ANALYSIS OF VARIATIONS IN HOSPITAL USE BY MEDICARE PATIENTS IN PSRO AREAS, 1974-1977

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A study of the use of short-stay hospitals in PSRO areas by Medicare enrollees aged 65 and over for the period 1974 through 1977 revealed that discharge rates increased, average length of stay (ALOS) decreased, and days-of-care rates remained relatively constant in nearly all of the PSRO areas. The data show large variations in hospital use in PSRO areas within States and HEW regions, and suggest that factors within the area are critical determinants of hospital utilization. This study presents important implications for PSRO program policy for it suggests that factors other than physician and hospital behavior should also be considered when setting objectives for reducing misutilization and improving the quality of health care.

For the growing segment of the population aged 65 and over, Medicare is by far the greatest source of protection against the costs of hospital care. An estimated 95 to 98 percent of this age group are covered by Medicare. In 1975 persons aged 65 years and over comprised 10.7 percent of the population, but accounted for 20 percent of total discharges and 33 percent of all days of care from short-stay hospitals, no doubt reflecting their greater health care needs.

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Since the Medicare program began in 1966, striking variations in hospital use have been noted, raising questions about quality of care and appropriate levels of hospital use. Responding to concern about the sharp rise in hospital expenses and the quality of federally reimbursed care, the Congress set up, through the 1972 Social Security Amendments, the Professional Standards Review Organization (PSRO) program to monitor the quality of federally funded care and to assure its delivery in an efficient and economical manner. This law designated 203 PSRO areas throughout the Nation and mandated each to develop a PSRO to review care provided to Medicare, Medicaid, and Maternal and Child Health program patients.

This article discusses geographic variations in hospital use by

Medicare enrollees aged 65 and over in PSRO areas during the period 1974 through 1977. Possible causal factors influencing these variations in hospital use are analyzed.

Knowledge of the extent and causes of variations in hospital use among PSRO areas is vital to the PSROs themselves and to others involved in the PSRO effort. It is basic to the setting of program objectives and to program evaluation. It is also of great interest to health care researchers and administrators for it illustrates the range of options in the way health care can be provided. Comparison of low and high use PSRO areas raises questions about the cost and appropriateness of hospital care and about access and equity in its delivery.

As the data will illustrate, in some PSRO areas, Medicare is paying for a volume of care (days of care per 1,000 enrollees) more than twice that in other areas. Some areas have a rate of hospitalization (discharges per 1,000 enrollees) twice that of others. In these PSRO areas, a significantly larger part of the area's Medicare enrollees are exposed to the benefits and risks of hospital care. In some areas, the average length of stay is considerably more than twice the average stay in other areas. These differences are focused upon in considerable detail.

Although the data presented here are aggregated by PSRO area, the purpose of this report is not to evaluate the effects of the PSRO program upon hospital use. Rather, these data are primarily intended to provide baseline and statistical information for both utilization review and health planning purposes and to furnish overall analysis of basic utilization trends. 1/

Data Sources

The figures presented here were developed from the Health Care Financing Administration's Medicare Statistical System. Data were derived primarily from three centrally maintained files: the master enrollment file, the hospital bill file, and the provider of service file. (For a fuller discussion of the data sources see the technical note, end of article.) This study is confined to Medicare enrollees; similar data are not yet available for Medicaid and Maternal and Child Health program enrollees.

Methodology

Traditionally, measures of hospital use by Medicare enrollees have been based on the experience of enrollees living in a defined area. These measures are referred to as beneficiary based because they depend solely upon where the beneficiary lives; the location of the hospital stay does not enter into the calculation. With the implementation of major areawide programs such as the PSRO and health planning 2/ programs, it was necessary to develop new measures based upon use in a specific group of hospitals located in a defined area. These rates are referred to as hospital based.

Hospital-based rates are constructed by including in the numerator all discharges or days of care which occur in a specific group of hospitals and including in the denominator the beneficiary population-at-risk for care in the group of hospitals.

The denominator used for beneficiary-based rates--the number of beneficiaries residing in an area--is not appropriate for

hospital-based rates because some residents of an area use hospitals outside the area and some nonresidents use hospitals in the area.

The following table indicates that in 1977 for 21.8 percent of the PSRO areas, 20 percent or more of residents' hospital stays occurred outside their PSRO area.

Percentage of discharges of residents of a PSRO area occurring outside the PSRO Area	Distribution of PSRO areas (percent)	
0-9	27.6	
10-19	50.6	
20-29	15.6	
30-39	4.2	
40-49	1.0	21.8
50-59	1.0	

From the opposite perspective of patient flow, nonresidents come into a PSRO area for hospital services. The distribution of PSRO areas by the percentage of discharges that were for nonresidents in 1977 is given below:

Percentage of discharges in the PSRO area for nonresidents	Distribution of PSRO areas (percent)	
0-9	34.9	
10-19	47.4	
20-29	13.5	
30-39	3.1	17.6
40-49	.5	
50-59	.5	

The data indicate that in 17.6 percent of the PSRO areas, 20 percent or more of the hospital stays were for nonresidents. These facts led to the development of techniques to account for patient migration. The method used for this study estimates the number of beneficiaries-at-risk in a given PSRO area by allocating portions of Medicare enrollment from all PSRO areas based upon each PSRO's contribution to patient load in the given PSRO area. This method is an adaptation of one proposed by Bailey, 3/ which estimated the population-at-risk for a selected group of hospitals. The methodology developed for PSRO areas is presented in equation 1 below.

$$\text{Equation (1):}\quad E_i = \sum_{j=1}^{n} \frac{d_{ij}}{D_j} e_j \qquad i = 1, 2, \ldots n$$

where E_i = total number of Medicare beneficiaries-at-risk in the ith PSRO area

d_{ij} = number of discharges from hospitals in the ith PSRO area of patients who resided in the jth PSRO area

D_j = total number of discharges of patients who resided in the jth PSRO area ($D_j = \sum_{k=1}^{n} d_{kj}$)

e_j = Medicare enrollment in the jth PSRO area

n = total number of PSRO areas under consideration

(For illustration of this methodology and a discussion of its limitations, see the technical note at the end of this article.)

Findings

To provide background for the findings in this study, a summary of national trends in hospital use by Medicare beneficiaries for the period 1967 through 1977 is presented. Using the methodology described above, data are presented for (1) PSRO area trends, 1974 through 1977, (2) a cross-sectional

analysis of Medicare utilization by PSRO area, and (3) correlation and regression analysis of the relationships between utilization and area characteristics.

National Trends, 1967 through 1977

During the period 1967-77, the discharge rate for Medicare patients in the Nation increased 28 percent, rising from 271 discharges per 1,000 enrollees in 1967 to 346 per 1,000 in 1977 (See fig. 1.)

Nationally, this rise in the discharge rate was offset by an opposite trend in the ALOS. As indicated in figure 1, ALOS was 13.8 days in 1967 and declined to 10.9 days by 1977. As a result of these opposing trends, the days-of-care rate has changed little over the 11-year interval, registering 3,740 days of care per 1,000 enrollees in 1967 and 3,767 in 1977. It should be noted, however, that during this period new technologies and services were introduced and the intensity and quantity of services changed. Thus, the "nature" of a day of care has changed over this period.

PSRO Area Trends, 1974 through 1977

The hospital-based measures generated for PSRO areas during 1974 through 1977 are listed within their HEW regions in table 1 (at end of article). 4/ (For boundaries of the 10 HEW regions, see fig. 2.) The national pattern of an increasing discharge rate and a decreasing ALOS was followed by nearly all PSRO areas during the period 1974-77. Figure 3 summarizes these changes and displays the distribution of PSRO areas by the percent change in these utilization measures. For the discharge rate, most of the PSRO areas are to the right of the "no change" or zero point of the horizontal axis, which illustrates that the discharge rate increased in most PSRO areas during this period. The figure shows that for 31 percent of the PSRO areas the discharge rate increased 5 to 7 percent and, for 23 percent of the PSRO areas, the discharge rate rose 8 to 10 percent.

In contrast, for average length of stay, most of the PSRO areas are to the left of the "no change" point, showing that average length of stay decreased in nearly all PSRO areas. The figure indicates that for 32 percent of the PSRO areas, ALOS decreased 5 to 7 percent and, for 33 percent of the PSRO areas, ALOS decreased 8 to 13 percent.

The result of these opposite trends are reflected in the days-of-care rate, with the last graph in figure 3 illustrating the relatively even distribution of PSRO areas around the "no change" point. The figure shows that for 22 percent of the PSRO areas the days-of-care rate changed 1 percent or less and for 57 percent of the PSRO areas the days-of-care rate changed 4 percent or less.

It has sometimes been hypothesized that the greatest declines in utilization are more likely to occur in areas where utilization is highest and the least declines in areas where utilization is lowest. Analysis of the data for all PSRO areas for each of the three utilization measures show mixed results. For the discharge rate--which did not decrease but increased in most areas--the hypothesis is somewhat confirmed. The discharge rate for the Nation in 1974 was 326 discharges per 1,000 enrollees with the rate ranging in the Nation from a high of 453 to a low of 244. The 20 PSRO areas with the greatest declines (or smallest rises) during the period 1974-77 had an average discharge rate of 355 in

Figure 1: U.S. Discharge rates, ALOS, and days-of-care rates for beneficiaries aged 65 and over, 1967-77.

