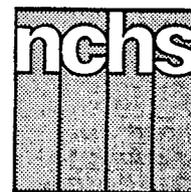


# Advance Data



From Vital and Health Statistics of the CENTERS FOR DISEASE CONTROL AND PREVENTION/National Center for Health Statistics

## Long-Stay Patients in Short-Stay Hospitals

by Margaret Jean Hall, Ph.D., and Lola Jean Kozak, Ph.D., Division of Health Care Statistics

### Introduction

Patients hospitalized for more than 3 weeks made up only 5 percent of discharges from short-stay hospitals in 1980 and 4 percent in 1990. However, in both years these long-stay patients used more than a quarter of the days of care in short-stay hospitals. The large share of days used by long-stay patients make them an important group for analysis. This report examines the characteristics of long-stay patients and compares them with characteristics of all discharges from short-stay hospitals in 1980 and 1990.

The period 1980-90 was chosen for analysis because it was a decade of marked change in the health care system. Concern about rising health care costs led to several developments that were intended to reduce hospital use. In 1983, the method of payment for hospitalized Medicare patients was fundamentally changed with the implementation of a prospective payment system based on diagnosis-related groups (DRG's). A rapidly growing number of surgical and diagnostic procedures were shifted

from inpatient to outpatient settings during the 1980's. Health maintenance organizations and preferred-provider organizations expanded during the period, and the number and stringency of utilization review programs increased (1-3).

Short-term hospital use declined during the 1980's. The total number of discharges was 19 percent lower, and the number of days of care was reduced 28 percent in 1990 compared with 1980. The number of discharges and days of care declined for patients with hospital stays of 3 weeks or less and for those with stays of more than 3 weeks.

However, despite the pressures to reduce hospital use, long-stay patients hospitalized for more than 3 weeks continued to account for the same disproportionately large share of hospital days in 1990 as they did in 1980. The extent to which the characteristics of long-stay or all patients changed during the 1980's will be examined in this report.

The data were collected by means of the National Hospital Discharge Survey (NHDS), a continuous

voluntary survey conducted by the National Center for Health Statistics since 1965. It is comprised of information on patients discharged from non-Federal short-stay hospitals. In 1980, data for the survey were abstracted from medical records of approximately 224,000 patients discharged from 420 hospitals. In 1990, 474 hospitals participated in the survey supplying approximately 266,000 abstracts of medical records.

A two-stage, stratified sample design was used for the NHDS during the period 1965-87. A three-stage, stratified sample design began in 1988. A brief description of these two designs, data collection procedures, and the estimation process are in the "Technical notes" of this report. A description of the two survey designs and the effects of the design changes on estimates from the survey has been published (4).

Up to seven diagnoses and four procedures were coded for each discharge in the survey. Coding of diagnoses and procedures was performed according to the *International Classification of Diseases*,

### Acknowledgments

This report was prepared at the Division of Health Care Statistics. Maria Owings, Hospital Care Statistics Branch, calculated relative standard errors for estimates, and Dorothy Graham, Technical Services Branch, verified the data. The report was edited by Klaudia Cox and typeset by Zung T.N. Le of the Publications Branch, Division of Data Services.



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
Public Health Service  
Centers for Disease Control and Prevention  
National Center for Health Statistics



9th Revision, Clinical Modification (ICD-9-CM) (5). Although diagnoses included in the ICD-9-CM section, "Supplementary classification of external causes of injury and poisoning" (codes E800-E999), are used in the NHDS, they are excluded from this report.

To interpret data and compare them with available data from other sources on short-stay hospital use, one must become familiar with the definitions used in NHDS. Definitions of the terms in this report are in the "Technical notes."

## Highlights

- More than 50 percent of long-stay patients were diagnosed with diseases of the circulatory system, mental disorders, neoplasms, injury, or poisoning.
- Hospitalizations for septicemia, psychoses, and miscellaneous complications of surgical and medical care were more frequent in 1990 than in 1980 for all patients and long-stay patients.
- Long-stay patients were more likely to have diagnoses such as septicemia, malignant neoplasms, psychoses, cerebrovascular disease, and fractures than were all patients.
- The rate of procedures per 1,000 discharges was 50 percent higher for long-stay patients than for all patients; the rates in 1990 were higher than the rates in 1980 for both groups.
- The majority of long-stay patients had Medicare as their expected principal source of payment in 1980 and 1990. Medicaid covered a larger share and private insurance covered a smaller share of long-stay and all discharges in 1990 than in 1980.
- The proportion of discharges transferred to other health care facilities was higher in 1990 than in 1981 for both long-stay and all patients. Long-stay patients were more likely to be transferred or discharged dead than were all patients.

**Table 1. Number of discharges, days of care, and average lengths of stay for patients discharged from short-stay hospitals, by length of stay category: United States, 1980 and 1990**

Length-of-stay category and measure of hospital use	1980	1990
All patients		
Number of discharges in thousands . . . . .	37,832	30,788
Number of days of care in thousands . . . . .	274,508	197,422
Average length of stay in days . . . . .	7.3	6.4
Short-stay patients <sup>1</sup>		
Number of discharges in thousands . . . . .	35,897	29,486
Number of days of care in thousands . . . . .	202,317	146,999
Average length of stay in days . . . . .	5.6	5.0
Long-stay patients <sup>2</sup>		
Number of discharges in thousands . . . . .	1,935	1,302
Number of days of care in thousands . . . . .	72,191	50,423
Average length of stay in days . . . . .	37.3	38.7

<sup>1</sup>Short-stay patients had lengths of stay of 3 weeks or less.  
<sup>2</sup>Long-stay patients had lengths of stay of more than 3 weeks.

## Trends

The number of discharges was lower in 1990 than in 1980 (table 1). The total number of discharges decreased 19 percent from 37.8 million in 1980 to 30.8 million in 1990. Discharges for patients hospitalized 3 weeks or less dropped 18 percent; discharges for long-stay patients hospitalized more than 3 weeks decreased by almost a third, declining from 1.9 million in 1980 to 1.3 million in 1990.

Large decreases in numbers of days of care also occurred during this period. The number of days of care for all patients declined 28 percent from 274.5 million in 1980 to 197.4 million in 1990. Patients with stays of 3 weeks or less had a 27 percent decrease in the number of days of care during the period, and long-stay patients had a 30 percent decrease from 72.2 million days of care in 1980 to 50.4 million days in 1990.

The average length of stay for all patients decreased from 7.3 days in 1980 to 6.4 days in 1990 and the length of stay for short-stay patients declined from 5.6 days in 1980 to 5.0 days in 1990. The average stay for long-stay patients did not change significantly: 37.3 days in 1980 and 38.7 days in 1990.

The objective of this report is to compare characteristics of long-stay patients to all patients. Therefore no

additional data are presented for short-stay patients. Because short-stay patients comprise such a large percentage of all patients (95–96 percent), the data for all and short-stay patients are very similar.

