.8
Dietary and Cafeteria	1971-1978	7.0	8.5
<u>Ancillary Services</u>			
<u>Operating Room, Recovery Room, and Anesthesiology</u>			
Anesthesiology	1971-1978	14.1	13.0
Labor and Delivery Room	1971-1978	9.9	9.5
Radiology	1971-1978	12.7	15.2
Laboratory	1971-1978	11.8	12.7
Inhalation Therapy	1971-1978	16.2	19.9
Physical Therapy	1971-1978	8.5	14.7
All Other	1973-1978	23.6	24.0
<u>Inpatient Services</u>			
<u>Adult and Pediatrics and Nursing Administration</u>			
Nursing Administration	1973-1978	9.8	11.2
Special Care Units	1973-1978	26.0	19.0
<u>Total Direct Cost</u>	1971-1978	11.7	12.9

NOTE: Cost is measured per patient day for *Inpatient Services*, per occasion of service for *Outpatient Services*, and per adjusted patient day for *General Services*, *Ancillary Services*, *Other Cost Centers*, and *Total Direct Cost*.

<sup>1</sup>*Outpatient Services* costs are measured using a 40 percent smaller sample than used for all other services due to underreporting.

The converse situation—costs in teaching hospitals pressed upward by intensity-of-service considerations—was undoubtedly at play in the one cost category in which costs rose faster in teaching than in nonteaching hospitals. This category was *Special Care Units* (costs rose 26.0 percent in teaching hospitals and 19.0 percent in nonteaching hospitals) suggesting that the nation's large universities and other major educationally-oriented institutions are at the forefront of new developments in this area. The proportion of teaching hospitals offering special care

services did not rise during the analysis period (over 97 percent of them provided some form of special care in 1973), such that the larger growth in this cost center would appear to be tied to expansion in the size or scope of special care units.<sup>6</sup>

<sup>6</sup>Among the many types of special care services reported by the sample hospitals were: Burn Care Unit, Coronary (Cardiac) Care Unit, Intensive Care Unit (including various medical, surgical, pediatric, and infant specialty units), Stroke Care Unit, Sub-Intensive Care or Sub-Coronary Care Unit, and Trauma Care Unit.

## Cost Center Trends by Bed Size Group

Table 9 presents cost change trends by bed size category. While the range of differentials is modest, the largest total cost increases are observed in the 100-249 bed and the 400-and-over bed categories, while the smallest increases occurred in the 250-399 bed group.

The hospitals with 400 or more beds intersect significantly with both the teaching and government hospital groupings. These large hospitals had the highest cost growth in the *Labor and Delivery Room* and *Outpatient Services* departments, which was characteristic of the predominantly urban-located government institutions, and they have the highest surgical cost growth, which was characteristic of the teaching group.

**TABLE 9**  
**Compounded Annual Percentage Change in Cost per Unit of Output by**  
**Bed Size—by Cost Center Group (Part A) and by Specific Cost Center (Part B)**

Part A Cost Center Group	Time Period Covered	Bed Size Group			
		1-99	100-249	250-399	400 +
General Services	1973-1978	13.3	14.5	12.9	13.7
Ancillary Services	1973-1978	16.5	16.8	16.2	17.7
Inpatient Services	1973-1978	14.2	14.1	14.1	15.8
Outpatient Services <sup>1</sup>	1973-1978	8.7	8.3	5.2	13.0
Other Cost Centers	1973-1978	16.2	15.0	11.4	16.3
Total Direct Cost	1973-1978	14.3	15.2	13.9	15.2

  

Part B Cost Center Group	Time Period Covered	Bed Size Group			
		1-99	100-249	250-399	400 +
<b>General Services</b>					
<b>Operation and Maintenance of Plant</b>					
Administration and General	1971-1978	14.8	16.3	15.3	15.1
Housekeeping	1971-1978	13.0	13.1	13.4	11.8
Dietary and Cafeteria	1971-1978	10.0	9.7	9.1	9.9
8.6	1971-1978	8.8	7.4	8.3	
<b>Ancillary Services</b>					
<b>Operating Room, Recovery Room, and</b>					
Anesthesiology	1971-1978	10.9	12.8	9.7	14.2
Labor and Delivery Room	1971-1978	7.4	5.3	7.0	10.8
Radiology	1971-1978	14.5	14.2	13.4	15.0
Laboratory	1971-1978	15.3	13.3	11.9	12.4
Inhalation Therapy	1971-1978	26.9	20.2	17.6	18.7
Physical Therapy	1971-1978	18.3	16.6	12.0	12.7
All Other	1973-1978	15.3	22.8	28.5	24.0
<b>Inpatient Services</b>					
<b>Adult and Pediatrics and</b>					
Nursing Administration	1973-1978	11.1	11.0	10.3	11.2
Special Care Units	1973-1978	31.9	21.0	19.1	20.5
Total Direct Cost	1971-1978	12.4	12.8	11.9	12.9

