

# Medicare Patients: Regional Differences in Length of Hospital Stays, 1969-71

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*This article focuses on the striking regional differences observed in the length of the hospital stay by Medicare patients discharged from short-stay hospitals in the four U.S. census regions. Medicare data for patients discharged from short-stay hospitals with specific diagnoses in 1969-71 are compared by region and age group, whether surgery was performed, and whether there were multiple diagnoses. Consistent regional differences were found in length of stay that are not explained by variations in the patient characteristics examined. No matter what the condition, length of stay was nearly always longest in the Northeast and shortest in the West, with the North Central region and the South occupying the positions in between. Implications are that variations consistently found in other measures of hospital utilization, such as admission rates, that directly affect hospital expenditures are also not explained by the patient characteristics studied. The data suggest the need for extensive study of other factors that may influence the duration of the hospital stay.*

SINCE ITS INCEPTION in 1966 the hospital insurance program under Medicare has protected virtually every person in the Nation aged 65 and over against the burdens of hospital costs, relieving them of about 90 percent of the charges incurred for short-stay hospitalization.<sup>1</sup> Public expenditures for this program have undergone a steep increase. Medicare reimbursements for discharges from short-stay hospitals in 1972 (\$5.6 billion or more than 95 percent of total hospital insurance reimbursements) were double the amount reimbursed just 5 years earlier in 1967 (\$2.8 billion). The growth in medical care prices

during that period has been widely reported, especially the accelerated growth in inpatient hospital care prices. The hospital daily-service-charge component of the Consumer Price Index rose at a faster rate than any other item of the medical care index.<sup>2</sup>

It has also been reported that the initial impact of Medicare protection was one of increased hospital utilization by the population aged 65 and over. The discharge rate, the average length of stay, and the average number of days of care per 1,000 enrollees were greater the year that Medicare began than they were in the preceding year. Estimates of the increase in the short-stay hospital discharge rate for persons aged 65 and over from the year before the program started to the program's first year have been in the range of 4.6-7.4 percent. Corresponding estimates of the increase in mean length of stay range from 4.1 percent to 7.8 percent; the number of days of care an estimated 8.9-16.0 percent.<sup>3</sup>

By 1949, both the average length of stay and the average number of days of care per 1,000 enrollees began to show a downward trend. As table 1 shows, the mean length of stay in short-stay hospitals by Medicare patients was 12.9 days in 1969 and declined to 12.4 days by 1971; the number of days of care per 1,000 enrollees dropped from 3,804 to 3,660. A study covering age differences in health care spending in fiscal year 1974 shows that for persons aged 65 and over the average stay in community hospitals reached a post-Medicare low of 11.35 days that year.<sup>4</sup>

Experience under Medicare has also been characterized by marked geographic variations in hospital utilization. For short-stay hospitals, regional differences in discharge rates, average length of

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<sup>1</sup> See "Hospital Charges Not Reimbursable by Medicare," in *Medicare: Health Insurance for the Aged, 1967, Section 4.1: Short-Stay Hospital Utilization*, Social Security Administration, Office of Research and Statistics, 1975.

Effective July 1, 1973, protection was extended to persons entitled to receive social security cash benefits because of disability and to persons suffering from chronic renal disease.

<sup>2</sup> Loucele A. Horowitz, "Medical Care Price Changes in Medicare's First Five Years," *Social Security Bulletin*, March 1972.

<sup>3</sup> See Julian H. Pettengill, "Trends in Hospital Use by the Aged," *Social Security Bulletin*, July 1972.

<sup>4</sup> See Marjorie Mueller, "Age Differences in Health Care Spending, Fiscal Year 1974," *Social Security Bulletin*, June 1975.

TABLE 1.—Number of discharges, mean length of stay, and number of days of care per 1,000 Medicare enrollees in short-stay hospitals, by census region, 1969–71

Census region	Number of discharges per 1,000 enrollees	Mean length of stay (in days)	Number of days of care per 1,000 enrollees
1969			
United States.....	294 9	12 9	3,804
Northeast.....	248 7	15 1	3,755
North Central.....	305 8	13 6	4,159
South.....	320 9	11 9	3,819
West.....	302 4	10 6	3,205
1970			
United States.....	292 4	12 8	3,743
Northeast.....	244 2	15 0	3,663
North Central.....	306 2	13 1	4,011
South.....	320 9	11 6	3,722
West.....	292 9	10 1	2,958
1971			
United States.....	295 2	12 4	3,660
Northeast.....	251 5	15 0	3,773
North Central.....	307 7	13 0	4,000
South.....	321 1	11.3	3,628
West.....	294 3	10 0	2,943

Source Unpublished data from billing forms for hospital discharges in Social Security Administration central records as of Dec 28, 1973

stay, and patient days per 1,000 enrollees may be observed in the figures for the four U.S. census regions for 1969–71, the period covered by this study. The number of discharges per 1,000 enrollees were consistently highest in the South and lowest in the Northeast. The length of stay in short-stay hospitals in the Northeast, on the other hand, consistently exceeded that in the West—by 4.5–5.0 days.

Such disparities raise the question of whether regional differences in certain characteristics of the patient population explain the differences in hospital utilization, particularly with respect to length of stay. National data for the Medicare population aged 65 and over show that mean length of stay in short-stay hospitals increases with age, is greater for surgical cases than for nonsurgical cases, is greater for patients with multiple diagnoses than for those with a single diagnosis, and varies considerably with primary discharge diagnosis.

This article focuses on variations in length of stay in short-stay hospitals in the four U.S. census regions (Northeast, North Central, South, and West) and brings together 3 years of Medicare data for patients discharged in 1969, 1970, and 1971. Information presented here is based on

tabulations in the annual Social Security Administration series<sup>5</sup> that show mean length of stay in 1969 and 1970 for 139 specific diagnoses (or diagnostic groups) and for 166 diagnoses in 1971 by census region and division. For each diagnosis, length-of-stay data are provided for three broad age groups, for discharges with single or multiple diagnoses, and for discharges with or without surgery.

Summary findings from the study show that, during 1969–71, consistent regional differences occurred in the length of stay for each of the three age groups, for surgical and nonsurgical cases, for patients with single or multiple diagnoses, and for the same primary discharge diagnosis. The regional variations in length of stay do not appear to be explained by variations in these patient characteristics. The data suggest the need to study other regional differences that may influence the duration of the hospital stay.

## REGIONAL DIFFERENCES FOR ALL DIAGNOSES

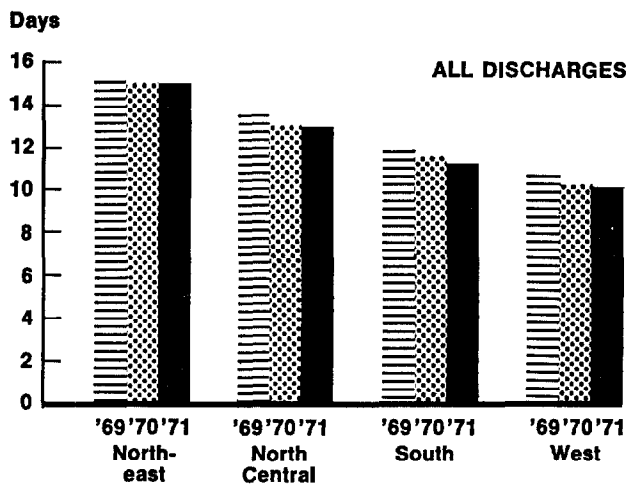
For Medicare patients discharged from short-stay hospitals in the United States during the study period, the average length of stay was 12.9 days in 1969, 12.8 days in 1970, and 12.4 days in 1971. Among the four census regions, marked differences were found for each of the years in length of stay (chart 1).<sup>6</sup> In the Northeast the mean length of stay in 1969 was 15.1 days—4.5 days longer than the average stay of 10.6 days in the West. The pattern of geographic variations observable in 1969 continued in the next 2 years: The Northeast had the longest stay, followed by the North Central States, the South, and the West.

In each region a tendency toward declining hospital stays is seen. The average stay went down to 0.6 day between 1969 and 1971 in the North

<sup>5</sup> Medicare: Health Insurance for the Aged, 1969: Length of Stay by Diagnosis, Social Security Administration, Office of Research and Statistics, 1973, and the corresponding reports for 1970 (1973) and for 1971 (1974).

<sup>6</sup> The census regions include: Northeast—Me., N.H., Vt., Mass., R. I., Conn., N. Y., N. J., Pa.; North Central—Ohio, Ind., Ill., Mich., Wis., Minn., Iowa, Mo., N. Dak., S. Dak., Nebr., Kans.; South—Del., Md., D. C., Va., W. Va., N. C., S. C., Ga., Fla., Ky., Tenn., Ala., Miss., Ark., La., Okla., Tex.; West—Mont., Idaho, Wyo., Colo., N. Mex., Ariz., Utah, Nev., Wash., Oreg., Calif., Alaska, Hawaii.

CHART 1.—Mean length of stay for short-stay hospital discharges under Medicare, by census regions, 1969–71



Central, South, and West regions; in the Northeast the decline was only 0.1 day. Consequently, the disparity between the Northeast and the West increased. In 1969, hospital stays in the Northeast were 42 percent longer than they were in the West; in 1970 the difference was 49 percent. By 1971 it had reached 50 percent, with the length of stay amounting to 15.0 days in the Northeast and 10.0 days in the West.

Regional variations similar to those for Medicare patients have been found for discharges from short-stay hospitals for patients of all ages. The data on length of stay shown below were compiled for the entire population by the National Center for Health Statistics. These figures show

Census region	Mean length of stay (in days)		
	1969	1970	1971
United States.....	8 4	8 0	7 8
Northeast.....	9 6	9 1	9 0
North Central.....	8 7	8 3	8 0
South.....	7 8	7 6	7 4
West.....	7 1	6 7	6 5

Source: National Center for Health Statistics, *Utilization of Short-Stay Hospitals: Summary of Nonmedical Statistics—United States, 1971*, Series 13, No. 17, and *Monthly Vital Statistics Report, Hospital Discharge Survey Data*, Vol. 21, No. 9, Supplement, Dec. 6, 1972.

rankings identical with those found for Medicare patients—duration of stay was longest in the Northeast, which was followed by the North Central States, the South, and the West. The mean length of stay declined each year in each

of the regions, with the drop from 1969 to 1971 averaging 0.6 day.

## PATIENT CHARACTERISTICS AND LENGTH OF STAY

### Age

For the Medicare population aged 65 and over, age is a factor closely related to length of stay. Discharges from short-stay hospitals during the 3-year study period were classified in three broad age groups—65–74, 75–84, and 85 and over. Fifty-three percent were for the youngest group, 38 percent for the middle group, and 9 percent for the oldest patients. During the period under study the oldest patients—those aged 85 and over—stayed about 2 days longer than those hospitalized at ages 65–74 (table 2).

As is apparent from the regional differences revealed in chart 2, for each of the age groups in each year hospital stays were longest in the Northeast and shortest in the West while the other two regions continued to hold the same positions in between. Except for the two oldest groups in the Northeast the average length of stay declined for each age group each year in each region.

It may be noted that each year the difference between the Northeast and the West was greatest in duration of stay for those aged 85 and over and that the difference increased during the study period. In 1969, the mean stay for the oldest age group in the Northeast was 5.1 days greater than it was for the same age group in the West. That difference increased to 5.6 days and 5.9 days in 1970 and 1971, respectively. For those in the middle group, differences were 4.7 days, 5.2 days, and 5.3 days in 1969, 1970, and 1971. For the youngest group, the corresponding figures were 4.2 days, 4.7 days, and 4.7 days.