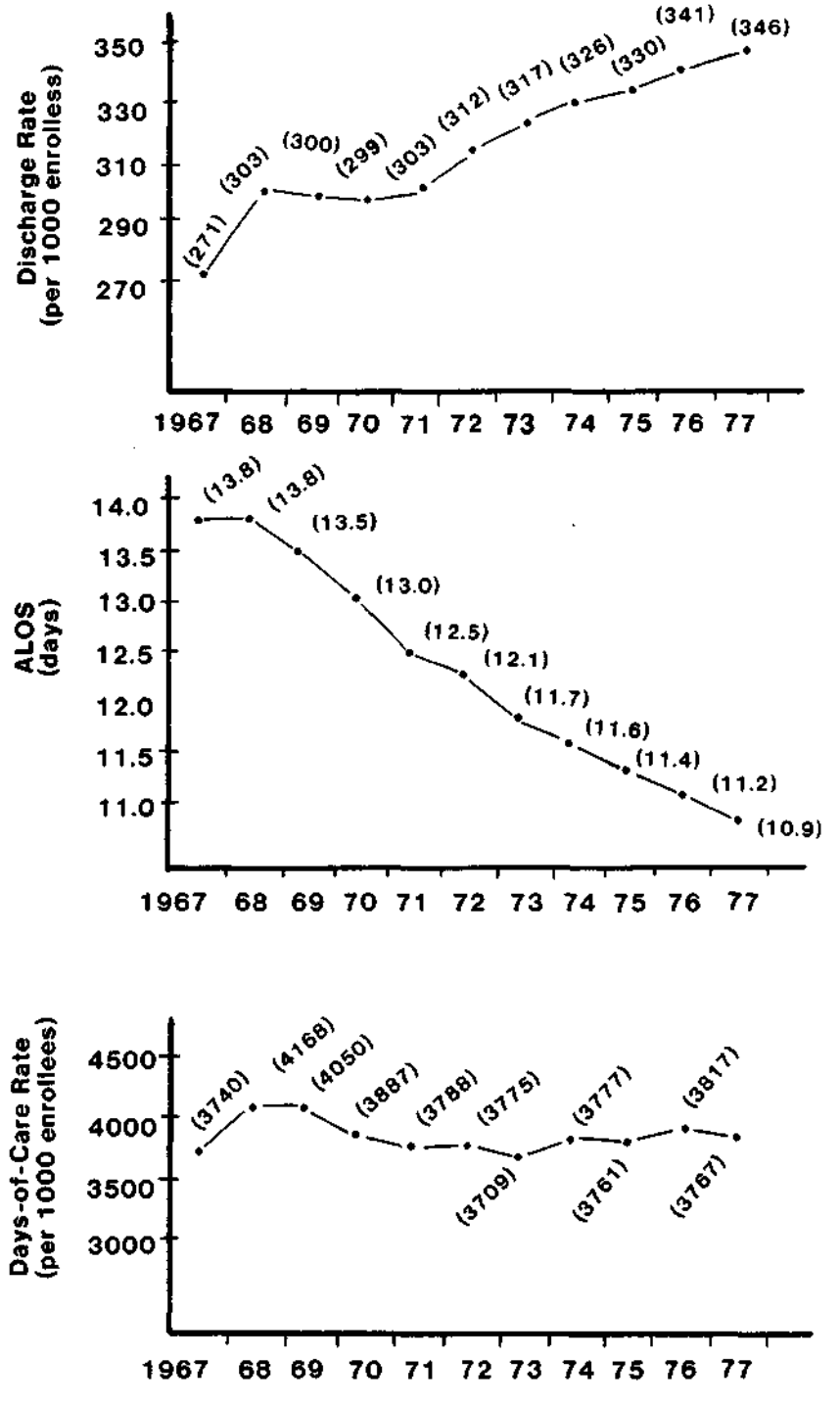


Figure 2: HEW Regional Boundaries

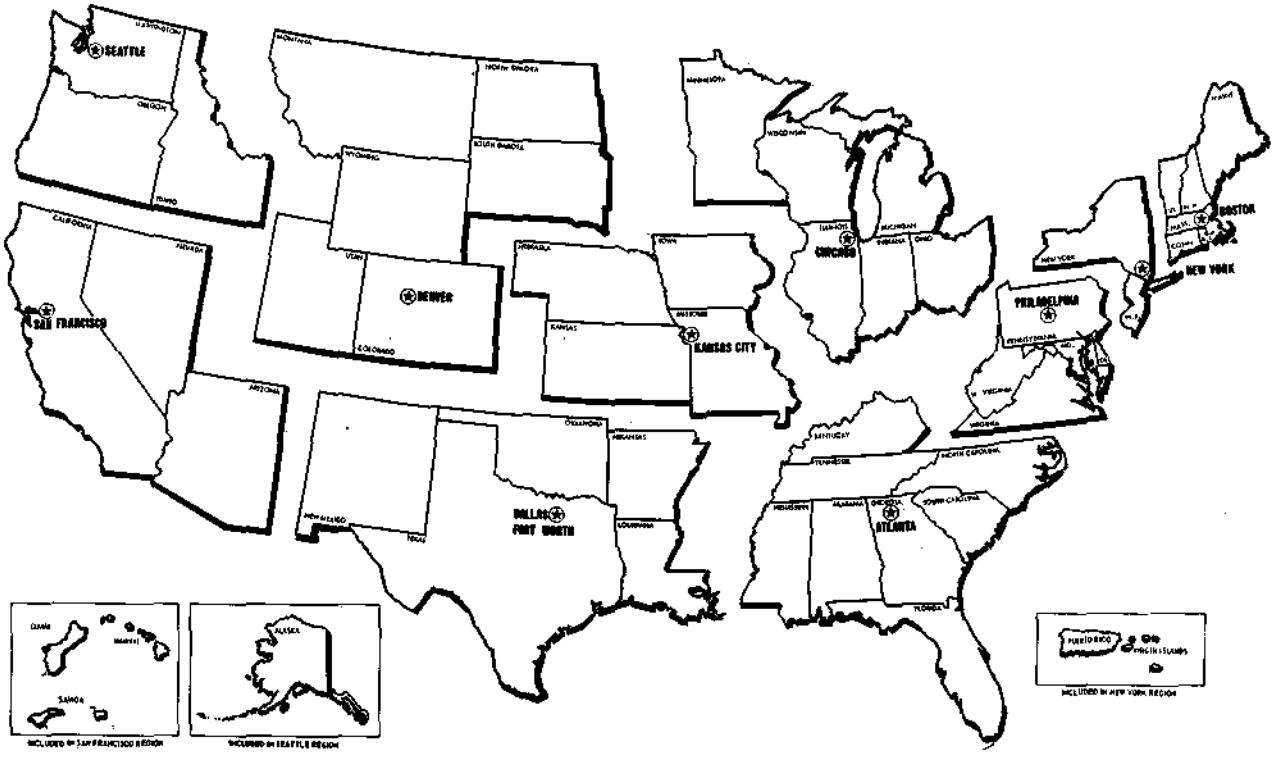
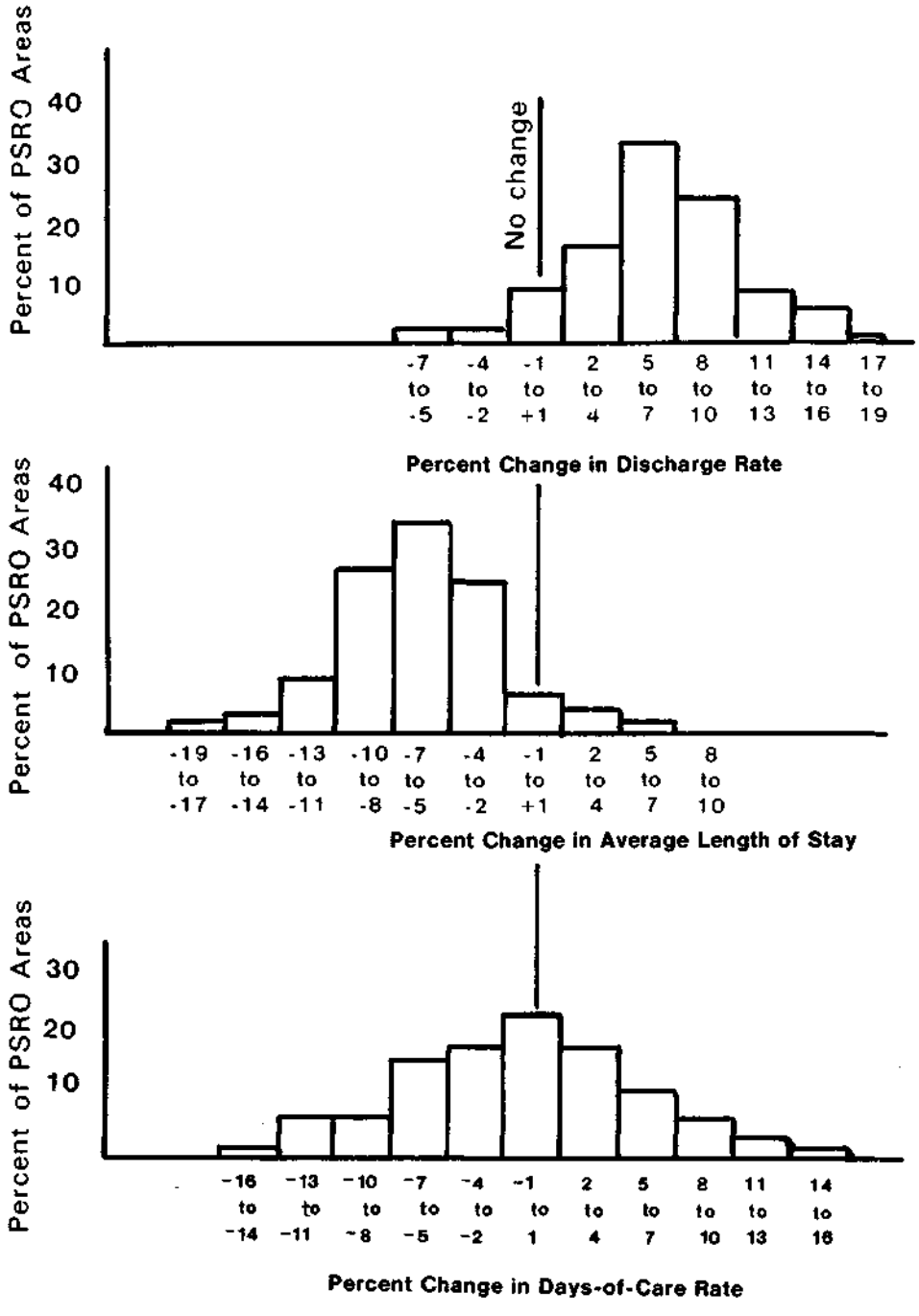


Figure 3: Percent Distributions of PSRO Areas by Change in Discharge Rates, Average Length of Stay, and Days-of-Care Rates, for Medicare Beneficiaries, aged 65 and over, 1974-77.



1974 whereas the 20 areas, with the least declines (or greatest rises) in the discharge rate had an average of only 274 discharges in 1974.

For ALOS, the hypothesis does not appear to hold true. The average length of stay in the Nation was 11.6 days in 1974, ranging from a high of 18.4 to a low of 7.5 days. The 20 PSRO areas with the greatest declines during this period had an average stay in 1974 of 12.3 days, a figure that was identical to the average for the 20 PSRO areas with the least declines during this period.

The changes in the days-of-care rate for this period do not confirm the hypothesis either. The days-of-care rate for the Nation in 1974 was 3,777 days per 1,000 enrollees, with the rate ranging from a high of 5,283 days to a low of 2,037 days. The 20 PSRO areas with the greatest declines during this period averaged 3,797 days per 1,000 in 1974 compared to the 20 PSRO areas with the least declines (or greatest rises) which averaged 3,583 days per 1,000--rates that are not notably different from the mean for the Nation. Further, two PSRO areas in the United States that experienced decreases of 16 percent and 13 percent in the days-of-care rate (the greatest declines recorded) had rates in 1974 that were 2,923 and 2,881 days per 1,000 respectively. These figures were considerably below the mean that year.

Cross-sectional Analysis of Hospital Utilization by PSRO Area, 1977

Also studied were 1977 utilization rates at the PSRO level. Analysis of the data indicated a dramatic range in all three measures of use.

Discharge Rates

An examination of discharge rates by PSRO area (table 1) revealed almost a two-fold difference between the lowest rate of 257 per 1,000 enrollees in the Pacific PSRO in Hawaii 5/ and the highest discharge rate of 468 per 1,000 enrollees in Texas PSRO area 1. Table 2 shows the 20 PSRO areas with the highest and the 20 with the lowest discharge rates in 1977. The PSRO areas with the highest discharge rates are predominantly large rural areas located in the central and southern parts of the country. Of the 20 PSRO areas with the lowest discharge rates, 15 are in the Northeast and include the PSRO areas consisting of the cities of Baltimore and Washington, D.C., the boroughs of Brooklyn and Queens, the Hartford metropolitan area, and two PSRO areas in northern New Jersey.

To determine the amount of variation within HEW regions, the data in table 3 were assembled to show the range in the utilization measures. Within each region, the values for the PSRO areas with the highest and lowest discharge rate, average length of stay, and days-of-care rate are shown.