## Age and sex

Over time, the distribution of discharges and days of care by sex has been stable. Among long-stay patients, 54 percent of discharges were female and they used 54 percent of long-stay days of care in both 1980 and 1990 (table 2). Females made up 60 percent of total discharges and 57–58 percent of total days of care in 1980 and 1990. However, if hospitalizations for deliveries are excluded, the distributions of discharges and days of care by sex are almost the same for long-stay and all patients. For example, in 1990 females made up 54 percent of total discharges and days of care, excluding deliveries.

In 1980 and 1990, approximately half of long-stay discharges and days of care were for patients 65 years of age and over. The elderly made up smaller proportions of total discharges and days of care in both years, but the proportions increased over time. In 1980, the elderly accounted for only 26 percent of total discharges and 38 percent of total days of care. By 1990, they were

**Table 2. Number and percent distribution of discharges and days of care for patients discharged from short-stay hospitals, by sex and age of patient, according to length-of-stay category: United States, 1980 and 1990**

[Discharges from non-Federal hospitals. Excludes newborn infants]

Sex or age	All patients		Long-stay patients <sup>1</sup>		All patients		Long-stay patients <sup>1</sup>	
	1980	1990	1980	1990	1980	1990	1980	1990
	Number of discharges in thousands				Percent distribution of discharges			
Total . . . . .	37,832	30,788	1,935	1,302	100.0	100.0	100.0	100.0
Male . . . . .	15,145	12,280	887	603	40.0	39.9	45.8	46.3
Female . . . . .	22,686	18,508	1,048	699	60.0	60.1	54.2	53.7
Under 15 years . . . . .	3,672	2,412	72	74	9.7	7.8	3.7	5.7
15-44 years . . . . .	15,635	11,799	383	309	41.3	38.3	19.8	23.7
45-64 years . . . . .	8,660	6,244	494	273	22.9	20.3	25.5	21.0
65 years and over . . . . .	9,864	10,333	986	646	26.1	33.6	50.9	49.6
	Number of days of care in thousands				Percent distribution of days of care			
Total . . . . .	274,508	197,422	72,191	50,423	100.0	100.0	100.0	100.0
Male . . . . .	116,267	85,067	32,996	23,438	42.4	43.1	45.7	46.5
Female . . . . .	158,241	112,355	39,196	26,985	57.6	56.9	54.3	53.5
Under 15 years . . . . .	16,191	11,655	3,029	3,337	5.9	5.9	4.2	6.6
15-44 years . . . . .	81,951	54,062	14,743	11,805	29.9	27.4	20.4	23.4
45-64 years . . . . .	71,008	42,153	18,287	10,575	25.9	21.4	25.3	21.0
65 years and over . . . . .	105,358	89,552	36,133	24,707	38.4	45.4	50.1	49.0

<sup>1</sup> Long-stay patients had lengths of stay of more than 3 weeks.

34 percent of discharges and used 45 percent of days of care.

Patients 45-64 years of age made up approximately the same proportion of long-stay and total discharges in 1980 and 1990. The proportion of discharges and days of care in this age category decreased for both long-stay and all patients from 1980 to 1990. When compared with all patients, long-stay patients under 45 years of age were underrepresented. The proportion of long-stay discharges and days of care for patients under 45 years of age were higher in 1990 than in 1980, although the share of total discharges for this age group decreased during the period.

### Source of payment

In 1980 and 1990, the majority of long-stay discharges and days of care were for patients with Medicare as the expected principal source of payment (table 3), which was consistent with the majority being 65 years of age and over. The proportion of discharges and days of care covered by Medicare were not

significantly different in 1980 and 1990 for long-stay patients, although the number of Medicare discharges and days of care decreased for these patients. For all patients, the proportion of Medicare discharges and days of care increased during that period. The number of discharges did not change significantly, and number of days of care decreased for all Medicare patients.

The private insurance category comprised all health insurance provided by nongovernmental sources, including Blue Cross, other insurance companies, private industry, and philanthropic organizations. In 1980 and 1990, long-stay patients were less likely to be covered by private insurance than all patients, and the number and proportion of discharges and days of care covered by private insurance have been decreasing for long-stay and all patients. In 1980, private insurance was the payment source for more than half of all discharges but less than a third of long-stay discharges. In 1990, only 39 percent of all discharges and

24 percent of long-stay discharges were in the private insurance category.

In contrast, the proportion of discharges and days of care for patients with Medicaid as their expected principal source of payment were higher in 1990 than in 1980 for long-stay and all patients, although the number of Medicaid discharges and days of care did not change significantly. Medicaid was the expected source of payment for 7 percent of long-stay discharges and days of care in 1980 and increased to 11-12 percent in 1990.

The self-pay category, where payment for hospitalization was expected from the patient, spouse, family, or next of kin, made up 5-6 percent of discharges and days of care for long-stay and all patients in 1990. Neither the number nor the proportion of discharges or days of care in the self-pay category were significantly different in 1980 and 1990.

These trend data show that private insurers were the leaders in reducing hospital use of long-stay and

**Table 3. Number and percent distribution of discharges and days of care for patients discharged from short-stay hospitals, by expected principal source of payment, according to length-of-stay category: United States, 1980 and 1990**

[Discharges from non-Federal hospitals. Excludes newborn infants]

Source of payment	All patients		Long-stay patients <sup>1</sup>		All patients		Long-stay patients <sup>1</sup>	
	1980	1990	1980	1990	1980	1990	1980	1990
	Number of discharges in thousands				Percent distribution of discharges			
All sources. . . . .	37,832	30,788	1,935	1,302	100.0	100.0	100.0	100.0
Private insurance. . . . .	19,597	11,926	607	310	51.8	38.7	31.4	23.8
Medicare. . . . .	10,766	10,625	1,049	691	28.5	34.5	54.2	53.1
Medicaid. . . . .	3,374	3,582	134	140	8.9	11.6	6.9	10.8
Self-pay. . . . .	2,057	1,788	73	63	5.4	5.8	3.8	4.8
Other sources. . . . .	2,037	1,875	72	64	5.4	6.1	3.7	4.9
Not stated <sup>2</sup> . . . . .	—	992	—	34	—	3.2	—	2.6
	Number of days of care in thousands				Percent distribution of days of care			
All sources. . . . .	274,508	197,422	72,191	50,423	100.0	100.0	100.0	100.0
Private insurance. . . . .	114,947	58,531	22,625	11,708	41.9	29.6	31.3	23.2
Medicare. . . . .	113,583	92,353	38,500	25,980	41.4	46.8	53.3	51.5
Medicaid. . . . .	21,531	20,860	5,150	6,276	7.8	10.6	7.1	12.4
Self-pay. . . . .	11,447	9,743	2,906	2,599	4.2	4.9	4.0	5.2
Other sources. . . . .	13,000	10,283	3,010	2,672	4.7	5.2	4.2	5.3
Not stated <sup>2</sup> . . . . .	—	5,652	—	1,188	—	2.9	—	2.4

<sup>1</sup>Long-stay patients had lengths of stay of more than 3 weeks.<sup>2</sup>In 1980 a source of payment was imputed for patients who did not indicate one.

all patients. One reason may have been that persons with private insurance were generally younger or healthier than populations covered by Medicare or Medicaid. Medicare covers the aged, disabled, and those afflicted with end-stage renal disease. In 1990, three-fourths of Medicaid benefits were for disabled, aged, and blind persons (6). Thus, hospital stays for the privately-insured population could have been shortened with less risk to patients' health, and they would have been likely candidates for treatment in outpatient settings.