### Single and Multiple Diagnoses

Medicare discharge data for the aged population reflect the presence of complicating conditions among a high proportion of those hospitalized. Nationally, 58 percent of all Medicare dis-

TABLE 2.—Mean length of stay and percentage distribution of short-stay hospital discharges under Medicare, by census region and by patient characteristic, 1969-71

Patient characteristic	Mean length of stay (in days)					Percentage distribution of discharges				
	United States	North-east	North Central	South	West	United States	North-east	North Central	South	West
1971										
All ages.....	12.4	15.0	13.0	11.3	10.0	100.0	100.0	100.0	100.0	100.0
65-74.....	11.8	14.2	12.3	10.7	9.5	52.3	52.1	50.6	53.8	52.5
75-84.....	13.0	15.7	13.6	11.9	10.4	37.6	38.4	38.6	36.4	37.1
85 and over.....	13.7	16.8	14.4	12.6	10.9	10.2	9.5	10.8	9.8	10.5
Single diagnosis.....	11.0	13.4	11.4	10.2	8.6	42.5	44.9	39.3	45.2	39.5
Multiple diagnoses.....	13.5	16.3	14.1	12.3	10.9	57.5	55.1	60.7	54.8	60.5
Without surgery.....	11.9	14.7	12.5	10.8	9.7	71.0	65.9	71.6	74.7	69.0
With surgery.....	13.6	15.5	14.4	12.9	10.7	29.0	34.1	28.4	25.3	31.0
1970										
All ages.....	12.8	15.0	13.1	11.6	10.1	100.0	100.0	100.0	100.0	100.0
65-74.....	12.1	14.3	12.4	11.0	9.6	53.2	53.4	51.6	54.3	52.7
75-84.....	13.4	15.7	13.7	12.2	10.5	37.2	37.8	38.1	36.1	37.0
85 and over.....	14.2	16.6	14.7	13.1	11.0	9.6	8.8	10.3	9.6	10.2
Single diagnosis.....	11.4	13.5	11.5	10.4	8.7	42.3	44.6	38.3	44.1	39.8
Multiple diagnoses.....	13.8	16.2	14.1	12.6	10.9	57.7	55.4	61.7	55.9	60.2
Without surgery.....	12.2	14.6	12.5	11.1	9.7	69.2	64.9	69.8	73.0	67.9
With surgery.....	14.1	15.8	14.5	13.2	10.9	30.8	35.1	30.2	27.0	32.1
1969										
All ages.....	12.9	15.1	13.6	11.9	10.6	100.0	100.0	100.0	100.0	100.0
65-74.....	12.2	14.4	12.8	11.3	10.2	53.0	53.7	51.5	54.1	52.4
75-84.....	13.5	15.7	14.3	12.5	11.0	37.4	37.5	38.3	36.5	37.3
85 and over.....	14.4	16.7	15.6	13.4	11.6	9.7	8.9	10.3	9.3	10.3
Single diagnosis.....	11.4	13.5	11.8	10.6	9.2	42.0	44.6	39.1	44.3	39.5
Multiple diagnoses.....	14.0	16.4	14.8	13.0	11.6	58.0	55.4	60.9	55.7	60.5
Without surgery.....	12.3	14.5	13.0	11.3	10.3	69.4	64.3	69.9	73.1	67.8
With surgery.....	14.2	16.0	15.0	13.5	11.4	30.6	35.7	30.1	26.9	32.2

charges had multiple diagnoses recorded in 1969. That proportion was remarkably constant for the years under study. Some regional variations exist. The North Central and West regions, for example, show multiple diagnoses for more than 60 percent of their discharges. For patients with multiple diagnoses during 1969-71, the duration of stay ranged from 2.4 days to 2.6 days longer than it did for patients with a single diagnosis.

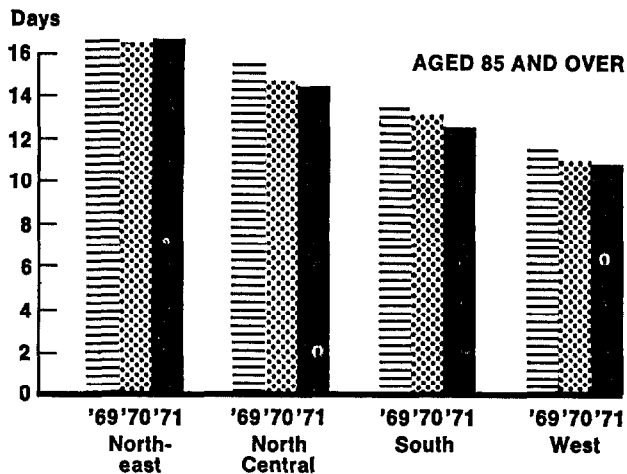
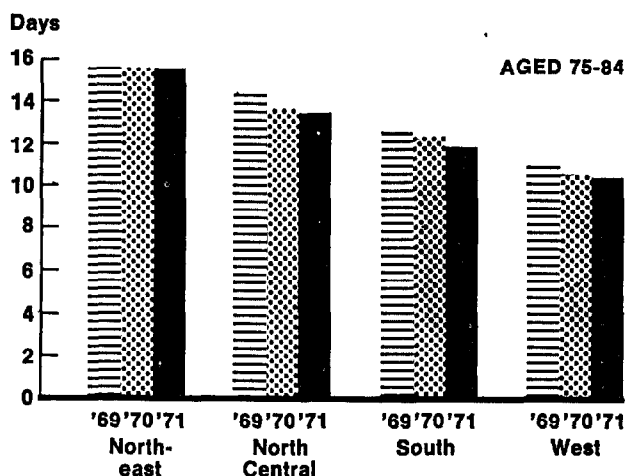
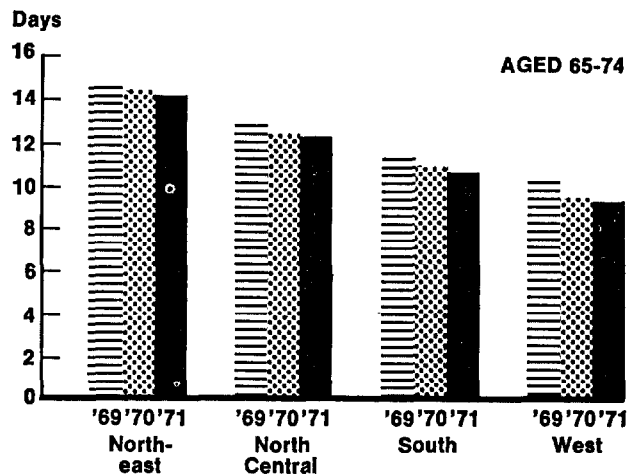
Chart 3 contrasts the average length of stay in each of the regions for discharges with multiple diagnoses and those with a single diagnosis in the 3 years of the study period. For both sets of discharges, duration of stay was longest in the Northeast, with the other regions holding the ranking pattern noted earlier. Relatively more regional variation is apparent for discharges with multiple diagnoses—ranging from 4.8 days to 5.4 days longer in the Northeast than in the West. For discharges with a single diagnosis, the range of the difference between those two regions was 4.3-4.8 days.

### Discharges With and Without Surgery

Of all Medicare discharges during the study period, 29-31 percent had surgical services during the hospital stay. The regions varied considerably in the surgery rate. In the Northeast a surgical procedure was recorded for 34-36 percent of the discharges; in the South the proportion with surgery (25-27 percent) was the lowest among the regions.

Cases involving surgery had an average stay that ranged from 1.7 days to 1.9 days longer than the average for nonsurgical hospitalization in the 3-year period. For both categories, duration of stay was longest in the Northeast, again followed by the North Central States, the South, and the West in that order (chart 4). Length of stay for discharges with surgery ranged from 4.6 days to 4.9 days longer in the Northeast than in the West. For nonsurgical cases, the difference between the two regions in length of stay was from 4.2 days to 5.0 days.

CHART 2.—Mean length of stay for short-stay hospital discharges under Medicare, by census region and by age, 1969-71



These figures show that among the Medicare population, hospital stays in each region are longer for patients with complicating conditions than for those with a single diagnosis. They are also longer for those who undergo surgery than for those who do not.

The Commission on Professional and Hospital Activities has published length-of-stay data for Professional Activity Study (PAS) hospitals that show a cross-classification of discharges: Single diagnosis (not operated and operated) and multiple diagnoses (not operated and operated). In the tabulation for 1970 that follows, the findings for patients aged 65 and over in PAS hospitals indicate that the same regional patterns prevail for each classification—that is, the longest stays are in the Northeast, followed by the North Central States, the South, and the West.

Geographic region	Mean length of stay (in days) <sup>1</sup>			
	Single diagnosis		Multiple diagnoses	
	Not operated	Operated	Not operated	Operated
Northeast.....	12 2	11 3	15 2	18 7
North Central.....	11 1	11 0	13 5	17 5
South.....	10 0	10 8	12 5	15 9
West.....	8 7	8 5	10 6	14 0

<sup>1</sup> Data exclude deaths, transfers, discharges of 100 days or longer, and discharges against medical advice. Source: Commission on Professional and Hospital Activities, *Length of Stay in PAS Hospitals, United States, Regional, 1970*, Ann Arbor, Mich., 1971, pp 2-3.

It is interesting to note that in each region, if the patient had a single diagnosis, the length of stay did not tend to be consistently longer for patients operated on than for patients not operated on. This was not the case for patients with multiple diagnoses; surgery lengthened the stay for such patients considerably. It may also be noted that, in each of the regions, patients with multiple diagnoses who were not operated on had appreciably longer hospital stays than patients who were operated on but had a single diagnosis.

#### Diagnostic Category

The length of the hospital stay is closely related to the condition for which the patient is hospitalized. Medicare patients hospitalized for cataract, for example, generally stay 7-8 days in contrast to patients hospitalized for fracture of

CHART 3.—Mean length of stay for short-stay hospital discharges under Medicare, by census region and by single and multiple diagnosis, 1969-71