The data in table 3 indicate that the variations in the discharge rate within regions are similar to the differences across regions. Within region 6 (Dallas), the difference in the discharge rate between the lowest and highest PSRO areas was 139 discharges per 1,000 enrollees. In region 2 (New York) the range was 104 discharges. By way of comparison, the difference in the regional discharge rate between the lowest region (New York) and the highest region (Dallas) was 110 discharges per 1,000.

Average Length of Stay

Observation of individual PSRO area measurements reveals that the highest average length of stay occurred in PSRO area 13 in New York (17.1 days) and was almost 2.5 times greater than the lowest rate of 7.1 days in PSRO area 11 in Central California (table 1). Nineteen of the 20 PSRO areas with the highest values of ALOS are in the Northeast and 19 of the 20 PSRO areas with the lowest values are in the West (table 4). Six areas (National Capital PSRO, Queens County PSRO, Kings County PSRO, Baltimore City PSRO, Bergen County PSRO, Nassau Physician Review PSRO) were in the group of 20 PSRO areas with the lowest values of discharge rates, as well as the 20 areas with the highest values of ALOS reflecting the fact that an inverse relationship often exists between the two measures.

The data indicate that large variations in ALOS also occur within regions (table 3). In the New York region--with the greatest variation--the difference in ALOS between the lowest and highest PSRO area was 5.1 days. This difference was nearly as great as the 6.5 day difference between the ALOS values for the New York region and the Seattle region. In eight of the ten regions, differences in ALOS between the lowest and highest PSRO areas were 31 percent or more.

Days-of-Care Rates

The highest rate of days of care for an individual PSRO area was 5,123 per 1,000 enrollees in the Adirondack PSRO area--a rate more than 2.5 times greater than the lowest rate of 2,022 in PSRO area 11 in Central California (table 1). Nine of the 20 highest days-of-care rates occur in PSRO areas in New York State and 17 are east of the Mississippi River (table 5). The lowest rates of days of care are found, with only one exception, in PSRO areas in the West. PSRO areas in California alone account for 14 of the 20 lowest rates.

Large variations in the days-of-care rate across PSRO areas occur within regions (table 3). Region 8 (Denver) had the greatest variation, ranging from 2,370 days per 1,000 enrollees in the lowest PSRO area to 4,209 days per 1,000 in the highest PSRO area. The days-of-care rate reflects the discharge rate and the average length of stay. Wennberg analyzed the importance of variations in the discharge rate compared to variations in the average length of stay in determining the consumption of patient days. The data studied were for 13 hospital service areas in Vermont and for the population under 21 years of age. He found that variations in the incidence of hospitalization, that is, variations in the discharge rate, for most pediatric conditions were more important than length of stay variations in determining the days-of-care rate. 6/

Medicare data for the aged population lead to opposite conclusions. The variation in length of stay is the more important factor in determining days of care used for the population aged 65 years and over. Of the 20 PSRO areas with the highest days-of-care rate (table 5), 11 were among the areas with extremely high ALOS (table 4). Similarly, of the 20 PSRO areas with the lowest days-of-care rate, 15 were among the areas with extremely low ALOS. Clearly, extremes in average length of stay have a strong impact on the days-of-care rate for the aged population. The same strong influence on the days-of-care rate

is not found for extremes in the discharge rates. Areas with the highest (or lowest) discharge rates (table 2) are not frequently found to be the same areas with the highest (or lowest) days-of-care rates.

PSRO area 13 in New York illustrates the effect that extremes in average length of stay can have. Despite the fact that the discharge rate in PSRO area 13, New York, was among the lowest in the Nation, the impact of its high average length of stay places this area among the highest in the days-of-care rate.

In further support of this point, coefficients of determination (R^2) were computed using Medicare data from each of the PSRO areas. The discharge rate was found to explain only 9 percent of the variation in days-of-care whereas ALOS explained 52 percent of the variation.

Relationships Between Utilization and Area Characteristics

Previous analyses of Medicare data have indicated that patient characteristics of age, sex, and race influence short-stay hospital utilization, with age being one of the strongest factors.

The rate of discharge and the average length of stay both increase substantially with age. Men have a slightly higher discharge rate compared to women, but men have a lower average length of stay. White persons have a higher discharge rate compared to persons of all other races, but white persons have a lower average length of stay.

Medicare data also have shown that population density tends to be related to hospital utilization. In general, discharge rates are higher in sparsely populated areas compared to more densely populated areas, although sparsely populated areas tend to have lower average lengths of stay.

Many investigators have examined area resource factors to determine if there are relationships between the supply of health care resources and utilization. Factors that are often considered are the supply of short-stay hospital beds as well as hospital occupancy rates, the supply of long-term beds, the supply of physicians, and the presence of teaching or specialty hospitals.

Given these considerations, nine factors were selected to determine their influence on PSRO area hospital utilization. The variables selected were (1) proportion of enrollees aged 75 and over; (2) proportion of female enrollees; (3) proportion of nonwhite enrollees; (4) population density; (5) short-stay hospital bed supply; (6) nursing home bed supply; (7) physician supply; (8) influence of teaching hospitals; and (9) hospital occupancy rates.

Partial Correlation

Table 6 shows partial correlation coefficients derived from the regression models for ALOS, discharge rate, and days-of-care rate. 7/ Blank cells indicate that the partial correlation coefficients were not statistically significant at the 95 percent level.

The proportion of enrollees over age 75 correlated positively with all three measures of use (though only minimally with discharge rate). These results were expected and confirmed earlier findings from Medicare data. Population density correlated highly with ALOS and days-of-care rate suggesting that in more densely populated areas--where

ambulatory services are generally available--a higher proportion of hospitalized patients have more severe illnesses, requiring longer stays. In sparser populated areas, the shorter ALOS suggests that a higher proportion of patients are hospitalized with less severe illnesses--that would have been treated on an outpatient basis had those services been available.

Although it has often been suggested that a low supply of nursing home beds results in longer hospital stays, the absence of any correlation between the supply of nursing home beds and ALOS may indicate that this explanation for longer stays in some areas does not hold.

The supply of physicians in a PSRO area correlated inversely with the discharge rate and days-of-care rate, suggesting the effect of the availability of alternatives to inpatient care upon hospitalization rates.

The percentage of admissions to teaching hospitals was slightly correlated with ALOS which may indicate the combined effects of more complicated case load and training programs upon duration of inpatient stays.

Hospital occupancy rates correlated positively with ALOS and days-of-care rate and correlated negatively with discharge rate. By far these were the most significant correlations observed.

The demographic and health resource variables explained 76 percent of the variation in ALOS, 49 percent of the variation in discharge rate, and 60 percent of the variation in days-of-care rate. Demographic variables (age, sex, race, population density) accounted for two-thirds of the explained variation in ALOS but only one-third of the explained variation in discharge rate and days-of-care rate.

Predictions

Data presented earlier in this report indicate that ALOS values in PSRO areas in the northeastern HEW regions are significantly higher than those in the western HEW regions. Prediction models for ALOS in these two areas were developed and appear in table 7. (The northeastern area includes HEW regions 1, 2, and 3; the western area includes HEW regions 8, 9, and 10.) The model for the Northeast has an R^2 value of .67, a maximum residual value of 3.2 days, and an average residual value of .8 days and may be used to predict ALOS in the Northeast.

Three arbitrarily selected PSRO areas in the West (Redwood Coast Region, Superior California, Tulane-Kings Counties) each had low values of ALOS in 1976 (7.3 days, 8.0 days, 7.4 days). If the values of the nine independent variables for each of these three PSRO areas are entered into the model for the Northeast, predicted values of ALOS are 7.1 days, 7.3 days, and 7.7 days. Thus, these areas, if hypothetically placed into the northeastern regional grouping, would still have low values of ALOS. Actual ALOS values in the Northeast range from 10.2 to 19.9 days, considerably higher than any of these predicted by the model.

The same phenomenon occurs if characteristics of PSRO areas in the Northeast are substituted into the regression model for the West. The model for the West has an R^2 value of .67, a maximum residual value of 1.0 days, and an average residual

value of .5 days. Again, three PSRO areas were selected: New York County with an actual ALOS of 17.7 days; National Capital with an ALOS of 14.3 days; Philadelphia with an ALOS of 14.8 days. Predicted values of ALOS using the regression model for the West are 16.5 days, 13.6 days, and 12.7 days, respectively. In comparison to the range of ALOS values in the West (7.3 to 10.9 days), the predicted values indicate that these PSRO areas would also have high values of ALOS in the West.

These illustrations indicate that PSRO areas have high (or low) values of ALOS not necessarily because of their geographic location, but in large measure because of the characteristics of the area. The examples illustrate extreme cases, but emphasize the importance of the area-specific characteristics in explaining variations in ALOS.

Summary and Discussion

For some time it has been known that Medicare utilization in short-stay hospitals varies considerably by geographic area. The development of utilization data by PSRO area along with a method to estimate the population-at-risk for using services in a defined group of hospitals enabled the present analyses to be made.

Study of utilization measures over the period 1974 to 1977 indicates that the national pattern of an increasing discharge rate and a decreasing ALOS, established in the early years of the Medicare program, has been followed by individual PSRO areas. In the great majority of PSRO areas, the discharge rate rose while ALOS fell. Overall the days-of-care rate remained steady. This steadiness implies that the large rise in Medicare hospital expenditures has not been due to an increase in the use of hospital days, but to input price increases and changes in the nature of hospital services.

The reasons for the steady rise in the discharge rate and the steady decline in ALOS are not well understood. Other investigations with Medicare data are examining the roles of increases in the rate of persons using hospital care, increases in the rate of multiple hospitalizations, shifts in the distribution of discharges by length of stay interval and changes in case mix over time as possible contributing factors.

A tendency was noted for the smallest increases in the discharge rate to occur in areas that already had high rates. However, for ALOS there was no relation between initial value of ALOS and change in ALOS during the study period--some areas with low ALOS displayed large percentage decreases in ALOS.

Analysis also revealed that the days-of-care rate among PSRO areas was closely correlated with ALOS but not with the discharge rate. Areas with extreme values of days-of-care were likely to have extreme values of ALOS, while there was no relation between extremes in the days-of-care rate and extremes in the discharge rate. This finding on the importance of ALOS in determining consumption of hospital days, coupled with the finding of great variation in ALOS among PSRO areas, may indicate that increased emphasis should be placed on review of length of stay in high ALOS areas. Considerably fewer hospital days would be used if the ALOS in areas with very high values could be brought closer to the national average (while, of course, holding the discharge rate constant).

Area characteristics expected to have some relation to hospital use were examined as possible factors contributing to variations in hospital use measures. The results of correlation and regression studies indicate that variations in population density, physician supply, and a supply measure related to population density--short-stay hospital bed supply--are associated with variations in measures of hospital use. The demographic characteristics of Medicare enrollees, the influence of teaching hospitals, and hospital occupancy rates in PSRO areas are also related to hospital use.

The significant relationships found between hospital utilization and supply of health services have important implications for PSRO program policy. The main components of PSRO activity--concurrent review of hospital cases, retrospective review of care via medical care evaluation studies (MCEs) and profile analyses--have focused on physician and hospital behavior in order to reduce misutilization and improve the quality of health care. The present study seems to show that changes in the supply variables and changes in occupancy rate can also have a great impact on levels of hospital utilization. Thus, PSROs in areas greatly above or below the utilization norms should look to variations in supply variables, as well as to physician practice patterns, for explanation. Where problems in utilization patterns are uncovered, attention should be given to alterations in the availability of services. This means that PSROs need to work closely with other programs, such as the Health Planning Program, whose purpose is to rationalize the amount and types of health facilities and services.