NOTE: Cost is measured per patient day for *Inpatient Services*, per occasion of service for *Outpatient Services*, and per adjusted patient day for *General Services*, *Ancillary Services*, *Other Cost Centers*, and *Total Direct Cost*.

<sup>1</sup>*Outpatient Services* costs are measured using a 40 percent smaller sample than used for all other services due to under-reporting.

The other high increase category, 100-249 bed hospitals, had a much different complement of cost changes. This group had the highest inflation among the *General Services*, most noticeably in *Operation and Maintenance of Plant*. In contrast to the 400-plus group, these hospitals had relatively low *Outpatient Services* cost growth (including the very lowest outpatient growth in absolute dollar terms), and also the lowest growth in *Labor and Delivery Room* costs. These findings may indicate that these mid-size hospitals are the most likely to be located in suburban areas and in the non-inner-city portions of the largest cities, where indigent and medically indigent populations are the least prevalent.

The smallest bed size group, up to 99 beds, had near mean total cost increases, with an interesting combination of the highest and lowest cost increases within the various patient service categories. As the following chart shows, these institutions initially had the most catching up to do of any group analyzed in the study in terms of the proportion of hospitals offering *Inhalation Therapy*, *Physical Therapy*, and *Special Care Units*.

Proportion of Hospitals Offering Inhalation Therapy	Up to 99 Bed Hospitals	All Other Hospitals
1972	80.0%	96.2%
1978	94.8%	98.7%
Change in Proportion	+ 18.5%	+ 2.6%

Proportion of Hospitals Offering Physical Therapy	Up to 99 Bed Hospitals	All Other Hospitals
1972	49.7%	94.2%
1978	69.3%	96.1%
Change in Proportion	+ 39.4%	+ 2.0%

Proportion of Hospitals Offering Special Care Services	Up to 99 Bed Hospitals	All Other Hospitals
1972	21.5%	90.3%
1978	42.5%	98.0%
Change in Proportion	+ 97.7%	+ 8.5%

As a result, the small hospital average cost increases among these services were considerably higher than in all other hospitals: 26.9 percent compared to 18.8 percent for *Inhalation Therapy*; 18.3 percent compared to 13.3 percent for *Physical Therapy*; and 31.9 percent compared to 20.6 percent for *Special Care Units*. At

the same time, the opposite phenomenon was occurring in the residual *Ancillary Services* costs. This quantity, which was earlier shown to contain some of the newer, advanced-technology services, grew at a rate of 15.3 percent per year in the smallest hospitals, compared to 24.7 percent in the other bed size groups.

Table 10 displays costs per unit of output by bed size group in 1978 in order to address the question of whether economics of scale exist in any of the hospital direct cost categories. As would be expected, the costs per unit of output rise consistently with larger bed size in most of the patient care departments. This outcome can be attributed to greater scopes of services and more complex case-mix in the larger hospitals.

Economics of scale would be expected among the *General Services*, and a surprising finding is that the sample hospital cost data provide absolutely no evidence of this happening. The difference in cost by bed size (indicative of diseconomies of scale) is as great, and in several cases greater, in the *General Services* cost centers than in the various *Ancillary Services*, *Inpatient Services*, and *Outpatient Services* cost centers.

### The Medicare Section 223 Limits

Table 11 displays the annual change in *Inpatient Routine Cost per Patient Day*—the variable covered by the Medicare Section 223 limits—and three other inpatient cost variables emanating from the Medicare cost allocation system. The Section 223 limits went into effect for reporting periods beginning July 1, 1974, and the data base defines reporting periods starting July 1 or later as producing 1975 data.<sup>7</sup> Consequently, the first annual percent change shown in Table 11 preceded implementation of the limits.