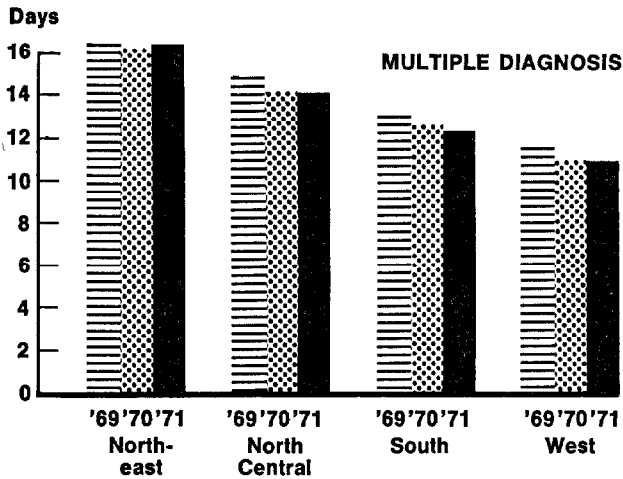
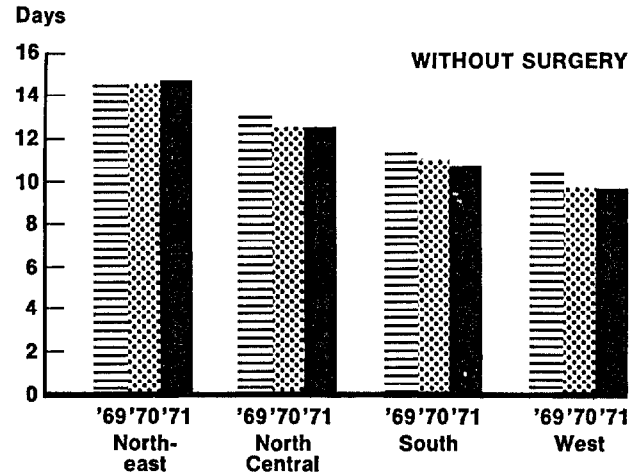
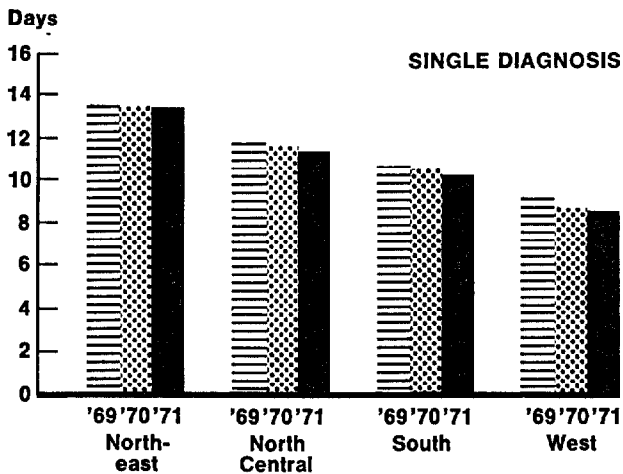
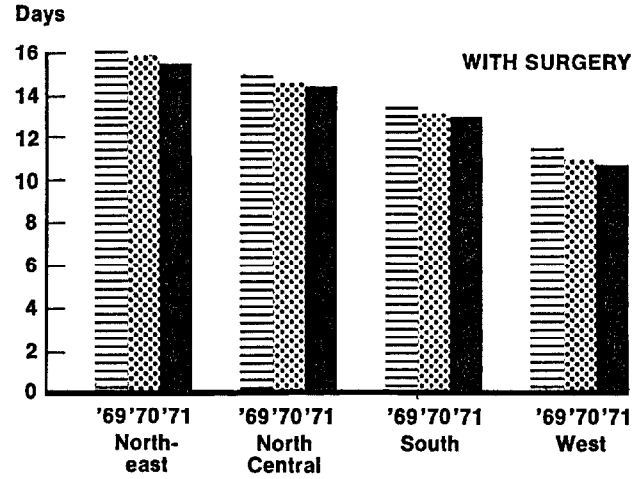


CHART 4.—Mean length of stay for short-stay hospital discharges under Medicare, by census region and by discharges with and without surgery, 1969-71



the femur—a condition that requires long hospital stays averaging 24-25 days. Consequently, the average length of stay reflects the distribution of conditions among a particular set of patients. One of the factors often suggested as contributing to generally longer hospital stays in teaching hospitals, compared with those in other hospitals, is that the mix of patients in teaching hospitals includes more complicated conditions requiring longer treatment.

Differences in hospital costs and utilization in Canada and the United States for 1950-67 were analyzed by Ronald Andersen and John T. Hull in a study published a few years ago.<sup>7</sup> The

<sup>7</sup> Ronald Andersen and John T. Hull, "Hospital Utilization and Cost Trends in Canada and the United States," *Health Services Research*, Fall 1969.

authors found that during the years studied the length of stay in Canada had been consistently greater than it had been in the United States. Hypothesizing that such differences might reflect a different patient mix—such as a higher proportion of Canadians admitted for chronic disorders, often involving longer stays—the authors gathered information on length of stay in the two countries for 30 specific acute and chronic conditions.<sup>8</sup> They found that Canadians stayed

<sup>8</sup> The classification used by Andersen and Hull for categorizing the 30 conditions as acute or chronic agrees with lists of acute and chronic conditions used by the National Center for Health Statistics in presenting findings from the Health Interview Survey (in the Series 10 publications) except for hemorrhoids, which are classified as "chronic" in that survey.

longer for every diagnostic category. The ratio of length of stay in Canada to that in the United States tended to be especially high for the chronic disorders studied, in comparison with the acute conditions.

The source data for this report permit a similar tabulation of Medicare data by regions for 1969 and 1970. Thirty diagnostic conditions were also tabulated, and the same codes as those selected for the Canada/United States study were used whenever possible (omitting for the Medicare population conditions relating to pregnancy and delivery) and the same classification of specific diagnostic categories as acute or chronic. Table 3 shows the findings for Medicare discharges by type of condition and region. It is evident from these figures that the findings parallel those of the original study. No matter what the condition, the length of stay was nearly always longest in

the Northeast and shortest in the West, with the North Central States and the South occupying their usual positions.

The ratio of length of stay by Medicare patients in the Northeast to that in the West is also given in table 3. In 1969, for acute conditions, the ratios ranged from 1.21 to 1.48, with the median ratio falling at 1.34. For chronic conditions, the ratios ranged from 1.23 to 1.59, with the median ratio a little higher (1.44). (In the Canada/United States study cited above, the median ratio was 1.31 for acute conditions and 1.95 for chronic conditions.)

Mean length-of-stay figures are provided for the three broad age groups studied in table 4. In each age group it is evident that for each diagnosis the hospital stays were longest in the Northeast and shortest in the West, with the other regions usually holding the same rank order

TABLE 3.—Mean length of stay for all short-stay hospital discharges under Medicare, by census region and by diagnosis, 1969 and 1970

Diagnosis or diagnostic group	ICDA code <sup>1</sup>	Mean length of stay (in days), all discharges									
		1969					1970				
		Northeast	North Central	South	West	Ratio of Northeast to West	Northeast	North Central	South	West	Ratio of Northeast to West
<b>Acute conditions</b>											
Cataract.....	385	8 3	8 5	7 8	6 6	1 26	7 9	8 1	7 5	6 1	1 30
Acute coronary occlusion.....	420 1	18 2	17 6	15 6	14 9	1 22	18 3	16 6	15 2	13 9	1 32
Hemorrhoids.....	461	9 7	9 4	9 2	8 0	1 21	9 7	9 7	8 9	7 2	1 35
Acute upper respiratory infection.....	470-75	10 3	9 8	9 1	7 9	1 30	10 8	9 5	8 6	6 8	1 69
Lobar pneumonia.....	490	15 5	13 8	13 0	11 2	1 38	15 9	13 6	13 5	11 0	1 45
Bronchopneumonia.....	491	15 7	14 0	12 3	11 6	1 35	15 0	13 1	12 0	11 0	1 36
Primary atypical pneumonia.....	492	14 2	13 3	11 4	10 4	1 37	14 5	12 6	11 4	9 3	1 56
Pneumonia, other and unspecified.....	493	15 5	14 0	12 6	11 6	1 34	15 4	13 8	12 5	11 4	1 35
Acute bronchitis.....	500	11 4	10 3	9 6	8 4	1 36	11 5	9 9	9 6	8 3	1 39
Bronchitis, unqualified.....	501	11 8	10 5	9 4	8 6	1 37	11 4	10 6	9 7	8 4	1 36
Appendicitis.....	550-53	16 3	14 1	13 3	12 8	1 27	16 1	14 5	13 6	11 2	1 44
Inguinal hernia w/o mention of obstruction.....	560 0	10 8	9 8	9 4	7 3	1 48	10 7	9 8	8 9	6 7	1 60
Hernia of abdominal cavity with obstruction.....	561	13 8	12 8	11 7	10 9	1 27	13 3	12 6	11 4	9 4	1 41
Cholelithiasis.....	584	16 8	14 6	13 7	12 5	1 34	16 8	14 4	13 4	12 2	1 38
Cholecystitis and cholangitis w/o mention of calculi.....	585	15 2	12 3	11 2	10 8	1 41	14 8	12 1	11 2	9 7	1 53
Fracture of humerus.....	812	15 0	14 8	13 0	11 5	1 30	13 5	14 2	12 9	11 5	1 17
Fracture of femur.....	820-21	27 4	27 7	22 0	21 0	1 30	27 7	26 0	21 4	19 9	1 39
Head injury (excluding skull fracture).....	850-56	11 8	11 0	10 2	8 5	1 39	11 5	10 7	9 7	7 9	1 46
<b>Median ratio.....</b>						<b>1 34</b>					<b>1 39</b>
<b>Chronic conditions</b>											
<b>Malignant neoplasm of—</b>											
Stomach.....	151	20 4	19 2	16 6	16 6	1 23	21 1	17 8	17 2	16 2	1 30
Rectum.....	154	23 7	22 7	21 0	17 1	1 39	23 5	22 0	21 3	16 7	1 41
Breast.....	170	16 1	16 8	14 8	11 9	1 35	16 4	15 7	14 5	11 1	1 48
Prostate.....	177	17 1	15 3	13 6	11 5	1 49	16 8	15 3	13 0	10 3	1 63
Bladder.....	181 0	13 5	12 7	12 1	9 3	1 45	13 2	12 1	11 9	9 1	1 45
Diabetes mellitus.....	260	16 0	14 1	12 4	11 2	1 43	16 2	13 6	12 2	10 5	1 64
Cerebral hemorrhage, nontraumatic and stroke.....	331, 334 8	18 0	17 2	14 9	12 8	1 41	18 2	16 2	14 7	12 7	1 43
Cerebral arteriosclerosis (so specified).....	334 0	14 6	13 6	11 8	9 3	1 57	14 7	12 2	11 2	8 8	1 67
Arteriosclerotic heart disease (so described).....	420 0	15 3	13 8	11 9	10 3	1 49	15 0	13 3	11 5	9 7	1 55
Hypertensive heart disease.....	442-43	15 5	13 7	12 1	10 3	1 50	14 8	13 0	11 7	9 6	1 54
General arteriosclerosis.....	450	18 1	15 9	13 8	11 4	1 59	17 8	15 2	13 7	11 0	1 62
Rheumatoid arthritis.....	722 0	18 0	16 1	13 6	13 0	1 38	19 2	14 8	13 4	13 4	1 43
<b>Median ratio.....</b>						<b>1 44</b>					<b>1 51</b>

<sup>1</sup> Seventh revision, tables 3-6, 8-11, eighth revision, table 7.