Acknowledgments

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Footnotes

1/ Tables similar to those presented in this report by PSRO area have been developed by health service area and will be made available to all Health Systems Agencies.

2/ The "Health Planning and Resources Development Act of 1974" authorized the creation of Health Systems Agencies (HSAs) in about 200 Health Service Areas Nation-wide to carryout various health planning functions in their areas.

3/ Norman T. J. Bailey, "Statistics in Hospital Planning and Design," Applied Statistics, November 1965, pp. 146-157.

4/ The data presented in this article were also used as the basic data set in the 1978 PSRO evaluation study. It is important to note that in the PSRO evaluation study, regression analysis techniques were used to focus on changes in utilization from 1974 to 1977, after adjusting for variables (e.g., hospital bed supply) which might affect PSRO impact. Consequently, actual changes in use rates shown in table 1 will differ from the regression result of the PSRO evaluation study. These differences are also discussed on page 67 of the 1978 PSRO evaluation study (HEW Pub. No. HCFA-03000, Jan. 1979).

5/ Only PSRO areas in the 50 States were considered.

6/ Wennberg, John E., "A Small Area Epidemiologic Approach to Health Care Data," Proceedings of the Public Health Conference on Records and Statistics, June 14-16, 1976, p. 334-351).

7/ To check for multicollinearity, all explanatory variables were entered stepwise into the regression model and successive lists of regression coefficients were examined for stability. Two variables--short-stay bed supply and proportion of female enrollees--were correlated with other variables causing unstable regression coefficients. The r-values in table 6 are derived from regression models which do not include these two variables.

Technical Note

Included here are information on data sources used, an example illustrating the methodology for estimating population-at-risk, a discussion of its limitations, and the formula for the sampling error associated with hospital-based rates.

Data Sources

Medicare data used in this report were derived primarily from three basic files maintained centrally in the Medicare Statistical System:

1. The master enrollment file contains information about all Medicare enrollees including age, sex, race, and state and county of residence.

2. The hospital bill file contains information taken from the claim submitted for payment, including dates of admission and discharge.

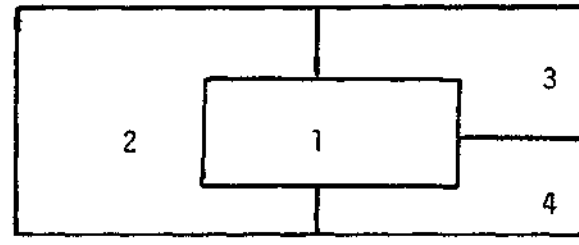
3. The provider file contains information about certified Medicare providers such as the location of the hospital, number of beds, and teaching status.

For 100 percent of hospital stays in the Nation, one record was created that contained information taken from all three files listed above. Two additional data elements were incorporated into the record to indicate (1) the PSRO area where the patient resided and (2) the PSRO area where the hospital stay occurred.

All hospital stays that occurred in the period 1974 through 1977 and processed centrally as of March 1978 were included in the file. The file contains about 95 percent of all hospital stays in a year within 3 months after the end of the year and about 98 to 99 percent within 15 months after the end of the year. Although there was only a small shortfall in the file, another more current file (query file) was used to correct the shortfall. The query file comes from the system employed by fiscal intermediaries to query the Medicare central office on eligibility and benefits available to Medicare patients admitted to a hospital. This file, which contains nearly a complete count of all admissions within a month after they occur, was used in conjunction with the hospital bill file to obtain complete counts of hospital stays.

Example Illustrating Adjustment for Patient Migration

The diagram below represents a hypothetical configuration using only four PSRO areas. The number of enrollees-at-risk to hospital care in PSRO area 1 is calculated by allocating a portion of the enrollees from each of the four PSRO areas. The proportion is based upon the fraction of total discharges for residents of each of the four PSRO areas which occurred in hospitals in PSRO area 1.



The patient origin matrix below shows the total number of discharges for residents of each of four PSRO areas and the location of the hospitals in which the discharges occurred. Suppose for residents of area 1 there were a total of 32,500 discharges of which 30,000 were from hospitals located in area 1; 500 discharges from hospitals in area 2; 1,250 discharges from hospitals in area 3; and 750 discharges from

hospitals in area 4. Similarly, for residents of area 4, there were a total of 30,250 discharges of which 4,000 were from hospitals in area 150 from hospitals in area 2; 100 from hospitals in area 3; and 26,000 from hospitals in area 4.

PSRO Area Where Discharge Occurred	Discharges for Residents of PSRO Areas			
	PSRO 1	PSRO 2	PSRO 3	PSRO 4
PSRO 1	30,000	6,000	5,000	4,000
PSRO 2	500	5,750	500	150
PSRO 3	1,250	1,000	20,000	100
PSRO 4	750	250	200	26,000
Total	32,500	13,000	25,700	30,250

Patient Origin Matrix

To estimate the beneficiaries-at-risk in PSRO area 1, the proportion of total discharges from hospitals in PSRO area 1 is determined for each possible PSRO area of residence. A fraction of enrollment from each area is then allocated to PSRO area 1 based upon the fraction of discharges that occurred in PSRO area 1. The calculation is demonstrated in the following chart.

(1) Residence of beneficiary	(2) Total Discharges	(3) Discharges from hospitals in PSRO 1	(4) (3)÷(2) Proportion of total discharges from hospitals in PSRO 1	(5) Medicare enrollment	(6) (4)x(5) Enrollment allocated to PSRO 1
PSRO 1	32,500	30,000	.92	75,000	69,000
PSRO 2	13,000	6,000	.46	30,000	13,800
PSRO 3	25,700	5,000	.19	30,000	5,700
PSRO 4	30,250	4,000	.13	50,000	6,500
Total	101,450	45,000		185,000	95,000

Limitations in Methodology to Produce Hospital-Based Rates

The need to develop information to compare the rate of hospital use in one area with the rate of hospital use in another area, as well as to analyze changes over time, led to the development of a method to produce hospital-based measures. The validity of this method depends upon its basic assumption that a population-at-risk can be constructed by observing where the patients come from. Although future efforts could refine the calculation, for example, by taking into account the characteristics of the patients, such as age, sex, and race, and relating them to the allocation of enrollees, there would remain some limitations that are inherent in the basic approach.

One inherent limitation is that hospital-based rates as constructed here are subject to a "dampening" phenomenon. If, for example, the number of discharges in a specific PSRO area is reduced due to PSRO review--while the number of hospital stays remains constant in all other areas--the new discharge rate for the second year in the PSRO area in which utilization was reduced will register a smaller reduction than actually occurred. This result stems from the methods used to generate the denominator for the rate. Because the proportion of total discharges received in the PSRO area declined, the number of enrollees allocated to the population-at-risk to services in the PSRO area automatically declines. At the same time, the other PSRO areas are necessarily allocated more enrollees, thus falsely decreasing their discharge rate.

Another limitation of the methodology is that different estimates for population-at-risk result when different geographic units are used. For example, the population-at-risk for a particular PSRO area will be different depending on whether data on patient origin are aggregated by PSRO area or country.

Sampling Errors

In the calculation of enrollees-at-risk required for hospital-based rates, the information contained in the patient-origin matrix is based upon a 20 percent sample file of inpatient bills. Thus, there is a sampling error associated with the estimated number of enrollees-at-risk in each PSRO area. The error is given by the following formula:

$$\text{Variance of } E_i = \sum_{j=1}^{n} \frac{d_{ij} D_j - d_{ij}^2}{.2\, D_j^3} e_j^2$$

Where E_i = Estimated total number of Medicare enrollees at risk in the ith PSRO area

d_{ij} = Number of discharges from hospitals in the ith PSRO area of patients who resided in the jth PSRO area

D_j = Total number of discharges of patients who resided in the jth PSRO area ($D_j = \sum_{k=1}^{n} d_{kj}$)

e_j = Medicare enrollment in the jth PSRO area

n = Total number of PSRO areas

Since the denominator used for the rate calculation (enrollees-at-risk) is an estimate, the rate itself is an estimate whose standard error is given by

$$\frac{K}{E_i^2} \left(\text{Variance } E_i\right)^{\frac{1}{2}}$$

Where K in the numerator of the expression above is either discharges of days-of-care. Table T1 which contains the standard errors for both the discharge rate and days-of-care rate for all PSRO areas is available upon request.

TABLE 1.--Hospital-based measures of short-stay hospitals use adjusted for patient origin, for Medicare beneficiaries, aged 65 and over, by PSRO area, State, and region, 1974-77