### Disposition

Changes over time in the dispositions of long-stay patients and all patients are shown in table 4. Data for 1981 rather than 1980 are used in table 4 because the disposition categories for the NHDS were the same in 1981 and 1990. In 1980 and earlier years, data were collected for different disposition categories.

Most patients leave short-stay hospitals as routine discharges. However, long-stay patients were less likely to be routine discharges than all patients, and the proportion of

long-stay discharges in this category decreased over time. In 1981, 67 percent of long-stay discharges were classified as routine, but only 59 percent were in this category in 1990. For all patients, the proportion of routine discharges was not significantly different in 1981 and 1990.

The proportion of long-stay and all patients transferred to other institutions increased over time. In 1981, 14 percent of the long-stay discharges were transferred to another facility or institution compared with 20 percent in 1990. For all discharges, 4 percent were transferred to other facilities in 1981 compared with 8 percent in 1990. In both years, more than three-quarters of the transfers of long-stay patients were to long-term care institutions and two-thirds of all transfers were in this category.

The increase in transfers may indicate that hospitalized patients were more seriously ill in 1990 than in 1981, which is consistent with the findings of other studies (1,7,8). Prior research has also found that to reduce lengths of stay, hospitals have

discharged patients in less stable condition in recent years. Hence, patients are now more likely to require further care (1).

A larger proportion of long-stay patients than all patients were discharged dead in 1981 and 1990. However, the proportion discharged dead in 1981 was not significantly different than in 1990 for either group. For long-stay patients, 10–11 percent were discharged dead compared with 3 percent of all patients. If the severity of illness for hospitalized patients has increased, the proportion discharged dead would be expected to grow. However, there is evidence that an increase in the severity of illness was combined with an increased tendency for hospitals to discharge terminally ill patients before their deaths (1). Deaths in short-stay hospitals made up 50 percent of all deaths in 1981, but decreased to 41 percent of all deaths in 1990 (9,10).

### Region

The distribution of discharges and days of care, by region, for long-stay and all patients is shown in

**Table 4. Number and percent distribution of discharges and days of care for patients discharged from short-stay hospitals, by disposition, according to length-of-stay category: United States, 1981 and 1990**

[Discharges from non-Federal hospitals. Excludes newborn infants]

Disposition	All patients		Long-stay patients <sup>1</sup>		All patients		Long-stay patients <sup>1</sup>	
	1981	1990	1981	1990	1981	1990	1981	1990
	Number of discharges in thousands				Percent distribution of discharges			
All dispositions . . . . .	38,544	30,788	1,976	1,302	100.0	100.0	100.0	100.0
Routine discharge . . . . .	31,879	25,713	1,327	764	82.7	83.5	67.2	58.7
Transfer to another short-term hospital . . .	539	805	49	58	1.4	2.6	2.5	4.4
Transfer to long-term care institution . . . .	1,038	1,612	220	198	2.7	5.2	11.2	15.2
Other live discharges . . . . .	3,449	1,284	157	116	8.9	4.1	8.0	8.9
Dead . . . . .	982	877	193	137	2.5	2.8	9.8	10.5
Not stated . . . . .	657	498	29	29	1.7	1.6	1.5	2.2
	Number of days of care in thousands				Percent distribution of days of care			
All dispositions . . . . .	277,230	197,422	72,560	50,423	100.0	100.0	100.0	100.0
Routine discharge . . . . .	214,319	143,498	46,670	27,856	77.3	72.7	64.3	55.2
Transfer to another short-term hospital . . .	4,604	6,932	1,877	2,625	1.6	3.5	2.6	5.2
Transfer to long-term care institution . . . .	17,105	20,628	9,063	8,400	6.2	10.4	12.5	16.7
Other live discharges . . . . .	23,359	11,906	5,791	4,360	8.4	6.0	8.0	8.6
Dead . . . . .	13,166	10,871	7,993	6,073	4.7	5.5	11.0	12.0
Not stated . . . . .	4,677	3,586	1,165	1,109	1.7	1.8	1.6	2.2

<sup>1</sup>Long-stay patients had lengths of stay of more than 3 weeks.**Table 5. Number and percent distribution of discharges and days of care for patients from short-stay hospitals, by region, according to length-of-stay category: United States, 1980 and 1990**

[Discharges from non-Federal hospitals. Excludes newborn infants]

Region	All patients		Long-stay patients <sup>1</sup>		All patients		Long-stay patients <sup>1</sup>	
	1980	1990	1980	1990	1980	1990	1980	1990
	Number of discharges in thousands				Percent distribution of discharges			
All regions . . . . .	37,832	30,788	1,935	1,302	100.0	100.0	100.0	100.0
Northeast . . . . .	7,868	6,895	577	426	20.8	22.4	29.8	32.7
Midwest . . . . .	10,878	7,620	615	302	28.8	24.8	31.8	23.2
South . . . . .	12,983	11,173	523	403	34.3	36.3	27.0	30.9
West . . . . .	6,103	5,100	220	171	16.1	16.6	11.4	13.1
	Number of days of care in thousands				Percent distribution of days of care			
All regions . . . . .	274,508	197,422	72,191	50,423	100.0	100.0	100.0	100.0
Northeast . . . . .	67,238	52,823	22,694	17,858	24.5	26.8	31.4	35.4
Midwest . . . . .	82,000	48,698	22,070	10,702	29.9	24.7	30.6	21.2
South . . . . .	88,216	67,810	18,778	15,083	32.1	34.3	26.0	29.9
West . . . . .	37,054	28,091	8,649	6,779	13.5	14.2	12.0	13.4

<sup>1</sup>Long-stay patients had lengths of stay of more than 3 weeks.

table 5. The Northeast Region had larger proportions of discharges and days of care for long-stay patients than for all patients in 1980 and 1990. In 1990, 33 percent of the discharges for long-stay patients were in the Northeast as compared with 22 percent of all discharges; 35 percent of long-stay days of care were also in the Northeast, but only

27 percent of all days of care were in this region.