TABLE 4.—Mean length of stay for short-stay hospital discharges under Medicare, by census region and by diagnosis and age, 1969

Diagnosis or diagnostic group	ICDA code	Mean length of stay (in days)				Ratio of Northeast to West
		North-east	North-Central	South	West	
<b>Aged 65-74</b>						
<b>Acute conditions</b>						
Cataract.....	385	8 0	8 2	7 6	6 5	1 23
Acute coronary occlusion.....	420 1	19 0	18 4	16 1	15 5	1 23
Hemorrhoids.....	461	9 5	8 8	9 2	7 3	1 30
Acute upper respiratory infection.....	470-75	10 0	8 8	8 3	7 4	1 35
Lobar pneumonia.....	490	14 2	13 2	12 6	11 0	1 29
Bronchopneumonia.....	491	15 2	13 9	11 6	11 2	1 36
Primary atypical pneumonia.....	492	13 6	12 5	10 6	10 0	1 36
Pneumonia, other and unspecified.....	493	15 0	13 5	11 8	10 8	1 39
Acute bronchitis.....	500	11 1	9 5	9 2	7 9	1 41
Bronchitis, unqualified.....	501	11 1	9 6	8 9	8 1	1 37
Appendicitis.....	550-53	15 5	12 9	13 0	12 2	1 27
Inguinal hernia w/o mention of obstruction.....	560 0	10 1	9 2	9 0	8 9	1 46
Hernia of abdominal cavity with obstruction.....	561	13 5	12 8	11 4	9 4	1 44
Cholelithiasis.....	584	16 0	13 9	13 0	12 0	1 33
Cholecystitis and cholangitis w/o mention of calculi.....	585	14 5	11 6	10 9	10 1	1 44
Fracture of humerus.....	812	13 1	13 1	12 3	10 0	1 31
Fracture of femur.....	820-21	27 7	27 3	21 8	21 1	1 31
Head injury (excluding skull fracture).....	850-56	11 7	11 1	10 3	9 3	1 26
<b>Median ratio</b> .....						1 34
<b>Chronic conditions</b>						
Malignant neoplasm of—						
Stomach.....	151	20 5	18 3	16 9	16 2	1 27
Rectum.....	154	23 7	22 4	20 9	17 2	1 38
Breast.....	170	16 1	16 6	15 1	12 0	1 34
Prostate.....	177	16 7	14 4	13 2	10 4	1 61
Bladder.....	181 0	12 7	11 6	11 3	9 2	1 38
Diabetes mellitus.....	260	15 5	13 7	11 9	11 3	1 37
Cerebral hemorrhage, non-traumatic and stroke.....	331, 334 8	18 1	17 0	14 4	12 5	1 45
Cerebral arteriosclerosis (so specified).....	334 0	14 1	12 5	10 9	9 1	1 55
Arteriosclerotic heart disease (so described).....	420 0	14 7	12 9	11 3	9 9	1 48
Hypertensive heart disease.....	442-43	14 5	12 9	11 6	9 9	1 46
General arteriosclerosis.....	450	18 1	15 0	13 5	11 4	1 59
Rheumatoid arthritis.....	722 0	17 5	16 5	13 8	13 3	1 32
<b>Median ratio</b> .....						1 42
<b>Aged 75-84</b>						
<b>Acute conditions</b>						
Cataract.....	385	8 5	8 6	8 0	6 7	1 27
Acute coronary occlusion.....	420 1	17 4	17 3	15 2	14 4	1 21
Hemorrhoids.....	461	10 1	10 7	9 4	9 9	1 02
Acute upper respiratory infection.....	470-75	10 9	10 0	9 6	8 7	1 25
Lobar pneumonia.....	490	17 6	13 6	13 4	11 2	1 57
Bronchopneumonia.....	491	16 4	14 2	12 8	12 0	1 37
Primary atypical pneumonia.....	492	14 8	13 6	12 1	10 7	1 38
Pneumonia, other and unspecified.....	493	16 1	14 5	13 1	12 1	1 33
Acute bronchitis.....	500	11 5	11 1	10 2	9 1	1 26
Bronchitis, unqualified.....	501	12 5	11 5	10 2	9 2	1 36
Appendicitis.....	550-53	17 3	14 9	13 6	13 8	1 25
Inguinal hernia w/o mention of obstruction.....	560 0	11 9	10 8	10 0	8 0	1 49
Hernia of abdominal cavity with obstruction.....	561	14 0	12 5	11 8	12 5	1 12
Cholelithiasis.....	584	18 1	15 7	14 8	13 2	1 37
Cholecystitis and cholangitis w/o mention of calculi.....	585	15 7	12 5	11 5	11 6	1 35
Fracture of humerus.....	812	16 4	15 5	13 6	13 0	1 26
Fracture of femur.....	820-21	27 8	28 2	22 0	21 2	1 31
Head injury (excluding skull fracture).....	850-56	11 6	11 0	10 6	7 6	1 53
<b>Median ratio</b> .....						1 32

TABLE 4.—Mean length of stay for short-stay hospital discharges under Medicare, by census region and by diagnosis and age, 1969—Continued

Diagnosis or diagnostic group	ICDA code	Mean length of stay (in days)				Ratio of Northeast to West
		North-east	North-Central	South	West	
<b>Aged 75-84—continued</b>						
<b>Chronic conditions</b>						
Malignant neoplasm of—						
Stomach.....	151	20 7	20 8	16 9	16 9	1 22
Rectum.....	154	24 3	23 2	21 3	17 3	1 40
Breast.....	170	16 7	16 8	14 6	11 9	1 40
Prostate.....	177	17 1	15 7	14 0	12 2	1 40
Bladder.....	181 0	13 9	13 3	12 3	9 4	1 48
Diabetes mellitus.....	260	16 6	14 5	13 1	11 1	1 50
Cerebral hemorrhage, non-traumatic and stroke.....	331, 334 8	17 9	17 7	15 3	13 0	1 38
Cerebral arteriosclerosis (so specified).....	334 0	14 7	14 0	12 2	9 3	1 58
Arteriosclerotic heart disease (so described).....	420 0	15 4	14 0	12 3	10 4	1 48
Hypertensive heart disease.....	442-43	16 4	14 1	12 5	10 6	1 55
General arteriosclerosis.....	450	18 1	16 0	13 5	11 1	1 63
Rheumatoid arthritis.....	722 0	18 4	15 3	13 4	12 4	1 48
<b>Median ratio</b> .....						1 48
<b>Aged 85 and over</b>						
<b>Acute conditions</b>						
Cataract.....	385	9 5	9 0	8 7	7 0	1 36
Acute coronary occlusion.....	420 1	15 9	13 8	13 8	13 0	1 22
Hemorrhoids.....	461	10 7	12 5	9 4	8 4	1 27
Acute upper respiratory infection.....	470-75	10 0	13 8	11 4	7 8	1 28
Lobar pneumonia.....	490	15 2	15 9	13 0	11 7	1 30
Bronchopneumonia.....	491	15 0	14 1	12 4	11 4	1 32
Primary atypical pneumonia.....	492	15 0	14 9	12 4	10 6	1 42
Pneumonia, other and unspecified.....	493	15 0	14 4	13 7	12 5	1 20
Acute bronchitis.....	500	12 6	11 8	10 3	8 5	1 43
Bronchitis, unqualified.....	501	15 5	12 0	9 7	9 4	1 65
Appendicitis.....	550-53	19 3	19 4	13 6	13 9	1 39
Inguinal hernia w/o mention of obstruction.....	560 0	12 9	12 9	11 5	8 6	1 50
Hernia of abdominal cavity with obstruction.....	561	14 5	13 5	12 7	10 7	1 36
Cholelithiasis.....	584	15 3	15 3	14 7	14 2	1 29
Cholecystitis and cholangitis w/o mention of calculi.....	585	17 4	14 9	11 8	12 1	1 44
Fracture of humerus.....	812	17 6	17 4	13 4	11 0	1 60
Fracture of femur.....	820-21	26 2	27 3	22 1	20 7	1 27
Head injury (excluding skull fracture).....	850-56	13 2	10 5	8 5	8 1	1 63
<b>Median ratio</b> .....						1 36
<b>Chronic conditions</b>						
Malignant neoplasm of—						
Stomach.....	151	18 4	16 7	13 6	16 8	1 10
Rectum.....	154	20 4	22 3	20 7	15 9	1 28
Breast.....	170	13 1	17 5	13 2	10 6	1 24
Prostate.....	177	19 1	16 8	13 9	13 6	1 40
Bladder.....	181 0	17 8	15 6	16 8	10 0	1 78
Diabetes mellitus.....	260	18 5	15 2	13 1	10 7	1 73
Cerebral hemorrhage, non-traumatic and stroke.....	331, 334 8	17 7	16 6	15 0	13 2	1 34
Cerebral arteriosclerosis (so specified).....	334 0	16 0	15 3	13 1	10 1	1 58
Arteriosclerotic heart disease (so described).....	420 0	16 6	15 3	12 8	10 8	1 54
Hypertensive heart disease.....	442-43	17 5	15 4	13 6	10 8	1 62
General arteriosclerosis.....	450	18 0	16 9	15 2	12 0	1 50
Rheumatoid arthritis.....	722 0	25 5	14 9	12 7	12 3	2 07
<b>Median ratio</b> .....						1 52

in between. For chronic conditions, the median ratio of the length of stay in the Northeast to the stay in the West exceeded the corresponding



figure for acute conditions in each age group.

As shown earlier, the length of stay for all discharges under Medicare increases with advancing age. In comparing the figures on length of stay in each region for each specific diagnosis for patients aged 75-84 with corresponding data for patients aged 65-74, it is found that in 87 percent of the comparisons (104 out of 120) the stays were greater for patients in the middle group than for those in the youngest group. Similarly, in 61 percent of the comparisons (73 out of 120) of length-of-stay data for patients aged 85 and over with corresponding data for patients aged 75-84 the average stay for the oldest group is seen to be greater than the average for the middle group.

The expectation of increasing length of stay with advancing age was not supported by the figures for acute coronary occlusion, head injury (excluding skull fracture), malignant neoplasm of stomach, malignant neoplasm of rectum, malig-

nant neoplasm of breast, cerebral hemorrhage (nontraumatic and stroke), and rheumatoid arthritis. The reversal in the general relationship of increasing length of stay with age may be explained by the fact that hospital stays for certain conditions are more frequently interrupted by the death of the patient than is the case for other conditions and that, as Medicare data show, as age increases so does the proportion of stays terminating with the death of the patient.

Similar information for patients with a single diagnosis and for those with multiple diagnoses is provided in table 5. In nearly every instance, no matter what the condition, the mean length of stay was greatest in the Northeast, which was followed by the North Central States, the South, and the West—in that order. As expected, in each region, for each of the diagnoses the hospital stay was lower for discharges with a single diagnosis than for those with more than one diagnosis.

As measured by the ratio of length of stay

TABLE 5—Mean length of stay for short-stay hospital discharges under Medicare, by census region, by discharges with single and multiple diagnoses, and by diagnosis, 1969