Region, State, and PSRO	Discharge rate (Per 1,000 enrollees)				Percent Change	Average length of stay (Days)				Percent Change	Days of care rate (Per 1,000 enrollees)				Percent Change
	1974	1975	1976	1977	1974-77	1974	1975	1976	1977	1974-77	1974	1975	1976	1977	1974-77
ALL REGIONS	326	330	341	346	6.1	11.6	11.4	11.2	10.9	- 6.0	3,777	3,761	3,817	3,767	- 0.3
BOSTON REGION	299	302	316	320	7.0	12.6	12.4	12.3	12.0	- 4.8	3,772	3,748	3,884	3,834	1.6
Connecticut	269	273	281	286	6.3	12.4	12.2	12.0	11.6	- 6.5	3,334	3,328	3,368	3,315	- 0.6
1 Fairfield County	279	283	299	307	10.0	12.9	12.6	12.4	12.1	- 6.2	3,594	3,571	3,706	3,717	3.4
2 Area II	258	260	265	269	4.3	12.6	12.5	12.3	11.9	- 5.6	3,246	3,254	3,256	3,205	- 1.3
3 Hartford County	270	275	283	287	6.3	12.5	12.2	12.1	11.6	- 7.2	3,377	3,357	3,429	3,331	- 1.4
4 Eastern Connecticut	275	278	280	284	3.3	11.1	10.8	10.3	10.0	- 9.9	3,047	3,005	2,888	2,841	- 6.8
Maine	323	322	340	345	6.8	10.6	10.3	10.2	10.1	- 4.7	3,422	3,315	3,466	3,479	1.7
Massachusetts	307	309	325	329	7.2	13.5	13.4	13.3	13.1	- 3.0	4,141	4,146	4,320	4,311	4.1
New Hampshire	316	316	330	332	5.1	10.9	10.5	10.3	10.0	- 8.3	3,446	3,320	3,397	3,321	- 3.6
Rhode Island	276	281	295	297	7.6	13.1	12.1	11.8	11.6	-11.5	3,618	3,396	3,494	3,443	- 4.8
Vermont	348	358	373	367	5.5	10.9	10.6	11.0	10.8	- 0.9	3,792	3,793	4,101	3,960	4.4
NEW YORK REGION	272	278	290	296	8.8	15.3	15.3	15.1	14.4	- 5.9	4,156	4,260	4,377	4,266	2.6
New Jersey	273	280	291	299	9.5	13.9	14.1	13.9	13.8	- 0.7	3,799	3,943	4,050	4,132	8.8
1 Area I	294	298	310	314	6.8	13.2	13.5	13.0	13.1	- 0.8	3,881	4,029	4,027	4,114	6.0
2 Passaic Valley	265	264	272	286	7.9	13.5	13.6	12.8	12.8	- 5.2	3,574	3,563	3,477	3,657	2.3
3 Bergen County	258	265	271	283	9.7	14.8	14.9	15.0	15.2	2.7	3,824	3,944	4,071	4,303	12.5
4 Essex Physicians Review	290	296	307	320	10.3	14.8	14.6	14.4	14.1	- 4.7	4,284	4,321	4,423	4,504	5.1
5 Hudson County	262	275	293	308	17.6	15.8	15.6	15.3	15.3	- 3.2	4,136	4,282	4,486	4,707	13.8
6 Union County	276	278	296	301	9.1	13.1	13.5	13.2	13.0	- 0.8	3,610	3,752	3,910	3,911	8.3
7 Area VII	267	275	282	288	7.9	13.2	13.6	13.7	13.5	2.3	3,529	3,741	3,859	3,885	10.1
8 Southern New Jersey	276	283	301	305	10.5	13.5	13.8	13.9	13.8	2.2	3,724	3,907	4,184	4,204	12.9
New York	276	283	295	303	9.8	16.0	16.1	15.9	15.0	- 6.2	4,411	4,563	4,693	4,542	3.0
1 Erie Region	287	299	312	317	10.5	17.1	16.9	16.6	16.1	- 5.8	4,915	5,044	5,174	5,108	3.9
2 Genesee Region	278	287	305	303	9.0	13.1	13.1	13.1	12.9	- 1.5	3,636	3,761	3,998	3,906	7.4
3 Central New York	316	319	327	331	4.7	13.4	13.3	13.4	13.0	- 3.0	4,234	4,240	4,375	4,303	1.6
4 Five-County Organization	302	311	322	326	7.9	14.5	13.7	14.1	13.4	- 7.6	4,380	4,257	4,535	4,365	- 0.3
5 Adirondack	357	350	365	377	5.6	14.8	14.6	14.6	13.6	- 8.1	5,283	5,113	5,336	5,123	- 3.0
6 Area VI	294	301	312	316	7.5	14.0	14.2	14.4	14.6	4.3	4,109	4,274	4,488	4,616	12.3
7 Eastern New York	305	312	324	331	8.5	15.0	15.0	14.9	14.3	- 4.7	4,573	4,685	4,833	4,730	3.4
8 Area 8	302	313	326	335	10.9	14.2	13.9	13.8	13.7	- 3.5	4,292	4,344	4,492	4,584	6.8
9 Area 9	284	286	297	311	9.5	14.9	14.7	14.5	13.8	- 7.4	4,234	4,200	4,310	4,286	1.2
10 Rockland	285	289	314	331	16.1	13.4	13.8	12.9	12.0	-10.4	3,816	3,988	4,048	3,968	4.0
11 New York County	261	271	282	291	11.5	18.3	18.0	17.7	16.2	-11.5	4,784	4,876	4,998	4,721	- 1.3
12 Richmond County	259	274	291	317	22.4	17.4	17.1	17.3	15.3	-12.1	4,510	4,678	5,026	4,848	7.5
13 Kings County	247	258	266	275	11.3	18.4	20.4	19.9	17.1	- 7.1	4,544	5,259	5,292	4,704	3.5
14 Queens County	255	255	269	273	7.1	17.2	16.9	16.9	15.9	- 7.6	4,379	4,311	4,553	4,347	- 0.7
15 Nassau Physicians' Organization	263	272	279	287	9.1	14.6	14.8	15.0	14.6	0.0	3,846	4,019	4,186	4,184	8.8
16 Bronx Medical Services	270	280	282	292	8.1	17.1	17.3	16.9	16.4	- 4.1	4,619	4,842	4,757	4,789	3.7
17 Suffolk Physicians Review	265	273	295	304	14.7	12.8	13.0	13.4	13.7	7.0	3,395	3,554	3,947	4,170	22.8

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Region, State, and PSRO	Discharge rate (Per 1,000 enrollees)				Percent Change	Average length of stay (Days)				Percent Change	Days of care rate (Per 1,000 enrollees)				Percent Change
	1974	1975	1976	1977	1974-77	1974	1975	1976	1977	1974-77	1974	1975	1976	1977	1974-77
NEW YORK REGION (CONTINUED)															
Puerto Rico	227	228	237	228	0.4	12.5	11.8	11.3	10.4	-16.7	2,834	2,694	2,680	2,374	-16.2
Virgin Islands	248	231	285	391	57.7	17.1	20.7	17.7	16.5	-3.5	4,236	4,787	5,044	6,446	52.1
PHILADELPHIA REGION	296	305	317	322	8.7	13.0	12.6	12.5	12.3	-5.4	3,852	3,845	3,961	3,960	2.8
Delaware	260	267	281	290	11.5	13.3	12.6	13.0	12.5	-6.0	3,458	3,361	3,651	3,630	4.9
District of Columbia	249	256	269	273	9.6	14.2	14.7	14.3	13.7	-3.5	3,530	3,757	3,849	3,738	5.9
Maryland	257	265	280	289	12.5	13.2	13.2	13.2	12.9	-2.3	3,386	3,496	3,689	3,725	10.0
1 Western Maryland	282	295	305	311	10.3	12.2	12.4	11.9	11.9	-2.5	3,434	3,663	3,627	3,701	7.8
2 Baltimore City	244	256	270	281	15.2	14.7	14.8	15.2	14.8	0.7	3,590	3,781	4,106	4,153	15.7
3 Montgomery County	274	258	281	287	4.7	12.2	11.9	12.1	11.7	-4.1	3,343	3,074	3,403	3,362	0.6
4 Prince George's Foundation	261	291	312	326	24.9	13.4	13.0	12.8	13.3	-0.7	3,496	3,787	3,993	4,334	24.0
5 Central Maryland	244	255	267	269	10.2	12.9	12.9	12.8	12.5	-3.1	3,150	3,294	3,419	3,360	6.7
6 Southern Maryland	280	281	290	302	7.9	11.4	11.4	11.2	11.0	-3.5	3,195	3,207	3,253	3,321	3.9
7 Delmarva Foundation	265	269	284	305	15.1	11.0	11.2	10.8	10.7	-2.7	2,919	3,018	3,062	3,260	11.7
Pennsylvania	291	301	312	319	9.6	13.3	12.8	12.7	12.5	-6.0	3,868	3,849	3,962	3,984	3.0
1 Northwestern Pennsylvania	325	343	359	360	10.8	12.2	11.8	11.8	11.6	-4.9	3,961	4,050	4,233	4,176	5.4
2 Central Pennsylvania	317	332	339	339	6.9	11.4	10.8	10.4	10.3	-9.6	3,612	3,585	3,528	3,490	-3.4
3 Northeastern Pennsylvania	281	294	304	315	12.1	13.0	12.4	12.6	12.7	-2.3	3,650	3,640	3,835	4,003	9.7
4 Eastern Pennsylvania	244	261	276	284	16.4	14.1	13.5	13.2	12.5	-11.3	3,442	3,519	3,641	3,564	3.5
5 Midwestern Pennsylvania	339	346	363	370	9.1	10.6	10.4	10.4	10.4	-1.9	3,595	3,594	3,771	3,848	7.0
6 Allegheny	312	322	326	330	5.8	13.4	13.0	12.9	12.9	-3.7	4,174	4,180	4,202	4,254	1.9
7 Southwestern Pennsylvania	324	327	346	356	9.9	12.2	11.8	11.8	11.3	-7.4	3,950	3,853	4,081	4,023	1.8
8 Highlands	331	341	345	352	6.3	12.3	11.9	12.0	11.7	-4.9	4,071	4,054	4,134	4,122	1.3
9 Southcentral Pennsylvania	257	262	273	279	8.6	13.9	13.1	12.9	12.6	-9.4	3,565	3,434	3,518	3,509	-1.6
10 Delaware-Chester	274	283	301	307	12.0	14.2	13.5	13.4	12.8	-9.9	3,894	3,822	4,028	3,924	0.7
11 Montgomery/Bucks	265	283	294	303	14.3	13.2	12.5	12.3	12.1	-8.3	3,501	3,541	3,614	3,680	4.5
12 Philadelphia	281	289	301	312	11.0	15.0	14.8	14.8	14.9	-0.7	4,213	4,276	4,460	4,644	10.2
Virginia	317	325	333	337	6.3	13.0	12.3	12.3	11.9	-8.5	4,118	3,998	4,101	4,013	-2.5
1 Shenandoah Foundation	318	321	337	335	5.3	12.5	11.6	11.6	11.4	-8.8	3,974	3,728	3,906	3,823	-3.8
2 Northern Virginia	296	294	304	313	5.7	12.6	12.2	11.9	11.3	-10.3	3,727	3,586	3,622	3,540	-5.0
3 Southwest Virginia	349	364	366	372	6.6	12.5	11.8	11.6	11.4	-8.8	4,367	4,295	4,247	4,241	-2.9
4 Southcentral	300	315	318	324	8.0	13.7	12.8	13.2	13.0	-5.1	4,110	4,027	4,197	4,207	2.4
5 Colonial Virginia	300	304	318	320	6.7	13.8	12.9	12.9	12.1	-12.3	4,143	3,917	4,105	3,871	-6.6
West Virginia	380	385	400	390	2.6	11.5	10.9	10.8	10.5	-8.7	4,369	4,199	4,325	4,099	-6.2