The Midwest Region was notable for sizeable decreases in its proportions of long-stay discharges and days of care. In 1980, 32 percent of the discharges and 31 percent of the days of care for long-stay patients were in the Midwest. However, in 1990 the Midwest had only 23 percent

of long-stay discharges and 21 percent of long-stay days. Although the total discharges and days of care also decreased in the Midwest during this period, the proportion of discharges and days of care were smaller in the Midwest for long-stay patients than for all patients in 1990.

The proportions of discharges and days of care in the South Region

were smaller for long-stay patients than for all patients in both 1980 and 1990. In 1990, for example, 36 percent of all discharges, but only 31 percent of long-stay discharges, were in the South. The West, like the South, had proportionately fewer discharges for long-stay patients than for all patients. The West accounted for 11–13 percent of long-stay discharges as compared with 16–17 percent of all discharges.

## Diagnoses

Four of the diagnostic chapters in the International Classification of Diseases (5) accounted for 62 percent of discharges of long-stay patients in 1980 and 58 percent in 1990 (table 6). These chapters encompass diseases of the circulatory system, mental disorders, neoplasms, and injury and poisoning. They accounted for only 34 percent of the discharges of all patients in 1980 and 37 percent in 1990.

The proportion of long-stay patients with diseases of the circulatory system decreased from 22 percent in 1980 to 19 percent in 1990, but was larger in both years than the proportion of all patients with circulatory diseases (14 percent in 1980 and 17 percent in 1990). Heart disease was the diagnosis for a larger proportion of long-stay patients than for all patients in 1980, but in 1990, the proportions were not significantly different for these two groups. In 1980 and 1990, long-stay patients were more likely to have diagnoses of cerebrovascular disease and diseases of arteries, arterioles, and capillaries than all patients. The number and proportion of discharges for ischemic heart disease, other than acute myocardial infarction, were lower in 1990 than in 1980 for long-stay patients.

Mental disorders increased from 13 percent of long-stay diagnoses in 1980 to 19 percent in 1990. For all patients, mental disorders accounted for approximately 5 percent of discharges in both years. Psychoses was a major and dramatically increasing diagnostic category for

long-stay patients, making up 5 percent of long-stay discharges in 1980 and 12 percent in 1990. The proportion of all patients with diagnoses of psychoses also increased from 1 to 3 percent. The number and proportion of long-stay and all discharges for neurotic and personality disorders were lower in 1990 than in 1980.

Neoplasms made up 15 percent of long-stay discharges in 1980, but decreased to 11 percent in 1990. Most of these hospitalizations were for treatment of malignant neoplasms, which accounted for 14 percent of the long-stay discharges in 1980, but declined to 11 percent in 1990. Among all patients, those with neoplasms were 6–7 percent of discharges and those with malignant neoplasms were approximately 5 percent of discharges in 1980 and 1990. The number and proportion of discharges with the diagnosis of malignant neoplasm of trachea, bronchus, and lung were lower in 1990 than in 1980 for long-stay patients, but did not change significantly for all patients during this period.

Injury and poisoning was the diagnostic category for 12 percent of long-stay discharges in 1980 and 10 percent in 1990. For all patients, the injury and poisoning category accounted for 10 percent of discharges in 1980 and 9 percent in 1990. In 1980 and 1990, a larger proportion of long-stay patients than of all patients had fractures, including fractures of the neck of the femur (hip fractures). However, the number and proportion of all fractures and hip fractures were lower in 1990 than in 1980 for long-stay patients. For all patients, the number and proportion did not change significantly for all fractures, but increased for hip fractures. For long-stay and all patients, the number and proportion of discharges classified as miscellaneous complications of surgical and medical care were higher in 1990 than in 1980.

Increases in long-stay discharges were also found for other diagnostic categories. For infectious and parasitic diseases, in particular

septicemia, the number and proportion of long-stay discharges in 1990 were two to four times those in 1980. By 1990, septicemia accounted for half of the long-stay discharges in the infectious and parasitic disease category. The 1990 number and proportion of all discharges with septicemia were also more than three times those in 1980.

In 1990, the number of long-stay discharges assigned to the supplementary classifications doubled, and the proportion more than tripled what they had been in 1980. Within this category, care involving use of rehabilitation procedures was rarely reported as a diagnosis in 1980, but in 1990, it accounted for more than half of the long-stay discharges in the supplementary classification.

The proportion of long-stay discharges for diseases of the respiratory system increased from 6 percent in 1980 to 9 percent in 1990, although the numbers did not change significantly. Pneumonia increased from 2 to 4 percent of long-stay discharges during this period. Both the number and proportion of all discharges for pneumonia were higher in 1990 than in 1980.

Notable decreases were seen in discharges for other diagnostic categories. The number and proportion of discharges for diseases of the musculoskeletal system and connective tissue were lower in 1990 than in 1980 for long-stay and all patients. For long-stay patients, the number of discharges for arthropathies and related disorders decreased by two-thirds, and the proportion dropped 50 percent during this period. Neither the number nor the proportion of all discharges for these disorders changed significantly. Diabetes mellitus was a less common diagnosis in 1990 than in 1980. The number and proportion of discharges with diabetes mellitus declined for long-stay patients and all patients.

The number and percent distribution of days of care for long-stay and all patients are shown by diagnostic categories in table 7. The pattern and trend in days of care

**Table 6. Number and percent distribution of discharges from short-stay hospitals, by selected categories of first-listed diagnoses, according to length-of-stay category: United States, 1980 and 1990**[Discharges from non-Federal hospitals. Excludes newborn infants. Diagnostic groupings and code numbers are based on the *International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM)*]