Diagnosis or diagnostic group	ICDA code	Discharges with single diagnosis					Discharges with multiple diagnoses				
		Mean length of stay (in days)				Ratio of Northeast to West	Mean length of stay (in days)				Ratio of Northeast to West
		North-east	North Central	South	West		North-east	North Central	South	West	
<b>Acute conditions</b>											
Cataract.....	385	7 9	8 0	7 5	6 3	1 25	9 8	9 9	9 0	7 7	1 27
Acute coronary occlusion.....	420 1	17 3	16 4	14 5	14 0	1 24	19 1	18 6	16 7	15 6	1 22
Hemorrhoids.....	461	8 5	8 5	8 4	7 0	1 21	10 9	10 3	10 1	9 0	1 21
Acute upper respiratory infection.....	470-75	8 9	7 8	7 4	6 5	1 37	10 8	10 5	9 9	8 5	1 27
Lobar pneumonia.....	490	13 5	11 1	11 2	8 9	1 52	16 3	15 4	14 3	12 4	1 31
Bronchopneumonia.....	491	13 0	11 0	10 1	9 8	1 33	16 4	15 2	13 5	12 2	1 34
Primary atypical pneumonia.....	492	11 4	10 6	9 5	8 5	1 34	15 3	14 4	12 4	11 1	1 38
Pneumonia, other and unspecified.....	493	13 5	12 0	10 9	9 4	1 44	16 7	15 1	14 0	12 8	1 30
Acute bronchitis.....	503	9 8	7 8	8 2	6 6	1 48	11 9	11 3	10 3	9 0	1 32
Bronchitis, unqualified.....	501	9 9	8 7	8 0	7 8	1 27	13 2	11 7	10 5	9 0	1 47
Appendicitis.....	550-53	14 0	12 1	11 4	10 1	1 39	19 7	16 5	16 0	17 0	1 16
Inguinal hernia w/o mention of obstruction.....	560 0	9 6	8 7	8 4	6 6	1 45	13 0	12 0	11 4	8 7	1 49
Hernia of abdominal cavity with obstruction.....	561	12 4	10 4	10 3	9 0	1 38	15 7	15 2	13 5	12 8	1 23
Cholelithiasis.....	584	15 4	13 4	12 6	11 5	1 34	18 1	15 6	14 8	13 4	1 35
Cholecystitis and cholangitis w/o mention of calculi.....	585	13 6	11 0	9 9	9 4	1 45	16 9	13 3	12 7	12 1	1 40
Fracture of humerus.....	812	12 4	11 1	10 5	9 5	1 31	18 0	18 6	16 3	13 4	1 34
Fracture of femur.....	820-21	26 2	26 0	20 6	19 6	1 34	29 3	29 8	24 5	22 9	1 28
Head injury (excluding skull fracture).....	850-56	12 4	9 2	9 5	8 5	1 46	11 6	11 5	10 5	8 5	1 36
<b>Median ratio.....</b>						1 37					1 32
<b>Chronic conditions</b>											
<b>Malignant neoplasm of—</b>											
Stomach.....	151	18 9	17 6	15 7	14 7	1 29	21 5	20 2	17 2	17 7	1 21
Rectum.....	154	22 8	21 0	20 5	16 1	1 42	24 6	23 8	21 6	17 8	1 38
Breast.....	170	14 0	14 1	13 0	9 9	1 41	18 9	18 9	16 4	13 4	1 34
Prostate.....	177	15 0	13 5	12 2	9 6	1 56	18 8	16 5	14 7	12 9	1 46
Bladder.....	181 0	11 6	10 4	10 4	7 6	1 53	16 4	15 8	14 7	11 5	1 43
Diabetes mellitus.....	260	14 1	11 5	10 9	9 5	1 48	16 7	14 8	12 9	11 6	1 44
Cerebral hemorrhage, nontraumatic and stroke.....	331, 334 8	16 7	15 6	13 6	12 3	1 36	19 2	18 4	16 1	13 2	1 45
Cerebral arteriosclerosis (so specified).....	334 0	12 1	10 9	10 1	7 3	1 66	15 7	14 7	12 7	10 1	1 55
Arteriosclerotic heart disease (so described).....	420 0	13 8	12 1	10 3	8 7	1 59	15 9	14 4	12 5	10 7	1 49
Hypertensive heart disease.....	442-43	13 0	11 0	10 3	8 1	1 60	16 1	14 3	12 6	10 7	1 50
General arteriosclerosis.....	450	15 5	14 1	12 5	10 7	1 45	18 8	16 2	14 2	11 5	1 63
Rheumatoid arthritis.....	722 0	17 2	14 5	12 1	12 8	1 34	18 5	16 7	14 5	13 1	1 41
<b>Median ratio.....</b>						1 47					1 45

TABLE 6.—Mean length of stay for short-stay hospital discharges under Medicare, by census region, by discharges without and with surgery, and by diagnosis, 1969

Diagnosis or diagnostic group	ICDA code	Discharges without surgery					Discharges with surgery					
		Mean length of stay (in days)				Ratio of Northeast to West	Mean length of stay (in days)				Ratio of Northeast to West	
		North-east	North Central	South	West		North-east	North Central	South	West		
<b>Acute conditions</b>												
Cataract.....	385	9 0	8 4	7 8	7 1	1 27	8 3	8 5	7 8	6 6	1 26	
Acute coronary occlusion.....	420 1	18 0	17 3	15 4	14 7	1 22	24 1	25 4	21 9	19 8	1 22	
Hemorrhoids.....	401	7 9	7 2	6 8	6 8	1 16	10 0	10 0	9 9	8 3	1 20	
Acute upper respiratory infection.....	470-75	10 2	9 7	9 0	7 7	1 32	11 6	11 9	11 4	12 6	9 2	
Lobar pneumonia.....	490	14 7	13 3	12 6	10 5	1 40	26 9	22 3	20 0	19 4	1 39	
Bronchopneumonia.....	491	14 7	13 2	12 0	11 2	1 31	26 1	28 5	20 8	18 4	1 42	
Primary atypical pneumonia.....	492	13 6	12 9	11 2	10 0	1 36	22 1	20 8	16 7	17 7	1 25	
Pneumonia, other and unspecified.....	493	14 7	13 5	12 2	11 2	1 31	24 0	23 3	20 4	17 5	1 37	
Acute bronchitis.....	500	11 1	10 1	9 5	8 4	1 32	17 7	15 1	13 4	9 7	1 82	
Bronchitis, unqualified.....	501	11 4	10 2	9 3	8 5	1 34	15 3	14 3	11 8	10 6	1 87	
Appendicitis.....	550-53	16 4	11 9	9 5	15 3	1 07	16 3	14 4	1 39	12 4	1 31	
Inguinal hernia w/o mention of obstruction.	560 0	10 8	8 7	8 7	7 6	1 42	10 7	9 9	9 4	7 3	1 47	
Hernia of abdominal cavity with obstruction.												
Cholelithiasis.....	561	12 3	7 9	7 6	9 5	1 29	14 1	14 2	12 6	11 1	1 27	
Cholecystitis and cholangitis w/o mention of calculi.....	584	11 2	9 6	9 1	8 7	1 29	10 3	17 6	16 9	14 2	1 36	
Fracture of humerus.....	812	14 5	14 6	12 5	11 1	1 31	15 7	15 1	31 8	12 1	1 30	
Fracture of femur.....	820-21	25 9	27 7	20 0	21 9	1 18	27 9	37 7	22 7	20 7	1 35	
Head injury (excluding skull fracture).....	850-56	10 8	10 1	9 0	7 5	1 44	16 3	14 2	14 3	11 9	1 37	
<b>Median ratio.....</b>						1 31					1 35	
<b>Chronic conditions</b>												
<b>Malignant neoplasm of—</b>												
Stomach.....	151	16 3	14 8	13 6	13 8	1 18	24 9	24 3	21 6	20 0	1 25	
Rectum.....	154	17 1	19 4	14 8	13 5	1 27	26 2	24 2	24 2	19 2	1 36	
Breast.....	170	17 2	18 6	16 5	13 6	1 26	15 6	15 7	13 9	11 0	1 42	
Prostate.....	177	15 5	14 5	12 5	11 8	1 31	18 0	16 0	14 4	11 4	1 58	
Bladder.....	181 0	14 5	13 8	13 6	11 1	1 31	13 2	12 4	11 6	18 8	1 50	
Diabetes mellitus.....	260	14 4	13 0	11 4	10 4	1 38	24 6	21 8	20 2	18 8	1 31	
Cerebral hemorrhage, nontraumatic and stroke.....	331, 334 8	17 5	17 0	14 6	12 7	1 38	26 2	24 3	22 2	16 3	1 61	
Cerebral arteriosclerosis (so specified).....	334 0	14 1	13 2	11 3	8 9	1 58	21 6	19 0	18 2	14 8	1 45	
Arteriosclerotic heart disease (so described).....	420 0	14 7	13 3	11 6	9 9	1 48	22 4	20 1	18 4	15 9	1 41	
Hypertensive heart disease.....	442-43	14 9	13 4	11 9	10 0	1 49	21 5	17 3	16 5	15 3	1 41	
General arteriosclerosis.....	450	15 6	14 3	12 5	9 8	1 59	26 7	24 6	20 8	18 8	1 42	
Rheumatoid arthritis.....	722 0	17 6	15 4	13 0	12 6	1 40	19 7	19 7	17 4	14 8	1 33	
<b>Median ratio.....</b>						1 38					1 42	

in the Northeast to the length of stay in the West, regional variations in length of stay for discharges with a single diagnosis were similar to the variations in length of stay for discharges with multiple diagnoses. The ratios for acute conditions ranged from 1.21 to 1.52 for single diagnosis and from 1.16 to 1.49 for multiple diagnoses, with corresponding median ratios of 1.37 and 1.32. It may be observed that the median for chronic conditions was a little higher than the median for acute conditions—1.47 and 1.45, respectively.

Data shown in table 6 for discharges with and without surgery indicate that the regions generally held the same rank order in length of stay as reported earlier.<sup>9</sup> Except for three diagnoses—malignant neoplasm of breast, malignant neo-

plasm of bladder, and cataract—in each of the regions, the mean length of stay for a specific diagnosis not involving surgery was generally shorter than the same condition with surgery.

Regional variations, as measured by the ratio of mean length of stay in the Northeast to the mean length of stay in the West, were similar for discharges with surgery and those without, but the largest discrepancies between these two regions for this set of diagnoses are found for discharges with surgery. In the Northeast, the average stay for acute bronchitis and for bronchitis (unqualified) was more than 80 percent greater than it was in the West. The corresponding median ratios were similar, and again the medians were slightly higher for chronic conditions than for acute conditions.

Length-of-stay data for 1970 show regional patterns identical with those for 1969. As noted earlier, the overall ratio of the average stay in the Northeast to the average stay in the West

<sup>9</sup> The patient's primary diagnosis is coded, as well as any surgical procedure performed during the hospital stay. Thus, a "discharge with surgery" does not necessarily imply that the surgery was associated with his primary diagnosis.

increased from 1.42 in 1969 to 1.49 in 1970. Of the 30 diagnoses tabulated, 27 showed an increase in 1970 in the ratio of mean length of stay in the Northeast to that in the West (table 3).

Data for 1971 are not strictly comparable with 1969 and 1970 data because of the 1971 change-over in coding from the Seventh Revision of the ICDA to the Eighth Revision. (See the Technical Note at the end of the article.)

Table 7 presents length-of-stay data for specific diagnoses selected from the 1971 source to match wherever possible the rubrics in tables 3-6. The figures for the four regions and for the ratios of the Northeast to the West show the same regional length-of-stay patterns as those for 1969 and 1970.

To enlarge the scope of comparison by region, compilations were made for 50 additional diagnostic groups randomly selected from the basic

source data. The pattern already cited consistently—length of stay longest in the Northeast, followed by the North Central, South, and West regions—held in nearly every instance.

Such consistent regional differences—especially when examined by diagnosis—suggest that factors other than the medical ones for which the patient was hospitalized affect the duration of stay. One such factor applies to the elderly far more than to younger persons: When the elderly become hospitalized they are likely to face complex socio-economic problems involving posthospital arrangements, stemming in part from old age, living alone, and the necessity of receiving continued medical and nursing services.

Studies in general hospitals have borne out the theory that many patients (and especially the elderly) remain in the hospital beyond the time they require that level of care. These patients could more appropriately be discharged from the hospital and receive posthospital extended-care services instead. In a utilization review study of a sample of hospitalized patients of all age groups, James G. Zimmer<sup>10</sup> reported that, among all patients observed and judged by reviewers to be inappropriately hospitalized on the day of review, "delay in discharge" accounted for 82.2 percent of the cases. Moreover, of all patients judged to be inappropriately hospitalized, "chronic disease hospital or nursing home" was recommended as the proper level of care for 52.2 percent of the cases.

The author of that study provided unpublished data, broken out by age groupings, for use in this report. These data show that hospital bed misutilization is more likely to occur among aged patients and that the recommended level of care for aged patients judged inappropriately hospitalized was very frequently a chronic-care facility. The proportion of patients judged misplaced in the hospital was 7.4 percent of those under age 71 but 15.8 percent of those aged 71 and over. Moreover, of those aged 65 and over who were judged inappropriately hospitalized on the day of review, 74.2 percent had a chronic-care facility recommended.