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	1974	1975	1976	1977	1974-77	1974	1975	1976	1977	1974-77	1974	1975	1976	1977	1974-77
ATLANTA REGION	337	343	356	365	8.3	10.6	10.3	10.2	10.0	- 5.7	3,573	3,531	3,628	3,651	2.2
Alabama	362	363	382	394	8.8	10.3	10.1	9.9	9.5	- 7.8	3,723	3,665	3,779	3,738	0.4
Florida	315	322	338	345	9.5	10.3	10.1	10.0	9.8	- 4.9	3,242	3,253	3,379	3,383	4.3
1 Foundation for PSR	396	392	419	433	9.9	9.1	8.8	8.8	8.7	- 4.4	3,584	3,450	3,689	3,765	5.1
2 Community Medical Services	319	336	345	350	9.7	9.6	9.3	9.3	8.9	- 7.3	3,058	3,122	3,209	3,119	2.0
3 Jacksonville Area	346	352	368	386	11.6	10.5	10.2	10.2	9.8	- 5.7	3,632	3,585	3,753	3,825	5.3
4 Pinellas County	266	268	290	301	14.0	11.0	11.0	11.0	10.6	- 3.6	2,906	2,943	3,185	3,185	9.6
5 Professional Foundation	310	313	320	322	3.9	10.2	10.0	9.7	9.6	- 5.9	3,161	3,131	3,102	3,094	-2.1
6 Polk-Highlands-Hardee	320	334	347	351	9.7	9.9	9.7	9.6	9.3	- 6.1	3,163	3,243	3,327	3,259	3.0
7 Central Florida	345	350	362	370	7.2	10.0	9.9	9.8	9.3	- 7.0	3,451	3,466	3,569	3,437	-0.4
8 Brevard-Volusia	326	326	333	337	3.4	10.7	10.4	10.4	10.2	- 4.7	3,484	3,391	3,462	3,438	-1.3
9 West Central Florida	286	296	310	311	8.7	10.5	10.2	10.2	9.8	- 6.7	3,005	3,014	3,159	3,044	1.3
10 Foundation for Medical Care	265	274	290	294	10.9	9.4	9.2	9.3	9.2	- 2.1	2,490	2,520	2,692	2,705	8.6
11 Broward-Collier	307	321	337	348	13.4	10.1	9.9	9.8	9.6	- 5.0	3,096	3,182	3,307	3,341	7.9
12 Dade Monroe	354	362	381	387	9.3	10.8	10.6	10.5	10.4	- 3.7	3,827	3,832	4,005	4,028	5.3
Georgia	342	344	357	374	9.4	9.6	9.2	9.0	8.9	- 7.3	3,285	3,163	3,216	3,325	1.2
Kentucky	351	358	370	378	7.7	10.3	10.3	10.2	10.0	- 2.9	3,616	3,686	3,770	3,784	4.6
Mississippi	417	426	434	446	7.0	10.3	10.0	10.1	10.0	- 2.9	4,298	4,263	4,387	4,458	3.7
North Carolina	315	324	331	336	6.7	12.3	11.7	11.5	11.3	- 8.1	3,879	3,786	3,806	3,800	-2.0
1 Western North Carolina	341	369	372	371	8.8	11.8	10.8	10.5	10.4	-11.9	4,025	3,981	3,910	3,857	-4.2
2 Piedmont Medical Foundation	330	330	337	342	3.6	12.5	11.7	11.4	11.3	- 9.6	4,128	3,857	3,843	3,867	-6.3
3 North Central	276	273	282	297	7.6	12.2	11.5	11.8	11.4	- 6.6	3,363	3,143	3,323	3,389	0.8
4 Central Piedmont	287	281	292	302	5.2	11.7	11.7	11.6	11.5	- 1.7	3,358	3,293	3,383	3,475	3.5
5 Capital Area	322	331	344	341	5.9	13.8	13.5	12.5	12.9	- 6.5	4,448	4,471	4,305	4,400	-1.1
6 Northeastern North Carolina	309	322	333	341	10.4	11.7	11.3	11.3	11.1	- 5.1	3,616	3,640	3,764	3,787	4.7
7 Metrolina	311	321	327	330	6.1	12.1	11.6	11.3	11.1	- 8.3	3,767	3,726	3,694	3,666	-2.7
8 Southeastern North Carolina	326	332	335	343	5.2	12.6	12.5	12.3	12.0	- 4.8	4,105	4,150	4,123	4,115	0.2
South Carolina	305	310	315	326	6.9	10.9	10.8	10.6	10.8	- 0.9	3,329	3,351	3,342	3,325	5.9
Tennessee	356	363	376	389	9.3	11.1	10.8	10.6	10.9	- 7.2	3,955	3,917	3,987	4,005	1.3
1 Mid-South Foundation	325	331	345	356	9.5	12.3	12.0	11.8	11.5	- 6.5	4,001	3,977	4,068	4,092	2.3
2 Tennessee Foundation	367	374	387	400	9.0	10.8	10.4	10.2	9.9	- 8.3	3,965	3,886	3,948	3,963	0.1

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Region, State, and PSRO	Discharge rate (Per 1,000 enrollees)				Percent Change	Average length of stay (Days)				Percent Change	Days of care rate (Per 1,000 enrollees)				Percent Change
	1974	1975	1976	1977	1974-77	1974	1975	1976	1977	1974-77	1974	1975	1976	1977	1974-77
CHICAGO REGION	330	334	344	347	5.2	12.4	12.0	11.8	11.5	-7.3	4,087	4,011	4,064	3,995	-2.3
Illinois	339	342	355	359	5.9	12.8	12.3	12.2	11.9	-7.0	4,334	4,204	4,326	4,274	-1.4
1 Northern Illinois	331	328	338	333	1.9	10.5	10.3	10.2	9.7	-7.6	3,471	3,381	3,447	3,251	-6.3
2 Crescent Counties Foundation	307	312	320	325	5.9	12.1	11.8	11.5	11.1	-8.3	3,710	3,683	3,684	3,603	-2.9
3 Chicago Foundation	309	316	331	336	8.7	14.3	14.0	14.1	13.6	-4.9	4,412	4,425	4,672	4,571	3.6
4 Quad River Foundation	329	335	342	354	7.6	14.2	12.2	12.5	12.1	-14.8	4,667	4,085	4,270	4,285	-8.2
5 Mid-State Foundation	377	377	388	397	5.3	12.3	11.5	11.4	11.0	-10.6	4,633	4,338	4,425	4,364	-5.8
6 East Central Illinois Foundation	377	369	376	381	1.1	10.7	10.2	10.1	9.9	-7.5	4,036	3,765	3,799	3,769	-6.6
7	405	398	412	415	2.5	11.9	11.2	10.8	10.9	-8.4	4,819	4,457	4,454	4,518	-6.2
8 Southern Illinois	388	390	404	409	5.4	11.0	10.5	10.2	10.3	-6.4	4,264	4,096	4,119	4,208	-1.3
Indiana	319	324	337	341	6.9	12.4	12.1	11.9	11.6	-8.3	3,956	3,927	4,008	3,891	-1.6
1 Calumet	306	301	314	321	4.9	12.5	12.1	12.3	11.9	-4.8	3,827	3,644	3,862	3,819	-0.2
2 Area II - South Bend	325	322	337	333	2.5	12.0	12.1	11.7	11.4	-5.0	3,904	3,900	3,947	3,801	-2.6
3 Area III - Fort Wayne	297	309	310	317	6.7	13.4	12.8	12.1	11.1	-17.2	3,976	3,957	3,756	3,517	-11.7
4 Area IV - Newcastle	326	323	338	340	4.9	12.6	12.7	12.0	11.7	-7.1	4,083	4,098	4,052	3,977	-2.6
5 Area V - Indianapolis	306	320	333	342	11.8	12.7	12.3	12.2	11.6	-8.7	3,883	3,934	4,067	3,971	2.3
6 Area VI - Terre Haute	350	353	369	363	3.7	11.0	10.6	10.7	10.3	-6.4	3,845	3,740	3,950	3,738	-2.8
7 Southwest Indiana	348	358	371	385	10.6	12.4	11.8	11.7	11.4	-8.1	4,311	4,225	4,340	4,392	1.9
Michigan	316	327	338	344	8.9	12.7	12.3	12.0	11.7	-7.9	4,016	4,024	4,053	4,026	0.2
1 Upper Peninsula	374	378	392	378	1.1	12.3	11.9	11.4	11.2	-9.0	4,596	4,496	4,466	4,194	-8.7
2 Area II	350	355	358	366	4.0	11.3	11.0	10.7	10.4	-7.0	3,951	3,906	3,838	3,781	-4.3
3 Western Michigan	290	302	313	320	10.3	11.4	10.9	10.6	10.1	-11.4	3,301	3,289	3,316	3,231	-2.1
4 Area IV - Saginaw	337	347	354	354	5.0	11.4	11.1	10.8	10.3	-9.6	3,841	3,857	3,824	3,647	-5.1
5 GLSC - Flint	344	348	365	366	6.4	13.8	13.1	12.9	12.5	-9.4	4,749	4,559	4,712	4,575	-3.7
6 Central Michigan Medical Care	320	321	331	335	4.7	11.9	11.8	10.9	10.9	-8.4	3,811	3,782	3,611	3,651	-4.2
7 Area VII - Ann Arbor	318	332	343	350	10.1	11.5	11.3	11.3	11.2	-2.6	3,657	3,753	3,876	3,922	7.2
8 Southeastern Michigan	300	315	330	339	13.0	14.3	14.0	13.6	13.4	-6.3	4,289	4,414	4,483	4,542	5.9
9 Oakland-Macomb	305	316	318	333	9.2	13.2	12.9	12.6	12.2	-7.5	4,023	4,079	4,009	4,057	0.8
10 Area X - Kalamazoo	334	342	351	356	6.6	11.3	10.9	10.8	10.2	-9.7	3,779	3,724	3,790	3,635	-3.8
Minnesota	379	375	384	371	-2.1	11.1	10.9	10.5	10.0	-9.9	4,205	4,084	4,032	3,710	-11.8
1	398	393	397	393	-1.3	10.6	10.3	10.0	9.4	-11.3	4,222	4,051	3,973	3,690	-12.6
2 Foundation for Health Care	390	382	394	368	-5.8	11.7	11.6	11.3	10.8	-7.7	4,559	4,434	4,453	3,977	-12.8
3 Quality Council	345	347	357	354	2.6	10.7	10.4	10.0	9.5	-11.2	3,696	3,604	3,572	3,365	-9.0
Ohio	310	319	327	333	7.4	12.6	12.3	12.2	11.9	-5.6	3,906	3,918	3,985	3,959	1.4
1 Medco Peer Review	296	308	313	324	9.5	13.6	13.0	12.8	12.4	-8.8	4,030	4,006	4,009	4,022	-0.2
2 Area II - Dayton	287	293	308	318	10.8	12.7	12.5	12.3	11.7	-7.9	3,645	3,656	3,792	3,726	2.2
3 Region III - Findlay	337	343	352	352	4.5	11.0	10.5	10.6	10.4	-5.5	3,709	3,602	3,734	3,659	-1.3
4 Fourth Ohio Area - Sylvania	330	347	349	358	8.5	11.7	11.3	11.3	11.0	-6.0	3,862	3,919	3,939	3,943	2.1
5 Region V - Painesville	312	333	331	341	9.3	11.6	11.3	11.1	11.0	-5.8	3,622	3,759	3,671	3,745	3.4
6 Region VI - Akron	310	310	323	324	4.5	12.7	12.4	12.4	12.1	-4.7	3,930	3,846	4,003	3,917	-0.3
7 Area VII - Martins Ferry	356	370	381	383	7.6	11.2	11.2	11.2	11.3	0.9	3,981	4,140	4,264	4,324	8.6
8 Area VIII - Zanesville	331	345	343	353	6.6	12.2	12.0	12.0	11.4	-6.6	4,042	4,137	4,120	4,024	-0.4
9 Region IX - Portsmouth	370	362	374	370	0.0	12.0	11.6	11.7	11.5	-4.2	4,436	4,196	4,375	4,260	-4.0
10 Region X - Columbus	288	306	317	325	12.8	12.7	12.7	12.6	12.3	-3.1	3,662	3,885	3,988	4,000	9.2
11 Area XI - Ashland	337	352	347	359	6.5	11.4	10.9	10.7	10.6	-7.0	3,841	3,840	3,708	3,804	-1.0
12 Physicians' Peer Review	296	299	310	312	5.4	13.7	13.6	13.7	13.2	-3.6	4,055	4,064	4,242	4,121	1.6
Wisconsin	337	335	342	342	1.5	11.9	11.4	10.9	10.7	-10.1	4,013	3,819	3,723	3,659	-8.7
1 Wisconsin Review Organization	357	353	361	357	0.0	11.3	10.8	10.3	10.0	-11.5	4,030	3,807	3,719	3,573	-11.3
2 Southeastern Wisconsin	301	302	305	313	4.0	13.9	12.8	12.4	12.1	-9.0	3,997	3,859	3,782	3,788	-5.2