First-listed diagnosis and ICD-9-CM code	All patients		Long-stay patients <sup>1</sup>		All patients		Long-stay patients <sup>1</sup>	
	1980	1990	1980	1990	1980	1990	1980	1990
	Number of discharges in thousands				Percent distribution of discharges			
All conditions . . . . .	37,832	30,788	1,935	1,302	100.0	100.0	100.0	100.0
Infectious and parasitic diseases . . . . . 001-139	649	737	26	58	1.7	2.4	1.4	4.5
Septicemia . . . . . 038	59	216	10	29	0.2	0.7	0.5	2.2
Neoplasms . . . . . 140-239	2,476	1,965	285	143	6.5	6.4	14.7	11.0
Malignant neoplasms . . . . . 140-208,230-234	1,829	1,571	267	137	4.8	5.1	13.8	10.5
Malignant neoplasm of large intestine and rectum. . . . . 153-154,197.5	200	175	45	26	0.5	0.6	2.3	2.0
Malignant neoplasm of other digestive organs and peritoneum . . . . . 150-152,155-159, 197.4,197.6-197.8	143	154	31	21	0.4	0.5	1.6	1.6
Malignant neoplasm of trachea, bronchus and lung . . . . . 162,197.0,197.3	277	231	46	16	0.7	0.8	2.4	1.3
Endocrine, nutritional and metabolic diseases, and immunity disorders . . . . . 240-279	1,145	1,089	82	48	3.0	3.5	4.2	3.7
Diabetes mellitus . . . . . 250	645	420	54	21	1.7	1.4	2.8	1.6
Mental disorders . . . . . 290-319	1,692	1,538	246	244	4.5	5.0	12.7	18.7
Psychoses . . . . . 290-299	507	812	105	155	1.3	2.6	5.4	11.9
Neurotic and personality disorders . . . . . 300-301	330	128	34	11	0.9	0.4	1.8	0.8
Alcohol dependence syndrome . . . . . 303	439	239	56	36	1.2	0.8	2.9	2.8
Diseases of the nervous system and sense organs . . . . . 320-369	1,762	770	58	34	4.7	2.5	3.0	2.6
Disorders of the central nervous system . . . . . 320-336,340-349	408	342	45	29	1.1	1.1	2.3	2.2
Diseases of the circulatory system . . . . . 390-459	5,140	5,161	423	240	13.6	16.8	21.9	18.5
Heart disease . . . . . 391-392,393-398, 402, 404,410-416,420-429	3,201	3,556	231	137	8.5	11.6	11.9	10.5
Acute myocardial infarction . . . . . 410	431	675	50	36	1.1	2.2	2.6	2.8
Other ischemic heart disease . . . . . 411-414	1,355	1,280	75	26	3.6	4.2	3.9	2.0
Congestive heart failure . . . . . 428.0	401	701	34	30	1.1	2.3	1.8	2.3
Cerebrovascular disease . . . . . 430-438	796	812	110	69	2.1	2.6	5.7	5.3
Diseases of arteries, arterioles, and capillaries . . . . . 440-448	306	267	47	21	0.8	0.9	2.4	1.6
Diseases of the respiratory system . . . . . 460-519	3,445	2,966	112	114	9.1	9.6	5.8	8.8
Pneumonia . . . . . 480-486	782	1,052	35	51	2.1	3.4	1.8	3.9
Diseases of the digestive system . . . . . 520-579	4,650	3,239	165	92	12.3	10.5	8.5	7.1
Diseases of the genitourinary system . . . . . 580-629	3,599	2,175	62	33	9.5	7.1	3.2	2.5
Diseases of the skin and subcutaneous tissue . . . . . 680-709	597	462	42	27	1.6	1.5	2.1	2.1
Diseases of the musculoskeletal system and connective tissue . . . . . 710-739	2,245	1,592	122	44	5.9	5.2	6.3	3.4
Arthropathies and related disorders . . . . . 710-719	543	479	43	14	1.4	1.6	2.2	1.1
Disorders of bone and cartilage . . . . . 730-733	286	196	32	17	0.8	0.6	1.7	1.3
Injury and poisoning . . . . . 800-999	3,593	2,774	240	132	9.5	9.0	12.4	10.1
Fractures, all sites . . . . . 800-829	1,163	1,017	148	60	3.1	3.3	7.7	4.6
Fracture of neck of femur . . . . . 820	210	281	64	26	0.6	0.9	3.3	2.0
Miscellaneous complications of surgical and medical care . . . . . 996-999	252	517	19	33	0.7	1.7	1.0	2.5
Supplementary classifications . . . . . V01-V82	4,421	4,507	20	47	11.7	14.6	1.1	3.6
Care involving use of rehabilitation procedures . . . . . V57	*	63	*	26	*	0.2	*	2.0
All other conditions . . . . . 280-289,630-676,740-799	2,417	1,814	50	46	6.4	5.9	2.6	3.5

<sup>1</sup>Long-stay patients had lengths of stay of more than 3 weeks.

**Table 7. Number and percent distribution of days of care for patients discharged from short-stay hospitals, by selected categories of first-listed diagnoses, according to length-of-stay category: United States, 1980 and 1990**[Discharges from non-Federal hospitals. Excludes newborn infants. Diagnostic groupings and code numbers are based on the *International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM)*]

First-listed diagnosis and ICD-9-CM code	All patients		Long-stay patients <sup>1</sup>		All patients		Long-stay patients <sup>1</sup>	
	1980	1990	1980	1990	1980	1990	1980	1990
	Number of days of care in thousands				Percent distribution of days of care			
All conditions . . . . .	274,508	197,422	72,191	50,423	100.0	100.0	100.0	100.0
Infectious and parasitic diseases . . . . .001-139	4,509	6,725	1,150	2,714	1.6	3.4	1.6	5.4
Septicemia . . . . .038	849	2,858	436	1,273	0.3	1.4	0.6	2.5
Neoplasms . . . . .140-239	26,004	16,771	10,525	5,707	9.5	8.5	14.6	11.3
Malignant neoplasms. . . . .140-208,230-234	22,009	14,693	9,848	5,327	8.0	7.4	13.6	10.6
Malignant neoplasm of large intestine and rectum. . . . .153-154,197.5	3,143	2,402	1,515	961	1.1	1.2	2.1	1.9
Malignant neoplasm of other digestive organs and peritoneum. . . . .150-152, 155-159,197.4,197.6-197.8	2,251	1,876	1,182	806	0.8	0.9	1.6	1.6
Malignant neoplasm of trachea, bronchus and lung . . . . .162,197.0,197.3	3,561	1,961	1,683	561	1.3	1.0	2.3	1.1
Endocrine, nutritional and metabolic diseases, and immunity disorders . . . . .240-279	10,972	7,610	3,124	1,854	4.0	3.9	4.3	3.7
Diabetes mellitus . . . . .250	6,754	3,295	2,061	891	2.5	1.7	2.9	1.8
Mental disorders . . . . .290-319	19,578	18,824	9,299	8,589	7.1	9.5	12.9	17.0
Psychoses . . . . .290-299	7,480	11,861	4,068	5,720	2.7	6.0	5.6	11.3
Neurotic and personality disorders . . . .300-301	3,362	1,121	1,324	405	1.2	0.6	1.8	0.8
Alcohol dependence syndrome . . . . .303	4,424	2,366	1,808	1,034	1.6	1.2	2.5	2.1
Diseases of the nervous system and sense organs . . . . .320-389	9,597	4,268	2,326	1,381	3.5	2.2	3.2	2.7
Disorders of the central nervous system . . . . .320-336,340-349	4,372	2,955	1,906	1,212	1.6	1.5	2.6	2.4
Diseases of the circulatory system . . . . .390-459	51,431	37,899	15,602	8,679	18.7	19.2	21.6	17.2
Heart disease . . . . .391-392.0,393-398, 402,404,410-416,420-429	30,500	24,557	7,819	4,694	11.1	12.4	10.8	9.3
Acute myocardial infarction. . . . .410	5,432	5,674	1,496	1,218	2.0	2.9	2.1	2.4
Other ischemic heart disease . . . . .411-414	11,702	6,896	2,621	837	4.3	3.5	3.6	1.7
Congestive heart failure. . . . .428.0	4,154	5,604	1,155	1,021	1.5	2.8	1.6	2.0
Cerebrovascular disease . . . . .430-438	10,114	7,727	4,649	2,798	3.7	3.9	6.4	5.5
Diseases of arteries, arterioles, and capillaries . . . . .440-448	4,127	2,550	1,880	747	1.5	1.3	2.6	1.5
Diseases of the respiratory system. . . . .460-519	21,649	20,433	3,842	4,566	7.9	10.4	5.3	9.1
Pneumonia . . . . .480-486	6,497	8,744	1,236	2,013	2.4	4.4	1.7	4.0
Diseases of the digestive system. . . . .520-579	32,342	19,197	5,818	3,500	11.8	9.7	8.1	6.9
Diseases of the genitourinary system . . . .580-629	20,068	10,989	2,159	1,422	7.3	5.6	3.0	2.8
Diseases of the skin and subcutaneous tissue . . . . .680-709	4,803	3,670	1,717	1,089	1.7	1.9	2.4	2.2
Diseases of the musculoskeletal system and connective tissue . . . . .710-739	18,679	10,222	4,208	1,630	6.8	5.2	5.8	3.2
Arthropathies and related disorders. . . .710-719	5,090	3,752	1,501	513	1.9	1.9	2.1	1.0
Disorders of bone and cartilage . . . . .730-733	3,122	1,871	1,203	652	1.1	0.9	1.7	1.3
Injury and poisoning. . . . .800-999	27,640	18,891	9,711	5,593	10.1	9.6	13.5	11.1
Fractures, all sites. . . . .800-829	12,583	8,435	5,800	2,310	4.6	4.3	8.0	4.6
Fracture of neck of femur. . . . .820	4,333	3,610	2,371	1,060	1.6	1.8	3.3	2.1
Miscellaneous complications of surgical and medical care . . . . .996-999	2,144	4,296	750	1,516	0.8	2.2	1.0	3.0
Supplementary classifications . . . . . V01-V82	16,337	14,212	776	1,803	6.0	7.2	1.1	3.6
Care involving use of rehabilitation procedures . . . . .V57	*	1,413	*	915	*	0.7	*	1.8
All other conditions . . . . .280-289,630-676,740-799	10,900	7,709	1,935	1,897	4.0	3.9	2.7	3.8