Nonmedical factors that clearly need examina-

TABLE 7.—Mean length of stay for all short-stay hospital discharges under Medicare, by census region and by diagnosis, 1971

Diagnosis or diagnostic group	ICDA code	All discharges				Ratio of Northeast to West
		Mean length of stay (in days)				
		North-east	North-Central	South	West	
<b>Acute conditions</b>						
Cataract.....	374	7.7	7.8	7.1	5.9	1.31
Acute myocardial infarction.....	410	17.5	16.2	14.4	13.7	1.28
Hemorrhoids.....	455	9.4	9.4	8.7	7.0	1.34
Acute upper respiratory infections except influenza.....	460-65	10.4	9.5	8.5	7.3	1.42
Pneumonia.....	480-86	15.6	13.2	11.8	10.2	1.53
Inguinal hernia w/o mention of obstruction.....	550	10.3	9.5	8.7	6.6	1.56
Hernia of abdominal cavity with obstruction.....	552-53	13.1	12.2	11.2	10.0	1.31
Cholelithiasis.....	574	16.3	14.0	13.1	11.8	1.38
Colecystitis and cholangitis w/o mention of calculus.....	575	15.0	12.0	11.1	10.4	1.44
Fracture of upper end or shaft of humerus, closed.....	812.0, 812.2	13.0	12.8	11.7	8.9	1.46
Fracture of other and unspecified part of neck of femur, closed.....	820.4	27.8	25.4	20.5	19.1	1.46
<b>Median ratio.....</b>						1.42
<b>Chronic conditions</b>						
Malignant neoplasm of—						
Stomach.....	151	20.3	17.7	17.0	15.3	1.33
Rectum and rectosigmoid junction.....	154	23.9	21.4	19.2	16.6	1.44
Breast.....	174	16.5	15.7	13.8	11.9	1.39
Prostate.....	185	16.0	14.5	12.5	10.2	1.57
Bladder.....	188	13.5	12.0	12.0	9.0	1.50
Diabetes mellitus.....	250	16.3	13.7	11.8	10.2	1.60
Hypertensive heart disease.....	402	14.1	12.4	10.3	9.3	1.52
Generalized ischemic cerebrovascular disease.....	437	14.8	11.8	11.0	8.9	1.66
Ill-defined cerebrovascular disease.....	436, 438	19.1	16.7	14.2	11.9	1.61
Empyema.....	492	14.0	12.3	10.4	9.8	1.43
<b>Median ratio.....</b>						1.51

<sup>10</sup> James G. Zimmer, "Length of Stay and Hospital Bed Misutilization," *Medical Care*, May 1974; and James Zimmer, unpublished data provided in a personal communication, January 27, 1975.

tion as determinants of hospitalization among the elderly include the impact of suitable home conditions for the return of the patient and/or community resources for posthospital care. As one factor of this type that may be reflected in regional variations in the hospital stay, the availability and use of skilled-nursing facility (SNF) services under Medicare are examined next.

## REGIONAL DIFFERENCES IN SNF SERVICES

### Availability of Services

Medicare data for 1969 show that the number of nursing-home beds in facilities certified for participation in the program varied considerably among the regions, with the number highest by far in the West. Since that region had only 3 million Medicare enrollees, in contrast to the more than 5 million in each of the other regions, regional variations in the number of beds per 1,000 enrollees were even greater, as the following data for 1969 indicate.

Census region	Number of skilled-nursing-home beds	Number of beds per 1,000 enrollees
United States.....	341,271	17.3
Northeast.....	81,524	15.8
North Central.....	79,807	14.0
South.....	82,951	14.3
West.....	96,989	32.2

Consistent with the theory that availability of nursing-home services has an impact on length of hospital stay, the number of SNF beds per 1,000 Medicare enrollees in the West (32.2) was more than double the rate in any of the other regions. The SNF bed rate in the Northeast was, however, a little higher than the rate in the North Central States and the South. Yet the length of hospital stay—in both those regions (especially in the South) was shorter than it was in the Northeast.

### Utilization of Services

Under the provisions of the law, up to 100 days of care in a skilled-nursing facility may be covered by the Medicare program following dis-

charge from a hospital after a stay of 3 days or more, if a physician certifies to the need for inpatient extended-care services. Nationally, SNF admission rates under Medicare have been relatively low in comparison with hospital admission rates. There was only 1 SNF admission for every 12 hospital admissions in 1969. That ratio declined to 1:14 in 1970 and 1:16 in 1971. Expressed as a percentage, the number of SNF admissions under Medicare in 1969 was 8.6 percent of the number of Medicare hospital admissions. The admissions figure for the West (15.4 percent) was nearly double the national figure, probably reflecting the fact that the SNF bed rate in that region was also about double the national rate. Shown below are SNF admissions expressed as a percentage of hospital admissions, by region, for 1969–71. A noticeable decline in these percentages occurred in each of the regions during that period.

Census region	SNF admissions as a percent of hospital admissions		
	1969	1970	1971
United States.....	8.6	7.3	6.4
Northeast.....	9.6	8.0	7.5
North Central.....	6.8	5.7	4.9
South.....	6.3	5.0	4.1
West.....	15.4	14.1	12.9

A special tabulation of SNF admissions in 1969 provides some information about Medicare patients discharged from the hospital who subsequently received extended care in a nursing home.<sup>11</sup> The report also allows regional comparisons of the utilization of SNF services. The tabulations were based on Medicare nursing-home billing forms, which record the length of the hospital stay preceding the nursing-home admission, as well as the nursing-home admission diagnosis. The data tabulated were from nursing-home admissions entered in the Social Security Administration central records as of January 16, 1971. It is estimated that, at that time, billing information was processed for 80 percent of the 1969 SNF admissions.

Tabulations were made for the 50 leading nursing-home admission diagnoses, showing the

<sup>11</sup> These data are from internal computer tabulations on SNF utilization under Medicare by Marian Moorhead, Mathematical Statistical Group, Division of Health Insurance Studies.

TABLE 8.—Mean length of stay for all short-stay hospital discharges and for patients admitted to skilled-nursing facilities under Medicare, by census region and by selected diagnosis, 1969

Selected diagnosis or diagnostic group	ICDA code	Mean length of hospital stay (in days)								Ratio of Northeast to West	
		Northeast		North Central		South		West		All discharges	Discharges followed by SNF admissions
		All discharges	Discharges followed by SNF admissions	All discharges	Discharges followed by SNF admissions	All discharges	Discharges followed by SNF admissions	All discharges	Discharges followed by SNF admissions		
Arteriosclerotic heart disease (so described).....	420 0	15 3	26 9	13 8	25 6	11 9	19 9	10 3	15 9	1 49	1 69
Congestive heart failure.....	434 1	15 5	23 8	14 1	24 8	12 4	19 8	10 8	16 8	1 44	1 42
Acute coronary occlusion.....	420 1	18 2	30 5	17 6	30 2	15 6	25 3	14 9	21 5	1 22	1 42
Cerebral arteriosclerosis (so specified).....	334 0	14 6	27 5	13 6	24 2	11 8	19 4	9 3	14 5	1 57	1 90
Emphysema without mention of bronchitis.....	527 1	14 6	28 2	12 9	25 5	11 3	20 0	10 6	16 9	1 38	1 67
Diverticulitis.....	572 1	12 4	26 3	9 9	25 0	9 2	20 6	9 0	16 8	1 38	1 57
Malignant neoplasm of rectum.....	154	23 7	33 4	22 7	32 6	21 0	28 4	17 1	22 3	1 39	1 50
Rheumatoid arthritis.....	722 0	18 0	27 2	16 1	28 5	13 6	21 5	13 0	18 0	1 38	1 51
Osteoporosis and atrophy.....	733 3	16 3	23 9	14 2	20 5	12 7	19 6	11 7	14 2	1 39	1 58
Malignant neoplasm of bladder.....	181 0	13 6	30 3	12 7	24 1	12 1	23 0	9 3	18 9	1 45	1 60
Malignant neoplasm of prostate.....	177	17 1	28 7	15 3	26 6	13 6	23 3	11 5	19 0	1 49	1 51
Osteoarthritis (arthrosis).....	723 0	17 2	25 8	14 8	23 9	12 0	18 5	13 3	18 1	1 29	1 50
Hyperplasia of prostate.....	610	16 6	26 8	14 7	27 0	12 8	21 6	10 7	16 3	1 55	1 64
Malignant neoplasm of breast.....	170	16 1	25 6	16 8	28 1	14 8	23 4	11 9	21 1	1 35	1 21
Arthritis (polyarthritis unspecified).....	725	14 9	22 5	12 7	21 8	11 1	18 5	10 3	15 7	1 46	1 43

mean length of the immediately preceding hospital stay and the average number of covered SNF days per stay. A comparison of the data in that special study with the hospital discharge data that form the basis of this report shows that nursing-home patients had much longer hospital stays.<sup>12</sup>

Table 8 gives the mean length of the hospital stay for all discharges in 1969 and the mean length of the hospital stay for patients who received extended care in a nursing home. It can be readily observed that in each region and for every diagnosis the hospital stay for patients who subsequently entered an SNF averaged several days longer than the hospital stay for all discharges. In addition, the same regional pattern observed for all hospital discharges prevailed for those who entered nursing homes—that is, the hospital stay preceding the SNF admission was longest in the Northeast, followed by the North Central States, the South, and the West. Regional differences, as measured by the ratio of the average stay in the Northeast to the average in the West, tended to be greater for those discharges followed by admissions to skilled-nursing facilities.

Table 9 gives the 15 leading SNF admission diagnoses in 1969, as well as the number of stays.

Table 10 shows the mean length of the preceding hospital stays, the mean number of covered SNF days, and the total number of days (hospital plus SNF) for these conditions. The average number of covered nursing-home days generally follows the same regional pattern as that for length of hospital stay. In every instance, covered nursing-home days per stay were greater in the Northeast than they were in the West, although the ratio of days in the Northeast to those in the West tended to be smaller than the ratios

TABLE 9.—Number of skilled-nursing facility stays for the 15 most frequently reported admitting diagnoses, by census region, 1969

Selected diagnosis or diagnostic group	ICDA code	Number of SNF stays			
		North-east	North Central	South	West
Fracture of neck of femur, closed.	820 0	7,376	9,410	8,497	8,185
Cerebral hemorrhage, non-traumatic.....	331	6,185	7,936	7,372	8,040
Arteriosclerotic heart disease.....	420 0	5,408	4,839	4,122	4,868
Diabetes mellitus, no specified complications.....	260 0	2,481	3,047	2,691	2,826
Congestive heart failure.....	434 1	2,336	2,373	2,724	3,218
Arteriosclerosis, not further specified.....	450 0	1,638	2,323	2,489	1,844
Acute coronary occlusion.....	420 1	2,394	1,485	1,813	2,367
Cerebral arteriosclerosis (so specified).....	334 0	1,489	1,909	2,804	1,999
Cerebral thrombosis.....	332 1	1,864	2,159	2,114	1,514
Cataract, unspecified and senile.....	385 9	1,903	1,251	1,719	2,673
Hypertensive heart disease.....	443	1,144	1,110	1,252	1,219
Heart disease specified as involving coronary arteries, not elsewhere classified.....	420 3	1,151	1,016	1,245	1,285
Myocardial degeneration with arteriosclerosis, not elsewhere classified.....	422 1	980	850	1,447	859
Emphysema without mention of bronchitis.....	527.1	624	907	1,192	1,352
Post-operative status musculo-skeletal surgery.....	997.7	519	1,027	1,083	1,374

<sup>12</sup> Fifteen diagnostic codes matched exactly and could be compared.