While both *Special Care Unit Costs* and *Inpatient Ancillary Costs* increased at a significantly higher rate than *Inpatient Routine Costs*, the relationship of growth rates between the routine and total cost variables remains fairly stable over the five-year period. The ratio of *Inpatient Routine Cost* growth to *Total Cost* growth climbed in 1976-1977, but then fell immediately back to its previous level. This longitudinal data gives no immediate indication that implementation of the limits changed the composition of cost increases.

<sup>7</sup>The only exception to this rule would be a partial-year report (resulting from a change in fiscal years) that began on July 1, 1974, which would be assigned to the 1974 data.

**TABLE 10**  
**Cost per Unit of Output in 1978 by Bed Size—by Cost Center Group**  
**and by Specific Cost Center**

Cost Center Group and Specific Cost Center	Bed Size Group			
	1-99	100-249	250-399	400+
<u>General Services</u>	\$65.91	\$88.38	\$91.67	\$99.44
Operation and				
Maintenance of Plant	8.55	10.28	11.36	10.89
Administration and General	18.71	22.63	22.19	22.10
Housekeeping	4.75	5.39	5.67	5.93
Dietary and Cafeteria	9.36	9.14	8.54	9.08
<u>Ancillary Services</u>	38.57	46.67	46.44	54.59
Operating Room, Recovery				
Room and				
Anesthesiology	6.21	10.62	9.80	12.56
Labor and Delivery Room	0.64	1.01	1.81	1.91
Radiology	5.98	7.60	7.90	8.88
Laboratory	9.99	12.07	11.66	13.07
Inhalation Therapy	3.33	3.12	2.91	2.95
Physical Therapy	1.50	1.38	1.29	1.34
All Other	10.92	10.89	11.06	13.88
<u>Inpatient Services</u>	39.75	41.76	46.03	47.91
Adult and Pediatrics and				
Nursing Administration	35.23	37.03	38.52	40.23
Special Care Units	2.57	6.00	6.88	8.17
<u>Outpatient Services<sup>1</sup></u>	3.20	6.45	4.23	7.45
<u>Other Cost Centers</u>	0.96	1.41	3.07	2.56

NOTE: Cost is measured per patient day for *Inpatient Services*, per occasion of service for *Outpatient Services*, and per adjusted patient day for *General Services*, *Ancillary Services*, and *Other Cost Centers*.

<sup>1</sup>*Outpatient Services* costs are measured using a 40 percent smaller sample than used for all other services due to under-reporting.

**TABLE 11**  
**Percentage Change in Post-Allocation Inpatient Cost Variables**  
**by Year**

Cost Variable	Fiscal Year Period				
	1973-1974	1974-1975	1975-1976	1976-1977	1977-1978
Inpatient Routine Costs per Patient Day	12.4	13.5	11.7	13.1	8.4
Special Care Unit Costs per Patient Day	20.4 <sup>1</sup>	30.9	24.7	11.7	17.7
Inpatient Ancillary Costs per Patient Day	23.6	18.0	17.5	16.7	14.0
Total Inpatient Costs per Patient Day	16.7	17.4	15.0	14.6	11.5
Ratio of Routine Cost Change to Total Cost Change	.74	.78	.78	.90	.73

<sup>1</sup>Unlike the direct cost data presented in Table 6, there is believed to be little, if any, bias in this measurement of Special Care Unit costs due to errors in reporting in 1973.

The low cost increases in routine care, relative to the *Special Care* and *Ancillary Services* categories, could be attributable to a number of factors. These factors include:

- Systematically increasing the intensity of *Ancillary Services* provided to inpatients
- Systematically increasing the per patient resources used in *Special Care* treatment regimens
- Systematically shifting the treatment of certain types of cases from routine care units to *Special Care Units*
- Shifting functions from the nursing staff of routine care units to the staff of *General Services* or *Ancillary Services* departments (for example, transferring unit drug preparation from nurses to pharmacy personnel, and transferring administration of inhalation therapy treatments from nurses to inhalation therapists)
- Transferring costs from routine care units to general service departments (for example, carrying nursing supervisory personnel as employees of *Nursing Administration* rather than as employees of *Adult and Pediatrics*)
- Intensifying efforts to reduce nurse staffing requirements through such means as: work measurement studies, improved patient scheduling to smooth the patient load by unit and day of the week, and improved staff scheduling to better correlate staffing to workload (as measured by number of patients and the relative nurse dependency of various types of patients).