<sup>1</sup>Long-stay patients had lengths of stay of more than 3 weeks.

for diagnoses were generally similar to those seen in the discharge data. Diseases of the circulatory system, mental disorders, neoplasms, and injury and poisoning together accounted for 63 percent of the days of care for long-stay patients in 1980 and 57 percent in 1990.

As was the case with discharges, the proportion of days of care for diagnostic categories such as septicemia; most malignant neoplasms; mental disorders; cerebrovascular disease; diseases of arteries, arterioles, and capillaries; all fractures; and hip fractures was higher for long-stay patients than for all patients. Unlike discharges, the proportion of days of care for diseases of the circulatory system was lower for long-stay patients than for all patients in 1990.

Days of care for long-stay patients increased for infectious and parasitic diseases (especially septicemia), psychoses, pneumonia, miscellaneous complications of surgical and medical care, and the supplementary classifications (where care involving use of rehabilitation procedures accounted for half of the days in 1990).

Long-stay patients had decreases in days of care for diagnostic categories such as malignant neoplasms of trachea, bronchus, and lung; diabetes mellitus; neurotic and personality disorders; ischemic heart disease (other than acute myocardial infarction); diseases of arteries, arterioles, and capillaries; arthropathies and related disorders; all fractures; and hip fractures.

## Procedures

The rate of procedures per 1,000 discharges for long-stay patients was 1,255 in 1980 and 2,046 in 1990, an increase of 63 percent (table 8). For all patients, the rate of procedures per 1,000 discharges increased by 58 percent—from 830 in 1980 to 1,316 in 1990. In 1980 and 1990, the rate of procedures per 1,000 discharges was more than 50 percent higher for long-stay patients than for all patients. Although long-stay patients

accumulated more procedures per hospitalization, they had fewer procedures per hospital day. In 1990, the rate of procedures per 100 hospital days was 5 for long-stay patients compared with 21 for all patients.

In 1990, 31 percent of the procedures performed on long-stay patients were in the category, miscellaneous diagnostic and therapeutic procedures. Operations on the digestive system made up 19 percent of the procedures and operations on the cardiovascular system accounted for 17 percent of procedures on long-stay patients. Thus, more than two-thirds of the procedures performed on long-stay patients were in these three categories. Only 52 percent of the procedures for all patients were in these three categories in 1990. In 1980, the same three categories of procedures made up approximately half of the procedures performed on long-stay patients and a third of the procedures for all patients.

The rate of miscellaneous diagnostic and therapeutic procedures per 1,000 discharges in 1990 was more than double the rate in 1980 for long-stay patients. The rate for all patients more than tripled during this period. Large increases can be seen in the rates for a number of specific procedures in this category. The rate of computerized axial tomography (CAT) scans more than tripled for long-stay patients and increased six-fold for all patients. Long-stay patients had a rate of diagnostic ultrasound per 1,000 discharges in 1990 that was 4.7 times the 1980 rate, and the 1990 rate of diagnostic ultrasound for all patients was more than six times the 1980 rate. Respiratory therapy and insertion of endotracheal tube were reported infrequently for long-stay and all patients in 1980, but were common procedures in 1990. The rate per 1,000 discharges for arteriography and angiocardiology using contrast material was not significantly higher for long-stay patients in 1990 than in 1980, but it more than tripled for all patients. This was one of the few

diagnostic procedures for which all patients had a higher rate per 1,000 discharges than long-stay patients in 1990.

The increases in miscellaneous diagnostic and therapeutic procedures were probably due in part to changes in the methodology of the National Hospital Discharge Survey (see "Technical notes"). Beginning in 1985, some data for the survey have been obtained from abstracting service organizations. Analysis has indicated that a greater number of nonsurgical procedures per patient were reported by hospitals using abstract services than by hospitals submitting data in the traditional manual form. In addition, more complete reporting of relatively minor procedures has been linked to the implementation of the 1983 Medicare prospective payment system, which is based on diagnosis-related groups (DRG's) (11–13).

Like the rate of miscellaneous diagnostic and therapeutic procedures, the rate of operations on the cardiovascular system per 1,000 discharges in 1990 was more than double the 1980 rate for long-stay patients and more than triple the 1980 rate for all patients. A number of cardiovascular procedures contributed to these increases. The rate of coronary artery bypass grafts per 1,000 discharges more than tripled for long-stay and all patients. The cardiac catheterization rate doubled for long-stay patients and more than tripled for all patients. Puncture of vessel was also reported at a much higher rate in 1990 than in 1980 for long-stay and all patients.