TABLE 10.—Mean length of hospital stay and mean number of covered skilled-nursing-home days per stay for the 15 most frequently reported admitting diagnoses, by census region, 1969

Selected diagnosis or diagnostic group	ICDA code	Northeast			North Central			South			West			Ratio of Northeast to West, total
		Mean length of hospital stay	Mean number of covered SNF days	Total	Mean length of hospital stay	Mean number of covered SNF days	Total	Mean length of hospital stay	Mean number of covered SNF days	Total	Mean length of hospital stay	Mean number of covered SNF days	Total	
Fracture of neck of femur, closed.....	820 0	33 7	60 0	93 7	32 8	60 1	92 9	25 9	54 9	80 8	23 1	53 7	76 8	1 22
Cerebral hemorrhage, nontraumatic.....	331	30 7	51 4	82 1	29 7	51 4	81 1	24 7	47 8	72 5	19 4	42 3	61 7	1 33
Arteriosclerotic heart disease.....	420 0	26 9	44 6	71 5	25 6	45 6	71 2	19 9	43 3	63 2	15 9	35 3	51 2	1 40
Diabetes mellitus, no specified complications.....	260 0	27 7	47 2	74 9	27 1	49 4	76 5	21 3	45 3	66 6	17 1	38 2	55 3	1 35
Congestive heart failure.....	434 1	23 8	38 0	61 8	24 6	41 2	65 8	19 8	37 7	57 5	16 8	32 0	48 8	1 27
Arteriosclerosis, not further specified.....	450 0	27 9	53 5	81 4	25 7	49 9	75 6	20 9	49 2	70 1	16 1	41 9	58 0	1 40
Acute coronary occlusion.....	420 1	30 5	29 5	60 0	30 2	35 5	65 7	25 3	31 0	56 3	21 5	27 9	49 4	1 21
Cerebral arteriosclerosis (so specified).....	334 0	27 5	50 9	78 4	24 2	51 2	75 4	19 4	48 1	67 5	14 5	38 9	53 4	1 47
Cerebral thrombosis.....	332 1	31 8	53 0	84 8	32 2	51 7	83 9	26 0	49 4	75 4	20 5	43 5	64 0	1 33
Cataract, unspecified and senile.....	385 9	11 5	22 5	34 0	11 4	22 3	33 7	10 6	20 4	31 0	8 5	15 9	24 4	1 39
Hypertensive heart disease.....	443	26 9	42 2	69 1	25 5	47 6	73 1	19 0	43 7	62 7	15 1	38 2	53 3	1 30
Heart disease specified as involving coronary arteries, not elsewhere classified.....	420 3	23 7	32 2	55 9	24 5	38 3	62 8	20 8	34 8	55 6	16 5	28 0	44 5	1 26
Myocardial degeneration with arteriosclerosis, not elsewhere classified.....	422 1	26 6	46 4	73 0	28 3	48 9	77 2	22 4	47 3	69 7	18 0	39 6	57 6	1 27
Emphysema without mention of bronchitis.....	527 1	28 2	39 9	68 1	25 5	40 7	66 2	20 0	39 2	59 2	16 9	33 1	50 0	1 36
Post-operative status musculoskeletal surgery.....	997 7	31 3	51 7	83 0	32 3	52 5	84 8	24 1	47 4	71 5	23 7	45 1	68 8	1 21

from table 3 discussed earlier. The one exception to the usual regional pattern was that the mean number of SNF days in the North Central region was often higher than the mean in the Northeast. Generally, the total number of days of inpatient care (hospital plus SNF) followed the usual pattern, except that, for half the diagnoses, the total was greater in the North Central region than it was in the Northeast.

### Potential Impact of SNF Use on Hospital Stay

As noted earlier, SNF admissions as a percentage of hospital admissions varied substantially among the regions from 1969 to 1971. As might be expected, a comparison of the number of SNF admissions under Medicare given in table 9 and the number of hospital discharges (in the basic source data for this report) shows that the rate of SNF admissions varies to a considerable extent according to the patient's diagnosis. The percentages below illustrate the variations in SNF

Diagnosis	Code	SNF admissions as a percent of hospital discharges			
		North-east	North-Central	South	West
Arteriosclerotic heart disease.....	420 0	8 6	6 2	5 7	13 4
Congestive heart failure.....	434 1	8 4	6 8	6 7	17 6
Acute coronary occlusion.....	420 1	5 4	3 1	3 6	8 6
Cerebral arteriosclerosis (so specified).....	334 0	11 4	8 1	10 3	16 6
Emphysema without mention of bronchitis.....	527 1	6 1	5 4	5 9	12 7

admissions as a proportion of hospital discharges for five of the diagnoses in table 9.

It may be observed from the data above that, for each of the diagnoses in the example, post-hospital SNF utilization was greatest in the West. Although availability and utilization of SNF services in the West was twice the national figure, on the average, fewer than 1 in 6 hospital discharges in that region resulted in an SNF admission.

What could have been the impact of such relatively low SNF utilization on regional differences in mean length of hospital stay? If SNF admissions as a proportion of hospital discharges in the other three regions were at the same rate as that for the West, what would be the effect on average hospital stays in those regions? Hypothetically, assume that, for each diagnosis, SNF admissions in the Northeast, the North Central States, and the South were increased so that they were in the same proportion to hospital discharges as that experienced in the West. Assume further that in each of three regions the additional SNF admissions represented a transfer of hospital days of care to SNF days of care (equal to the average number of covered SNF days of care experienced in that region for that diagnosis).

Table 11 shows the actual SNF utilization and hospitalization in those regions for the five diagnoses used in the preceding example and provides details of the hypothetical exchange of days of

TABLE 11.—Actual and hypothetical skilled-nursing facility and hospital utilization for five selected diagnoses, by census region, 1969

Selected diagnosis	ICDA code	SNF utilization			Hospital utilization		
		Number of SNF admissions	Average number of covered days per stay	Total covered SNF days of care	Number of hospital discharges	Number of hospital days of care	Mean hospital length of stay
Actual							
<b>Northeast</b>							
Arteriosclerotic heart disease.....	420 0	5,408	44 6	241,197	63,115	965,660	15 3
Congestive heart failure.....	434 1	2,336	35 0	83,768	27,690	429,195	15 5
Acute coronary occlusion.....	420 1	2,394	29 5	70,623	44,275	805,805	18 2
Cerebral arteriosclerosis (so specified).....	334 0	1,489	50 9	75,790	13,005	189,873	14 6
Emphysema without mention of bronchitis.....	527 1	624	39 9	24,898	10,165	148,409	14 6
Hypothetical							
Arteriosclerotic heart disease.....	420 0	8,457	44 6	377,182	63,115	829,675	13 1
Congestive heart failure.....	434 1	4,873	38 0	185,174	27,690	332,789	12 0
Acute coronary occlusion.....	420 1	3,808	29 5	112,336	44,275	764,092	17 3
Cerebral arteriosclerosis (so specified).....	334 0	2,159	50 9	109,893	13,005	155,770	12 0
Emphysema without mention of bronchitis.....	527 1	1,291	39 9	51,511	10,165	121,796	12 0
Actual							
<b>North Central</b>							
Arteriosclerotic heart disease.....	420 0	4,839	45 6	220,658	78,085	1,077,573	13.8
Congestive heart failure.....	434 1	2,373	41 2	97,768	34,915	492,302	14 1
Acute coronary occlusion.....	420 1	1,485	35 5	52,718	48,355	861,048	17.6
Cerebral arteriosclerosis (so specified).....	334 0	1,909	51 2	97,741	23,475	319,290	13.6
Emphysema without mention of bronchitis.....	527 1	907	40 7	36,915	16,860	217,464	12.9
Hypothetical							
Arteriosclerotic heart disease.....	420 0	10,463	45 6	477,113	78,085	821,118	10 5
Congestive heart failure.....	434 1	6,145	41.2	253,174	34,915	386,896	9 6
Acute coronary occlusion.....	420 1	4,159	35 5	147,645	48,355	756,121	15 6
Cerebral arteriosclerosis (so specified).....	334 0	3,897	51 2	199,526	23,475	217,475	9 3
Emphysema without mention of bronchitis.....	527 1	2,141	40 7	87,139	16,860	187,270	9 9
Actual							
<b>South</b>							
Arteriosclerotic heart disease.....	420 0	4,122	43 3	178,483	72,815	866,499	11.9
Congestive heart failure.....	434 1	2,724	37 7	102,695	40,435	501,394	12 4
Acute coronary occlusion.....	420 1	1,813	31 0	56,203	51,000	795,600	15 6
Cerebral arteriosclerosis (so specified).....	334 0	2,604	46 1	120,442	24,390	287,802	11 8
Emphysema without mention of bronchitis.....	527 1	1,192	39 2	46,726	20,190	228,147	11.3
Hypothetical							
Arteriosclerotic heart disease.....	420 0	9,757	43 3	422,478	72,815	622,504	8.5
Congestive heart failure.....	434 1	7,117	37 7	268,311	40,435	335,778	8 8
Acute coronary occlusion.....	420 1	4,366	31.0	135,968	51,000	715,837	14 0
Cerebral arteriosclerosis (so specified).....	334 0	4,049	46 1	194,757	24,390	213,487	8 8
Emphysema without mention of bronchitis.....	527 1	2,564	39.2	100,509	20,190	174,364	8 6

Source: Skilled-nursing facility utilization data derived from tables 9 and 10; for hospital utilization data, see publication referred to in footnote

5 of this report.

care. In every instance the hypothetical mean length of hospital stay was considerably lower than the actual stay. For arteriosclerotic heart disease, for example, mean length of hospital stay declined from 15.3 days to 13.1 days in the Northeast, from 13.8 days to 10.5 days in the North Central region, and from 11.9 days to 8.5 days in the South.

For the five diagnoses the actual length of stay averaged 16.0 days in the Northeast and 11.5 days in the West—a difference of 4.5 days. In

the hypothetical situation, the length of stay averaged 13.9 days in the Northeast and remained at 11.5 days in the West—a difference of 2.4 days. Evidently, regional variations in the use of SNF services can have an appreciable impact on the regional variations in average hospital stay. In this illustration and under the stated hypothesis, the difference between the Northeast and the West in the mean length of hospital stay dropped from 4.5 days to 2.4 days—a reduction of about 50 percent.

## OTHER MEASURES OF HOSPITAL UTILIZATION

Medicare data indicate that other measures of short-stay hospital utilization also varied considerably according to region. The number of persons per 1,000 enrollees in each region who used short-stay hospital services, as well as the number of discharges per 1,000 enrollees, showed regional variations that were very marked and consistent over a period of time. These and other utilization measures are shown below for 1967 and 1968 discharges. The ratio of total discharges

number of hospitalizations was 1.38 in 1967 and in 1968. The Northeast had the lowest rate of multiple hospitalizations, and the South had the highest. The rate of multiple hospitalizations was relatively high in the West also. A study in progress should provide further and more detailed data about multiple hospitalizations, including information on whether the relatively high rates in the South and the West (where the mean length of stay is low) actually reflect higher than average readmissions for the same condition.

## SUMMARY AND CONCLUSIONS

Consistent and marked regional variations have been observed in short-stay hospital utilization under Medicare. Furthermore, these regional differences tend to persist over a period of time. This study, which focuses on the striking regional differences in mean length of hospital stay, found that these differences in duration of stay were not fully explained by differences in the patient characteristics examined here—age, primary diagnosis, the presence of complicating conditions, and whether or not surgery was performed.

Implications are that these patient characteristics may fail to explain regional differences in other measures of hospital utilization, such as the number of persons who use short-stay hospital services and the number of discharges per 1,000. The findings suggest the need for extensive study of regional variations in managing the special medical and socioeconomic problems of the hospitalized elderly, as well as the need to study regional differences in patterns of medical care delivery.