Some of these phenomena (the last four items) could be the result of attempts to avoid losses under the Section 223 limits, but all of them could occur independently of the limits. Some actions taken expressly to avoid losses could result in more efficient production of *Inpatient Services*, while others might result only in accounting shifts of costs. In order to gain an in-depth understanding of how the limits system has affected cost performance, it will be necessary to cross-correlate trends in cost between hospitals that were and were not operating near or above the limits.

## Summary of Findings and Conclusions

The 1971-1978 trends in hospital costs by type of service, measured per unit of output (patient day, adjusted patient day, and outpatient occasion of service) for a sample of 457 hospitals are summarized as follows:

- By far the largest cost increases were found in the *Ancillary Services*, slightly higher-than-average increases were found in the *Inpatient Services*, and *General Services* increased at a below-average rate. *Outpatient Services* costs es-

calated rapidly in absolute terms, but rose much more slowly in per unit terms.

- Among the specific *Ancillary Services* departments, the largest cost increases were found in *Inhalation Therapy* and the next highest in *Radiology*. *Labor and Delivery Room* costs grew at a relatively slow pace. While the rapid growth in most of the *Ancillary Services* departments analyzed was concentrated in the earlier years of the study, the "All Other Ancillary Costs" category, which encompasses many of the newer advanced technology services, continued to increase rapidly through 1978.
- The relatively low cost increases in the *General Services* category were consistent across three of the four specific departments addressed; the exception was *Operation and Maintenance of Plant*.
- The *Adult and Pediatrics* category (the routine care inpatient units) was among the lowest growth departments analyzed, while the *Special Care Units* category was one of the highest growth departments.
- Costs in nonfederal government hospitals rose faster than those in private nonprofit hospitals, with the largest increases occurring in *Outpatient Services* and *Labor and Delivery Rooms*.
- The costs of investor-owned hospitals also rose faster than those of the private nonprofit institutions, with the higher rates encompassing most of the *General Services* and *Ancillary Services* departments. *Inpatient Services* costs declined in these hospitals relative to all others. (The sample of for-profit hospitals may be less representative of its universe than the sample for other hospital groups.)
- The costs of teaching hospitals increased at a lower rate than those of nonteaching hospitals (although aided by relative volume increases), with the lower growth observed in most of the cost centers studied except for *Special Care Units*, which expanded rapidly.
- The largest hospitals (400 beds and above) incurred above average cost increases characteristic, by department, of the government group. The 100-249 bed group experienced equally high inflation, with the largest increases centered in the *General Services*.
- Costs in the smallest hospitals (up to 99 beds) rose at an average pace, with very high increases in *Inhalation Therapy*, *Physical Therapy*, and *Special Care Units*, but very low inflation in the "All Other Ancillary Services" category.
- The 250-399 bed hospitals had the lowest cost increases of the bed size groupings, with lower growth spread across virtually all patient-related services.

A recurring theme throughout the analysis of cost trends by type of service is that intensity-of-service changes in *Ancillary Services* departments and in in-



patient *Special Care Units* appear to be a significant factor in hospital cost inflation. *General Services* costs would seem to be much less prone to intensity-of-service influence than *Ancillary Services* costs are, and the 1973-1978 cost changes occurring in these two groupings within the sample hospitals were, in fact, significantly different. Measuring both per adjusted patient day, the *General Services* costs increased 13.8 percent per year, while the *Ancillary Services* costs rose 17.4 percent. The three specific cost quantities with the highest increases—*Other Ancillary Services* (24.2 percent), *Special Care Units* (20.8 percent), and *Inhalation Therapy* (19.1 percent)—all involve services that were obviously expanding in use (on a per patient or per patient day basis) during the period.

With only one measurement period available before the Medicare Section 223 limits were applied to reimbursement for inpatient routine costs, there was no immediate longitudinal evidence of these limits having significantly affected relative cost increases across the *Inpatient Routine*, *Special Care Unit*, and *Inpatient Ancillary* categories. However, to adequately gauge the impact of these limits, it will be necessary to cross-correlate cost trends for those hospitals which have and have not operated near or above the limits. Cost center data such as those developed for this study would be useful in a comprehensive analysis of the nature and extent of hospital responses to the limits.

#### Acknowledgments

The author would like to thank Dr. J. Michael Fitzmaurice of the Office of Research, Health Care Financing Administration (HCFA), and Mr. Alfred Meltzer of Applied Management Sciences, who provided valuable suggestions in their review of this paper. He would also like to thank the research project staff which included Richard Jensen, Jim Friedman, Cyrus Baghelal, and Cindy Maus.

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