The rate of operations on the digestive system was not significantly different in 1980 as compared with 1990 for long-stay or all patients, but rates of several specific digestive system procedures increased during this period. The rates per 1,000 discharges for gastrostomy and endoscopy of the small intestine more than tripled for long-stay patients and all patients. Long-stay patients had an 86 percent higher rate of endoscopy of the large intestine in 1990 than in 1980, and rates for lysis of peritoneal

**Table 8. Number of procedures and ratio of procedures to discharges for patients discharged from short-stay hospitals, by procedure and length-of-stay categories: United States, 1980 and 1990**[Discharges from non-Federal hospitals. Excludes newborn infants. Diagnostic groupings and code numbers are based on the *International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM)*]

Procedure category and ICD-9-CM code	All patients discharged		Long-stay patients <sup>1</sup>		All patients discharged		Long-stay patients <sup>1</sup>	
	1980	1990	1980	1990	1980	1990	1980	1990
	Number of procedures in thousands				Procedures per 1,000 discharges			
All procedures . . . . .	31,412	40,506	2,428	2,665	830.3	1,315.6	1,254.8	2,046.3
Operations on the nervous system . . . . . 01-05	728	952	106	103	19.2	30.9	54.8	78.8
Spinal tap . . . . . 03.31	216	396	33	41	5.7	12.9	17.1	31.8
Operations on the respiratory system . . . . . 30-34	868	975	192	202	22.9	31.7	99.2	155.4
Temporary tracheostomy . . . . . 31.1	49	41	32	30	1.3	1.3	16.5	23.2
Bronchoscopy with or without biopsy . . . . . 33.21-33.24,33.27	290	298	63	56	7.7	9.7	32.6	43.0
Incision of chest wall and pleura . . . . . 34.0	117	180	26	33	3.1	5.8	13.5	25.6
Operations on the cardiovascular system . . . . . 35-39	1,352	3,881	236	444	35.7	126.1	122.2	341.1
Coronary artery bypass graft . . . . . 36.1	137	392	24	47	3.6	12.7	12.1	36.4
Cardiac catheterization . . . . . 37.21-37.23	348	995	28	39	9.2	32.3	14.4	29.7
Puncture of vessel . . . . . 38.9	56	515	17	124	1.5	16.7	8.7	95.3
Shunt or vascular bypass . . . . . 39.0-39.2	98	162	31	26	2.6	5.2	16.1	20.2
Operations on the hemic and lymphatic system . . . . . 40-41	321	361	61	49	8.5	11.7	31.3	37.6
Biopsy of bone marrow . . . . . 41.31	144	157	28	32	3.8	5.1	14.7	24.4
Operations on the digestive system . . . . . 42-54	5,320	5,271	563	509	140.6	171.2	290.8	391.1
Gastrostomy . . . . . 43.1	33	115	15	45	0.9	3.7	7.6	34.3
Endoscopy of small intestine . . . . . 45.11-45.14,45.16	282	785	25	73	7.4	25.5	12.9	56.2
Endoscopy of large intestine . . . . . 45.21-45.25	535	548	44	55	14.1	17.8	22.9	42.5
Resection of intestine . . . . . 45.6-45.8	180	266	51	48	4.8	8.6	26.2	37.1
Ileostomy, colostomy, and other enterostomy . . . . . 46.1-46.3	82	89	37	29	2.2	2.9	18.9	22.3
Cholecystectomy . . . . . 51.2	458	522	32	18	12.1	17.0	16.8	13.9
Lysis of peritoneal adhesions . . . . . 54.5	228	323	26	30	6.0	10.5	13.3	23.4
Operations on the urinary system . . . . . 55-59	1,921	1,664	148	89	50.8	54.1	76.3	68.2
Cystoscopy . . . . . 57.31-57.33	875	527	61	30	23.1	17.1	31.3	22.7
Operations on the male genital organs . . . . . 60-64	799	594	57	19	21.1	19.3	29.5	14.9
Prostatectomy . . . . . 60.2-60.6	335	364	35	9	8.9	11.8	17.9	7.0
Operations on the female genital organs . . . . . 65-71	4,274	2,440	44	22	113.0	79.2	22.5	17.3
Operations on the musculoskeletal system . . . . . 76-84	3,215	3,132	340	187	85.0	101.7	175.7	143.4
Open reduction of fracture with internal fixation . . . . . 79.3	301	391	58	29	8.0	12.7	29.9	21.9
Amputation of lower limb . . . . . 84.1	96	107	52	35	2.5	3.5	26.9	26.5
Operations on the integumentary system . . . . . 85-86	1,896	1,387	184	167	50.1	45.1	95.3	128.5
Debridement of wound, infection, or burn . . . . . 86.22,86.28	196	332	56	82	5.2	10.8	29.0	63.2
Skin graft . . . . . 86.6-86.7	183	110	60	32	4.8	3.6	30.8	24.3
Miscellaneous diagnostic and therapeutic procedures . . . . . 87-99	3,930	11,890	444	818	103.9	386.2	229.5	628.2
Computerized axial tomography . . . . . 87.03,87.41,87.71,88.01,88.38	306	1,506	51	124	8.1	48.9	26.6	94.8
Arteriography and angiocardiology using contrast material . . . . . 88.4-88.5	569	1,735	57	48	15.0	56.4	29.3	36.7
Diagnostic ultrasound . . . . . 88.7	318	1,608	33	103	8.4	52.2	17.0	79.3
Radioisotope scan . . . . . 92.0-92.1	525	603	78	52	13.9	19.6	40.6	39.6
Respiratory therapy . . . . . 93.9	*7	1,164	*	97	*0.2	37.8	*	74.2
Insertion of endotracheal tube . . . . . 96.04	14	297	*	49	0.4	9.7	*	38.0
All other procedures . . . . . 06-29,72-75	6,788	7,959	53	54	179.4	258.5	27.6	41.6

<sup>1</sup>Long-stay patients had lengths of stay of more than 3 weeks.

adhesions increased approximately 75 percent for long-stay and all patients. In contrast, the rates of cholecystectomy per 1,000 discharges were not significantly higher in 1990 as compared with 1980 for long-stay or all patients.

Other significant changes included a 57-percent-higher rate of

operations on the respiratory system per 1,000 discharges for long-stay patients in 1990 as compared with 1980. Within the respiratory category, the rate for incision of the chest wall and pleura per 1,000 discharges increased 87-90 percent for long-stay and all patients. Notable in other categories was the change in the rate

for debridement of wound, infection, and burn per 1,000 discharges, which in 1990 was twice the 1980 rate. The rate for spinal tap also doubled for all patients and increased 86 percent for long-stay patients during this period.

Unlike most rates, the rate of operations on the male genital organs per 1,000 discharges was lower for

long-stay patients in 1990 than in 1980. In particular, the rate of prostatectomy per 1,000 discharges decreased for long-stay patients, even though it did not change significantly for all patients during this period.

Prostatectomy was performed at a higher rate per 1,000 discharges for long-stay patients in 1980 but at a higher rate for all patients in 1990.