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Region, State, and PSRO	Discharge rate (Per 1,000 enrollees)				Percent change	Average length of stay (Days)				Percent change	Days of care rate (Per 1,000 enrollees)				Percent change
	1974	1975	1976	1977	1974-77	1974	1975	1976	1977	1974-77	1974	1975	1976	1977	1974-77
DALLAS REGION	389	389	400	406	4.4	9.9	9.6	9.5	9.3	- 6.1	3,847	3,730	3,802	3,772	- 2.0
Arkansas	405	405	420	431	6.4	9.6	9.3	9.0	8.8	- 8.3	3,884	3,764	3,781	3,788	- 2.5
Louisiana	373	373	386	396	5.6	9.9	9.7	9.7	9.6	- 3.0	3,696	3,616	3,739	3,783	2.4
1 North Louisiana	407	408	421	426	4.7	8.9	8.7	8.7	8.6	- 3.4	3,626	3,550	3,664	3,661	1.0
2 Southwest Louisiana	431	430	442	452	4.9	8.7	8.5	8.4	8.3	- 4.6	3,748	3,657	3,709	3,753	0.1
3 Louisiana Medical Standards	394	395	402	408	3.6	9.2	8.9	8.9	8.9	- 3.3	3,626	3,512	3,581	3,631	0.1
4 Southeast Louisiana	302	301	315	329	8.9	12.5	12.4	12.4	12.0	- 4.0	3,773	3,729	3,904	3,945	4.6
New Mexico	336	341	351	346	3.0	9.0	9.0	9.0	8.5	- 5.6	3,028	3,072	3,157	2,945	- 2.7
Oklahoma	401	394	401	397	-1.0	9.3	9.0	8.9	8.9	- 4.3	3,730	3,549	3,569	3,531	- 5.3
Texas	390	391	403	410	5.1	10.2	9.9	9.8	9.4	- 7.8	3,976	3,873	3,953	3,854	- 3.1
1	453	446	457	468	3.3	9.7	9.3	9.2	8.9	- 8.2	4,393	4,168	4,203	4,165	- 5.2
2	372	374	381	397	6.7	10.3	9.8	9.7	9.4	- 8.7	3,835	3,669	3,697	3,735	- 2.6
3	355	359	372	376	5.9	10.5	10.3	10.1	9.8	- 6.7	3,726	3,695	3,752	3,682	- 1.2
4	435	432	445	450	3.4	9.8	9.3	9.2	8.9	- 9.2	4,263	4,019	4,090	4,006	- 6.0
5	407	402	416	422	3.7	9.8	9.6	9.5	9.0	- 8.2	3,985	3,863	3,953	3,802	- 4.6
6	365	375	384	387	6.0	10.3	9.8	9.7	9.2	-10.7	3,761	3,674	3,726	3,557	- 5.4
7	386	387	403	408	5.7	10.9	10.6	10.5	10.4	- 4.6	4,212	4,104	4,226	4,244	0.8
8	400	414	409	421	5.3	11.4	11.1	10.7	10.0	-12.3	4,554	4,598	4,380	4,206	- 7.6
9	358	362	378	385	7.5	10.2	9.9	9.9	9.5	- 6.9	3,652	3,583	3,746	3,653	0.03
KANSAS CITY REGION	378	382	395	399	5.6	11.7	11.5	11.3	10.8	- 7.7	4,426	4,391	4,461	4,311	- 2.6
Iowa	375	378	388	388	3.5	11.2	11.2	10.8	10.0	-10.7	4,202	4,234	4,190	3,883	- 7.6
Kansas	414	419	438	440	6.3	11.7	11.6	11.5	11.2	- 4.3	4,838	4,857	5,032	4,932	1.9
Missouri	357	362	374	384	7.6	12.3	12.1	11.9	11.4	- 7.3	4,387	4,381	4,444	4,379	0.2
1 Northwest Missouri	359	368	374	381	6.1	12.0	12.1	11.7	11.4	- 5.0	4,305	4,458	4,375	4,341	0.8
2 Mid-Missouri	382	398	405	417	9.2	12.1	11.7	11.7	10.8	-10.7	4,626	4,652	4,734	4,504	- 2.6
3 Central Eastern Missouri	325	329	346	360	10.7	14.0	13.5	13.3	12.8	- 8.6	4,543	4,437	4,600	4,604	1.3
4 MOAF	360	359	371	379	5.3	10.9	10.8	10.6	10.1	- 7.3	3,925	3,877	3,928	3,829	- 2.4
5 Southeast Missouri	431	424	442	453	5.1	10.4	10.2	10.2	9.9	- 4.8	4,480	4,322	4,509	4,481	0.02
Nebraska	402	399	414	410	2.0	10.7	10.2	9.9	9.7	- 9.3	4,303	4,072	4,098	3,972	- 7.7
DENVER REGION	382	378	388	385	0.8	9.7	9.6	9.4	9.0	- 7.2	3,706	3,628	3,650	3,468	- 6.4
Colorado	369	369	378	377	2.2	9.8	10.0	9.9	9.5	- 3.1	3,614	3,685	3,744	3,580	- 0.9
Montana	422	413	423	413	-2.1	9.0	8.9	8.4	8.0	-11.1	3,798	3,673	3,550	3,305	- 13.0
North Dakota	441	436	450	443	0.5	10.5	10.2	9.9	9.5	- 9.5	4,625	4,446	4,457	4,209	- 9.0
South Dakota	422	417	430	429	1.7	10.0	10.0	9.7	9.1	- 9.0	4,223	4,169	4,173	3,905	- 7.5
Utah	290	288	295	296	2.1	8.6	8.3	8.2	8.0	- 7.0	2,492	2,387	2,420	2,370	- 4.9
Wyoming	395	380	392	389	-1.5	9.6	9.1	9.0	8.6	-10.4	3,792	3,453	3,529	3,348	- 11.7

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Region, State, and PSRO	Discharge rate (Per 1,000 enrollees)				Percent Change	Average length of stay (Days)				Percent Change	Days of care rate (Per 1,000 enrollees)				Percent Change
	1974	1975	1976	1977	1974 - 77	1974	1975	1976	1977	1974 - 77	1974	1975	1976	1977	1974 - 77
SAN FRANCISCO REGION	310	312	317	319	2.9	9.6	9.3	9.3	9.1	- 5.2	2,972	2,899	2,951	2,905	- 2.3
Arizona	315	316	317	321	1.9	10.6	10.5	10.4	10.0	- 5.7	3,339	3,313	3,300	3,211	- 3.8
1 Northern Arizona	305	310	312	314	3.0	10.5	10.4	10.3	9.8	- 6.7	3,202	3,219	3,213	3,080	- 3.8
2 Greatern Southern	338	330	330	338	0.0	10.9	10.7	10.6	10.3	- 5.5	3,687	3,525	3,493	3,477	- 5.7
California	310	312	318	320	3.2	9.5	9.2	9.2	8.9	- 6.3	2,940	2,870	2,925	2,847	- 3.2
1 Redwood Coast Region	311	322	328	321	3.2	7.5	7.2	7.3	7.2	- 4.0	2,331	2,316	2,393	2,314	- 0.7
2 Superior California	357	347	357	351	- 1.7	8.3	7.8	8.0	7.7	- 7.2	2,963	2,705	2,856	2,706	- 8.7
3 North Bay	301	295	308	304	1.0	9.1	9.2	8.9	8.8	- 3.3	2,737	2,711	2,741	2,673	- 2.3
4 Greater Sacramento	301	307	308	303	0.7	8.6	8.4	8.2	8.0	- 7.0	2,590	2,579	2,525	2,426	- 6.3
5 San Francisco Peer Review Organization, Inc	305	308	313	317	3.9	10.7	10.7	10.9	10.4	- 2.8	3,266	3,295	3,409	3,298	- 1.0
6 Mid-Peninsula	284	292	294	301	6.0	10.0	9.8	9.7	9.7	- 3.0	2,836	2,861	2,853	2,917	2.9
7 East Bay	292	294	305	312	6.8	8.9	8.8	8.7	8.8	- 1.1	2,595	2,586	2,655	2,742	5.7
8 San Joaquin Area	306	301	310	308	1.3	7.7	7.6	7.8	7.8	1.3	2,343	2,284	2,416	2,400	2.4
9 Santa Clara Valley	271	270	279	280	3.3	9.1	8.9	9.0	8.7	- 4.4	2,462	2,401	2,509	2,433	- 1.2
10 Stanislaus-Merced-Mariposa	323	329	343	335	3.7	8.9	8.6	8.7	8.4	- 5.6	2,871	2,829	2,980	2,814	- 2.0
11 Fresno-Madera	265	274	283	285	7.5	7.7	7.1	7.3	7.1	- 7.8	2,037	1,948	2,064	2,022	- 0.7
12 Monterey Bay Area	275	272	281	280	1.8	8.2	8.1	8.1	7.9	- 3.7	2,254	2,205	2,272	2,208	- 2.0
13 PSRO of Tulare - Kings Counties	319	314	324	324	1.6	7.9	7.5	7.4	7.3	- 7.6	2,518	2,351	2,398	2,362	- 6.2
14 Kern County	331	343	343	351	6.0	8.3	8.0	8.0	7.6	- 8.4	2,748	2,740	2,746	2,667	- 2.9
15 Professional Standards	325	327	328	322	- 0.9	9.4	9.1	9.0	8.8	- 6.4	3,052	2,978	2,955	2,831	- 7.2
16 Santa Barbara/San Luis Obispo Counties	324	321	317	302	- 6.8	9.0	8.6	8.6	8.5	- 5.6	2,915	2,760	2,728	2,566	- 12.0
17 Ventura Area	313	322	315	332	6.1	8.3	7.9	8.1	7.9	- 4.8	2,594	2,542	2,552	2,619	1.0
18 Area XVIII	322	327	334	340	5.6	10.3	10.0	10.1	9.7	- 5.8	3,319	3,269	3,373	3,296	- 0.7
26	314	322	325	330	5.1	9.5	9.2	9.3	9.0	- 5.3	2,986	2,962	3,023	2,965	- 0.7
27 Riverside County	324	315	317	305	- 5.9	8.9	8.6	8.6	8.2	- 7.9	2,881	2,708	2,726	2,504	- 13.1
28 San Diego/Imperial	286	282	288	294	2.8	8.0	8.6	8.6	8.6	7.5	2,575	2,422	2,474	2,528	- 1.8
Hawaii	263	263	258	257	- 2.3	10.2	9.7	9.5	9.8	- 3.9	2,680	2,550	2,446	2,514	- 6.2
Nevada	345	345	372	361	4.6	9.6	9.5	9.6	8.9	- 7.3	3,312	3,279	3,566	3,211	- 3.0
SEATTLE REGION	324	323	328	326	0.6	8.6	8.1	8.0	7.9	- 8.1	2,785	2,614	2,621	2,575	- 7.5
Alaska	332	288	312	322	- 3.0	8.0	7.5	8.0	8.3	3.8	2,654	2,156	2,499	2,670	0.6
Idaho	358	358	366	357	- 0.3	8.7	8.3	8.2	8.0	- 8.0	3,111	2,970	2,998	2,859	- 8.1
Oregon	316	311	317	316	0.0	9.8	8.7	8.4	8.3	- 15.3	3,092	2,708	2,663	2,622	- 15.2
1 Multnomah Foundation	311	312	322	320	2.9	11.0	9.9	9.6	9.3	- 15.5	3,422	3,090	3,089	2,978	- 13.0
2 Greater Oregon	318	311	315	314	- 1.3	9.2	8.0	7.9	7.8	- 15.2	2,923	2,486	2,486	2,448	- 16.3
Washington	323	325	328	327	12.4	7.8	7.6	7.6	7.6	- 2.6	2,517	2,466	2,491	2,484	- 1.3