## TECHNICAL NOTE

The data in this study are derived from bills for inpatient services in short-stay hospitals for a 20-percent sample of Medicare beneficiaries. All discharges are included—that is, bills for patients discharged alive, as well as those who died during hospitalization or who were transferred to other facilities.

Data for 1969 are based on the 5.4 million total discharges during 1969, which were recorded in Social Security Administration central records

Census region	Number of persons hospitalized per 1,000 enrollees	Number of discharges per 1,000 enrollees	Mean length of stay	Number of days of care per 1,000 enrollees	Ratio of number of discharges to number of persons hospitalized
1967					
United States.....	189 0	261 7	13 8	3,607	1 38
Northeast.....	167 8	217 4	16 1	3,501	1 30
North Central.....	200 0	276 6	14 6	4,052	1 38
South.....	190 5	282 9	12 3	3,474	1 44
West.....	189 9	267 7	11 8	3,151	1 42
1968					
United States.....	207 4	286 9	13 8	3,948	1 38
Northeast.....	186 9	241 7	16 2	3,922	1 29
North Central.....	215 8	297 2	14 6	4,334	1 38
South.....	218 7	315 1	12 4	3,910	1 44
West.....	204 5	290 7	11 4	3,310	1 42

Source See publication referred to in footnote 1 of this report, 1968 data from unpublished data for 1968 edition

to the total number of persons served, included in the tabulation, reflects the rate of multiple hospitalizations. The figures above illustrate the general consistency in regional rankings for the various measures of hospital utilization but also indicate that regional patterns may differ for different measures of utilization.

One hypothesis that might be examined through the use of these data is that average length of hospital stay is lowest where multiple hospitalizations are highest. In other words, it is possible that the mean length of stay is lowest in the West because individuals in that region are readmitted to hospitals more frequently for the same conditions.

The data in the preceding tabulation indicate that multiple hospitalizations did tend to occur more often in those regions where the mean length of stay was shortest. For persons who were hospitalized at least once, the average



by December 2, 1970; data for 1970 are based on the 5.5 million discharges recorded by January 1972; and 1971 data are based on the 5.7 million discharges during 1971 recorded by January 1973.

### Source of Data

When a beneficiary is hospitalized, an admission notice and subsequent bills are received by the Social Security Administration, where they are processed and placed on file. Information from the billing forms is matched to other central records maintained by the Social Security Administration, which contain data about the characteristics of each Medicare beneficiary, as well as on individual short-stay hospitals participating under Medicare. General and special hospitals reporting average stays of less than 30 days are included. In this study, discharges are categorized by the address of the hospital providing care.

Participating hospitals use standard billing forms to identify the beneficiary and specify the services rendered during the stay. The billing form includes space for the entry of a description of the patient's primary diagnosis at the time of discharge from the hospital. Primary diagnosis

is defined as the primary reason for the patient's hospitalization—that is, the disease, illness, condition, or injury requiring the current hospitalization. Space is also provided for the entry for any secondary diagnoses. The name and date of any surgical procedure performed during the hospital stay are recorded.

### Medical Coding

The primary discharge diagnosis on each bill in the 20-percent sample of Medicare beneficiaries is assigned a four-digit code, using the International Classification of Diseases Adapted—Seventh Revision (ICDA-7) for discharges in 1969 and 1970 and the Eighth Revision for discharges in 1971. If more than one diagnosis appears on the bill and the primary diagnosis is not indicated, the first diagnosis listed is coded. If, however, a "symptom or ill-defined condition" is listed first, preference is given to the more substantive diagnosis that appears second.

Surgical procedures are also coded on each sample bill on which one or more surgical procedures are reported. Codes are assigned through the use of the Current Procedural Terminology

TABLE I.—Difference between mean length of stay in the Northeast and West,  $M_1-M_2$ , approximate standard error of difference,  $SE_{(M_1-M_2)}$ , and Z-score for estimates shown in table 4

Diagnosis or diagnostic group	ICDA code	Aged 65-74			Aged 75-84			Aged 85 and over		
		$M_1-M_2$	$SE_{(M_1-M_2)}$	Z	$M_1-M_2$	$SE_{(M_1-M_2)}$	Z	$M_1-M_2$	$SE_{(M_1-M_2)}$	Z
<b>Acute conditions</b>										
Cataract.....	385	1.5	.10	14.56	1.8	.12	14.85	2.5	.34	7.35
Acute coronary occlusion.....	420.1	3.5	.26	13.22	3.0	.35	8.56	2.9	.82	3.54
Hemorrhoids.....	461	2.2	.34	6.42	.2	.71	2.28	2.3	1.46	1.57
Acute upper respiratory infection.....	470-75	2.6	.59	4.38	2.2	.80	2.75	2.2	1.18	1.86
Lobar pneumonia.....	490	3.2	1.41	2.27	6.4	1.73	3.70	3.5	2.73	1.28
Bronchopneumonia.....	491	4.0	.61	6.51	4.4	.67	6.58	3.6	.94	3.82
Primary atypical pneumonia.....	492	3.6	.46	7.80	4.1	.60	6.87	4.4	1.10	4.01
Pneumonia, other and unspecified.....	493	4.2	.44	9.45	4.0	.53	7.61	2.5	.83	3.02
Acute bronchitis.....	600	3.2	.43	7.47	2.4	.57	4.18	3.8	1.23	3.09
Bronchitis, unqualified.....	601	3.0	.47	6.39	3.3	.72	4.59	6.1	2.49	2.45
Appendicitis.....	550-53	3.3	.94	3.50	3.5	1.31	2.68	5.4	3.61	1.50
Inguinal hernia w/o mention of obstruction.....	560.0	3.2	1.5	21.01	3.9	.31	12.52	4.3	.87	4.94
Hernia of abdominal cavity with obstruction.....	561	4.1	.70	5.88	1.5	.89	1.68	3.8	1.43	2.86
Cholelithiasis.....	584	4.0	.29	13.67	4.9	.49	10.10	4.1	1.21	3.66
Cholecystitis and cholangitis w/o mention of calculi.....	585	4.4	.46	9.61	4.1	.69	5.97	5.3	1.40	3.79
Fracture of humerus.....	812	3.1	.78	3.99	3.4	1.02	3.35	6.6	1.45	4.56
Fracture of femur.....	820-21	6.6	.63	10.42	6.6	.48	13.62	5.5	.67	8.23
Head injury (excluding skull fracture).....	850-56	2.4	.79	3.02	4.0	.78	5.12	5.1	1.52	3.36
<b>Chronic conditions</b>										
Malignant neoplasm of—										
Stomach.....	151	4.3	1.18	3.64	3.8	1.18	3.23	1.6	2.48	.65
Rectum.....	154	6.5	.97	6.71	7.0	1.18	5.91	4.5	2.53	1.78
Breast.....	170	4.1	.51	8.04	4.8	.66	7.24	2.5	1.19	2.10
Prostate.....	177	6.3	.56	11.21	4.9	.64	7.61	5.5	1.49	3.68
Bladder.....	181.0	3.5	.60	5.80	4.5	.68	6.84	7.8	1.65	4.74
Diabetes mellitus.....	260	4.2	.30	14.06	5.5	.37	14.83	7.8	1.00	7.82
Cerebral hemorrhage, nontraumatic and stroke.....	331,334.8	5.6	.46	12.18	4.9	.43	11.32	4.5	.75	6.01
Cerebral arteriosclerosis (so specified).....	334.0	5.0	.47	10.60	5.4	.47	11.56	5.9	.94	6.30
Arteriosclerotic heart disease (so described).....	420.0	4.8	.23	20.79	5.0	.23	21.44	5.8	.45	12.95
Hypertensive heart disease.....	442-43	4.6	.37	12.42	5.8	.45	12.83	6.7	1.07	6.26
General arteriosclerosis.....	450	6.7	.65	10.36	7.0	.54	12.96	6.0	.90	6.69
Rheumatoid arthritis.....	722.0	4.2	.97	4.33	6.0	1.24	4.86	13.2	6.62	2.00

(CPT) manual.<sup>13</sup> When two or more surgical procedures appear on a bill the first listed surgical procedure is coded. If, however, the first listed procedure is primarily diagnostic in nature—such as an endoscopic procedure or biopsy—coding preference is given to more serious procedures such as resections, removals, repairs, etc. The CPT defines surgery to include procedures involving incision, excision, amputation, introduction, endoscopy, repair, destruction, suture, manipulation, and surgical-collapse therapy.

### Sampling Variability

Since the mean length-of-stay data in this study are based on discharges for a sample of enrolled persons, they may differ somewhat from the figures that would have been obtained from the entire universe of enrolled persons.

The standard error is primarily a measure of sampling variability—that is, of the variations that occur by chance because a sample rather than the whole universe was used. The chances are about 68 out of 100 that an estimate from

the sample would differ from the result for the entire universe by less than the standard error; about 95 out of 100 that the difference would be less than twice the standard error; and about 99 out of 100 that the difference would be less than two and one-half times the standard error. This applies equally to sample estimates of differences.

Table I<sup>14</sup> shows the differences found between the mean length of stay in the Northeast and the West ( $M_1 - M_2$ ) for the estimates shown in table 4. For example, the mean length of stay for discharges with cataract for patients aged 65-74 was 8.0 days in the Northeast and 6.5 days in the West. That is,  $M_1 - M_2 = 8.0 - 6.5 = 1.5$ .

Table I also shows the approximate standard errors of the differences in mean length of stay in the Northeast and the West— $SE_{(M_1 - M_2)}$ —for the selected conditions. The value ( $Z$ ) of the ratio of  $(M_1 - M_2)$  to  $SE_{(M_1 - M_2)}$  is also given in table I. A  $Z$  value of 1.96 or greater can be interpreted to mean that the difference between the mean length of stay in the Northeast and the West is significant at the 95-percent confidence level.

<sup>14</sup> Prepared with the assistance of Nathaniel M Pigman, Jr., of the Mathematical Statistical Group of the Division of Health Insurance Studies

<sup>13</sup> *Current Procedural Terminology* (First Edition), American Medical Association, 1966.

## Notes and Brief Reports

### Automatic Increases Under the Social Security Programs\*

*OASDHI benefit increase.*—As the result of legislation enacted in 1972 and 1973, the first<sup>1</sup> automatic cost-of-living increase in cash benefits

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<sup>1</sup> P.L. 92-336 (signed July 1, 1972), P.L. 92-603 (signed October 30, 1972), and P.L. 93-233 (signed December 31, 1973).

The previous 11-percent increase in OASDHI benefits effective for June 1974 was legislated (P.L. 93-233) by Congress on the basis of an estimated change in the cost of living from the third quarter of 1972 to the second quarter of 1974. In enacting this increase, Congress specified that the 11-percent increase would be regarded as a cost-of-living change, rather than a general benefit change, for purposes of implementing future automatic cost-of-living provisions of the law.

under the old-age, survivors, disability, and health insurance (OASDHI) program, went into effect June 1, 1975. The increase, reflected in the July 3 checks, is 8.0 percent. It applies to all beneficiaries on the rolls except those receiving benefits under the special minimum-benefit provision.

The cost-of-living benefit increase reflects the change in the Consumer Price Index (CPI) of the Bureau of Labor Statistics from the second quarter of 1974 to the first quarter of 1975. The 8.0-percent rise was determined by dividing the average of the CPI for January, February, and March of 1975 by the average of the CPI for April, May, and June 1974 (the effective quarter of the previous increase—11 percent—in OASDHI benefits).

The next automatic cost-of-living benefit increase will be based on the increase in the CPI from the first quarter of 1975 (if there is no statutory benefit increase) to the first quarter of