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TABLE 2.--Discharge rates in short-stay hospitals for Medicare beneficiaries aged 65 and over, in highest- and lowest-ranking PSRO areas, 1977

(Hospital-based data adjusted for patient origin)

PSRO Area No.	PSRO Area Name and State	Discharge rate (Per 1,000 enrollees)
		Highest ranking
4501	Texas 1/	468
2605	Southeast Missouri, Missouri	453
1902	Southwest Louisiana, Louisiana	452
4504	Texas 1/	450
2500	Mississippi Foundation, Mississippi.	446
3500	North Dakota Health Care Review, North Dakota	443
1700	Kansas Foundation, Kansas	440
1001	Foundation for PSR, Florida	433
0400	Arkansas Foundation, Arkansas	431
4300	South Dakota Foundation, South Dakota	429
1901	North Louisiana, Louisiana	426
4505	Texas 1/	422
4508	Texas 1/	421
2602	Mid-Missouri, Missouri	417
1407	Illinois 1/	415
2700	Montana Foundation, Montana	413
2800	Nebraska 1/	410
1408	Southern Illinois, Illinois	409
4507	Texas 1/	408
1903	Louisiana Medical Standards, Louisiana	408
		Lowest ranking
4000	Foundation of Peurto Rico, Puerto Rico	228
1200	Pacific PSRO, Hawaii	257
2105	Central Maryland, Maryland	269
0702	Area II PSRO, Connecticut	269
0900	National Capital, District of Columbia	273
3314	Queens County, New York	273
3313	Kings County, New York	275
3909	South Central Pennsylvania, Pennsylvania	279
0512	Monterey Bay Area, California	280
0509	Santa Clara Valley, California	280
2102	Baltimore City, Maryland	281
3103	Bergen County, New Jersey	283
3904	Eastern Pennsylania, Pennsylvania	284
0704	Eastern Connecticut, Connecticut	284
0511	Fresno-Madera, California	285
3102	Passaic Valley, New Jersey	286
3315	Nassau Physicians Review, New York	287
0703	Hartford County, Connecticut	287
2103	Montgomery County, Maryland	287
3107	Area 7 Physicians Review, New Jersey	288

1/ PSRO contract not yet awarded.

TABLE 3.--Short-stay hospital use by Medicare beneficiaries aged 65 and over, by HEW region, 1977

(Hospital-based data adjusted for patient origin)

Region and PSRO	Discharge rate (Per 1,000 enrollees)	Average length of stay (Days)	Days of care rate (Per 1,000 enrollees)
Total U.S.....	346	10.9	3,767
Boston.....	320	12.0	3,834
Highest PSRO.....	367	13.1	4,311
Lowest PSRO.....	269	10.0	2,841
New York..... 1/	296	14.4	4,266
Highest PSRO.....	377	17.1	5,123
Lowest PSRO.....	273	12.0	3,657
Philadelphia.....	322	12.3	3,960
Highest PSRO.....	390	14.9	4,644
Lowest PSRO.....	269	10.3	3,260
Atlanta.....	365	10.0	3,651
Highest PSRO.....	446	12.9	4,458
Lowest PSRO.....	294	8.7	2,705
Chicago.....	347	11.5	3,995
Highest PSRO.....	415	13.6	4,575
Lowest PSRO.....	312	9.4	3,231
Dallas.....	406	9.3	3,772
Highest PSRO.....	468	12.0	4,243
Lowest PSRO.....	329	8.3	2,945
Kansas City.....	399	10.8	4,311
Highest PSRO.....	453	12.8	4,932
Lowest PSRO.....	360	9.7	3,829
Denver.....	385	9.0	3,468
Highest PSRO.....	443	9.5	4,209
Lowest PSRO.....	296	8.0	2,370
San Francisco.....	319	9.1	2,905
Highest PSRO.....	372	10.4	3,477
Lowest PSRO.....	257	7.1	2,022
Seattle.....	326	7.9	2,575
Highest PSRO.....	357	9.3	2,978
Lowest PSRO.....	314	7.6	2,448

1/ Excludes Puerto Rico and Virgin Islands

TABLE 4.--Average length of stay in short-stay hospitals for Medicare beneficiaries ages 65 and over, in highest- and lowest-ranking PSRO areas, 1977

(Hospital-based data)

No.	PSRO Area Name and State	Average length of stay (in days)
		Highest ranking
3313	Kings County, New York.....	17.1
4800	Virgin Islands Medical Institute....	16.5
3316	Bronx Medical Services, New York....	16.4
3311	New York County, New York.....	16.2
3301	Erie Region, New York.....	16.1
3314	Queens County, New York.....	15.9
3105	Hudson County, New Jersey.....	15.3
3312	Richmond County, New York.....	15.3
3103	Bergen County, New Jersey.....	15.2
3912	Philadelphia, Pennsylvania.....	14.9
2102	Baltimore City, Maryland.....	14.8
3315	Nassau Physicians Review, New York..	14.6
3306	Area VI of New York, New York.....	14.6
3307	Eastern New York, New York.....	14.3
3104	Essex Physicians Review, New Jersey.	14.1
3108	Southern New Jersey, New Jersey.....	13.8
3309	Area 9, New York.....	13.8
0900	National Capital, District of Columbia	13.7
3317	Suffolk Physicians Review, New York.	13.7
3308	Area 8, New York.....	13.7
		Lowest Ranking
0511	Fresno-Madera, California.....	7.1
0501	Redwood Cost Region, California.....	7.2
0513	Tulare-Kings, California.....	7.3
5000	Washington State, Washington.....	7.6
0514	Kern County, California.....	7.6
0502	Superior California, California.....	7.7
3802	Greater Oregon, Oregon.....	7.8
0508	San Joaquin Area, California.....	7.8
0512	Monterey Bay Area, California.....	7.9
0517	Ventura Area, California.....	7.9
4600	Utah PSRO, Utah.....	8.0
2700	Montana Foundation, Montana.....	8.0
0504	Greater Sacramento, California.....	8.0
1300	Idaho PSRO, Idaho.....	8.0
0527	Riverside County, California.....	8.2
1902	Southwest Louisiana, Louisiana.....	8.3
0200	Alaska PSRO, Alaska.....	8.3
0510	Stanislaus-Merced-Mariposa, California	8.4
0516	Santa Barbara/San Louis Obispo, California	8.5
3200	New Mexico PSRO, New Mexico.....	8.5

TABLE 5.--Days-of-care rate in short stay hospitals for Medicare beneficiaries aged 65 and over, in highest- and lowest-ranking PSRO areas, 1977

(Hospital-based data adjusted for patient origin)

No.	PSRO Area Name and State	Days-of-care rate (per 1,000 enrollees)
		Highest ranking
4800	Virgin Islands Medical Institute.....	6,446
3305	Adirondack, New York.....	5,123
3301	Erie Region, New York.....	5,108
1700	Kansas Foundation, Kansas.....	4,932
3312	Richmond County, New York.....	4,848
3316	Bronx Medical Service, New York.....	4,789
3307	Eastern New York, New York.....	4,730
3311	New York County, New York.....	4,721
3105	Hudson County, New Jersey.....	4,707
3313	Kings County, New York.....	4,704
3912	Philadelphia, Pennsylvania.....	4,644
3306	Area VI, New York.....	4,616
2603	Central Eastern Missouri, Missouri.....	4,604
3308	Area 8, New York.....	4,584
2305	Professional Review--GLSC, Michigan....	4,575
1403	Chicago Foundation, Illinois.....	4,571
2308	Southeastern Michigan, Michigan.....	4,542
1407	Illinois 1/.....	4,518
2602	Mid-Missouri, Missouri.....	4,504
3104	Essex Physician Review, New Jersey.....	4,504
		Lowest ranking
0511	Fresno-Madera, California.....	2,022
0512	Monterey Bay Area, California.....	2,208
0501	Redwood Coast Region, California.....	2,314
0513	Tulare-Kings, California.....	2,362
4600	Utah PSRO, Utah.....	2,370
4000	Puerto Rico Foundation, Puerto Rico....	2,374
0508	San Joaquin Area, California.....	2,400
0504	Greater Sacramento, California.....	2,426
0509	Santa Clara Valley, California.....	2,433
3802	Greater Oregon, Oregon.....	2,448
5000	Washington State PSRO, Washington.....	2,484
0527	Riverside County, California.....	2,504
1200	Pacific PSRO, Hawaii.....	2,514
0528	Dan Diego/Imperial, California.....	2,528
0516	Santa Barbara/San Luis Obispo, California.....	2,566
0517	Ventura Area, California.....	2,619
0514	Kern County, California.....	2,667
0200	Alaska PSRO, Alaska.....	2,670
0503	North Bay, California.....	2,673
0502	Superior, California.....	2,704

1/ PSRO contract not yet awarded.

TABLE 6.--Partial Correlation Coefficients 1/ of ALOS, Discharge Rate, Days-of-Care Rate with Independent Variables for all PSRO Areas, 1976

	ALOS	Discharge Rate	Days-of-Care Rate
Age (percent 75 and Over)	r=.24 (t=3.3)	.15 (2.0)	.30 (4.3)
Race (percent Nonwhite)			
Population Density (per sq. mi.)	.38 (5.5)		.26 (3.7)
Nursing Home Beds (per 1000 enrollees)			
Physicians (per 1000 enrollees)		-.30 (-4.3)	-.30 (-4.3)
Teaching Hospitals (percent admission)	.16 (2.2)		
Occupancy (percent)	.73 (14.6)	-.26 (-3.7)	.48 (7.5)

1/ The partial correlation coefficients were calculated from the formula:

$$r_{yx_i \cdot T} = \frac{t}{\sqrt{t^2 + (n-8)}} \qquad i = 1,2,\ldots 7$$

Where $r_{yx_i \cdot T}$ denotes the partial correlation of y and x_i; i = 1,2,...7 and T denotes the full subset of the remaining 6 variables whose values are held fixed.

t is given by $\hat{b}_i / \hat{\sigma}_{b_i}$ where $\hat{b}_i$ are the regression coefficients in the model with all variables entered and $\hat{\sigma}_{b_i}$ are their associated standard errors.

n is the number of independent observations (n = 190).

Table 7: Prediction Models for ALOS in the Northeast and West (Regression Coefficient and t values)

Explanatory Variable	Northeast HEW Region 1-2-3	West HEW Region 8-9-10
Age (percent 75 and Over)	18.4483 (1.5)	-18.9338 (-1.8)
Sex (Percent Female)	15.0974 (1.1)	25.3719 (2.7)
Race (percent Nonwhite)	5.2844 (1.8)	2.4790 (1.7)
Population Density (per sq. mi.)	.00009 (4.5)	.00008 (.8)
Short Stay Beds (per 1000 enrollees)	.1017 (.8)	.4645 (3.1)
Nursing Home Beds (per 1000 enrollees)	.1037 (.8)	.0064 (.1)
Physicians (per 1000 enrollees)	-.3953 (-1.4)	-.4918 (-1.3)
Teaching Hospital (ercent admissions)	-.0060 (-.7)	.0081 (1.1)
Occupancy (percent)	.2214 (5.4)	.0469 (1.3)
Constant	-21.9396	-3.2408
R^2	.67	.67
F	11.3	6.0
N	61	36