The rate per 1,000 discharges for the "all other procedures" category was higher for all patients than for long-stay patients in 1980 and 1990. This category included obstetrical procedures and operations on the endocrine system, eye, ear, nose, mouth, and pharynx.

## Summary

In 1980 and 1990, only 4–5 percent of patients in short-stay hospitals were hospitalized for more than 3 weeks. The number of discharges and days of care for these long-stay patients were lower in 1990 as compared with 1980, but they continued to use more than a quarter of all hospital days in 1990. Long-stay patients were more likely than all patients to be 65 years of age and over and have Medicare as their expected principal source of payment. For long-stay and all patients, private insurance covered smaller proportions of discharges and days of care, and Medicaid covered larger proportions in 1990 than in 1980.

Long-stay patients were more likely than all patients to be discharged dead or transferred to other hospitals or nursing homes. Long-stay and all patients were more likely to be transferred at discharge in 1990 than in 1981. The Northeast Region had a larger proportion of long-stay patients than of all patients, and that proportion increased from 1980 to 1990. The proportion of long-stay discharges and days of care in the Midwest decreased during this period.

In 1980 and 1990, more than 50 percent of the discharges and days of care for long-stay patients were for diseases of the circulatory system, mental disorders, neoplasms, or injury

and poisoning. Despite the overall decreases in hospital use by long-stay patients, their discharges and days of care increased significantly from 1980 to 1990 for diagnoses such as septicemia, psychoses, and miscellaneous complications of surgical and medical care. Over time, decreases were seen in long-stay discharges and days of care for a variety of diagnostic categories, including malignant neoplasm of trachea, bronchus, and lung; diabetes mellitus; and fracture of the neck of the femur.

Long-stay patients had a higher rate of procedures per 1,000 discharges in 1990 than in 1980, and a higher rate than all patients in both years. Approximately half of all the procedures performed on long-stay patients in 1980 and two-thirds in 1990 were miscellaneous diagnostic and therapeutic procedures, operations on the cardiovascular system, or operations on the digestive system. The rates of numerous procedures, especially diagnostic tests, increased for long-stay and all patients from 1980 to 1990.

## References

1. Coulam RF, Gaumer GL. Medicare's prospective payment system: a critical review. *Health Care Finan Rev Annual Supplement*. 1991.
2. Guterman S, Eggers PW, Riley G, et al. The first 3 years of Medicare prospective payment: an overview. *Health Care Finan Rev* 9(3):67–77. 1988.
3. Schramm CJ, Gabel J. Prospective payment, some retrospective observations. *N Engl J Med* 318(25):1681–82. 1988.
4. Haupt BJ, Kozak LJ. Estimates from two survey designs: National Hospital Discharge Survey. National Center for Health Statistics. *Vital Health Stat* 13(111). 1992.
5. Public Health Service and Health Care Financing Administration. *International Classification of Diseases, 9th Revision, clinical modification*. Washington: Public Health Service. 1980.
6. Levit KR, Lazenby HC, Cowan CA, Letsch SW. National health expenditures, 1990. *Health Care Finan Rev* 13(1):29–49. 1991.
7. Sloan FA, Morrisey MA, Valvona J. Case shifting and the Medicare prospective payment system. *Am J of Public Health* 18(5):553–56. 1988.
8. Prospective Payment Assessment Commission. *Medicare and the American Health Care System. Report to the Congress*. Washington, D.C. June 1991.
9. Graves EJ, Haupt BJ. Utilization of short-stay hospitals: United States, 1981, annual summary. National Center for Health Statistics. *Vital Health Stat* 13(72). 1983.
10. Graves EJ. National Hospital Discharge Survey: annual summary, 1990. National Center for Health Statistics. *Vital Health Stat* 13(112). 1992.
11. Cohen BB, Pokras R, Meads MS, Krushat WM. How will diagnosis-related groups affect epidemiologic research? *Am J Epidemiol* 126(1):1–9. 1987.
12. Kozak LJ. Hospital inpatient surgery: United States, 1983–87. Advance data from vital and health statistics; no 169. Hyattsville, Maryland: National Center for Health Statistics. 1989.
13. Steinwald B, Dummit LA. Hospital case-mix change: sicker patients or DRG creep? *Health Affairs* 35–47. Summer 1989.
14. Simmons WR, Schnack GA. Development of the design of the NCHS Hospital Discharge Survey. National Center for Health Statistics. *Vital Health Stat* 2(39). 1977.
15. Shah BV. SESUDAAN: Standard Errors Program for Computing of Standardized Rates from Sample Survey Data. Research Triangle Park, North Carolina: Research Triangle Institute. 1981.
16. Haupt BJ. Utilization of short-stay hospitals: annual summary for the United States, 1980. National Center for Health Statistics. *Vital Health Stat* 13(64). 1982.

## Technical notes

### Survey methodology

#### Source of data

The National Hospital Discharge Survey (NHDS) covers discharges from noninstitutional hospitals, except Federal, military, and Veterans' Administration hospitals, that are located in the 50 States and the District of Columbia. Only hospitals with at least six beds and an average length of stay of less than 30 days for all patients were included in the survey from 1965–87. Beginning in 1988, the universe also included hospitals whose specialty was general (medical or surgical) or children's general, even if the hospital's average length of stay for patients was 30 days or more.

The original universe for the survey consisted of 6,965 hospitals listed in the 1963 National Master Facility Inventory (NMFI). The universe was updated periodically using NMFI data and data from the American Hospital Association to reflect new hospitals entering the universe. Beginning in 1988, the universe for the NHDS consisted of hospitals that were listed in the April 1987 SMG Hospital Market Tape, met the above criteria, and began accepting patients by August 1987.

In 1980, the sample consisted of 544 hospitals, of which 52 were found to be out-of-scope because they had gone out of business or failed to meet the criteria for the NHDS universe. Of the 492 in-scope (eligible) hospitals, 420 participated in the survey. In 1990, 542 hospitals were sampled and 23 were found to be out-of-scope. Of the 519 in-scope hospitals, 474 responded to the survey.

#### Sample design and data collection

From 1965 to 1987, the NHDS had a stratified, two-stage design. Sample hospitals were selected with probabilities ranging from certainty for the largest hospitals to 1 in 40 for the smallest hospitals. Within each

sample hospital, a systematic random sample was selected.

Beginning in 1988, the NHDS sample included, with certainty, all hospitals with 1,000 beds or more, or 40,000 discharges or more annually. The remaining sample of hospitals was based on a stratified, three-stage design. The first stage consisted of a selection of 112 primary sampling units (PSU's) that were a probability subsample of PSU's to be used in the 1985–94 National Health Interview Survey. The second stage consisted of a selection of noncertainty hospitals from the sample PSU's. At the third stage, a sample of discharges was selected by a systematic random-sampling technique. A detailed description of the old and new survey designs has been published (4).

Two data collection procedures were used for the survey. The first was a manual system of sample selection and data abstraction, which was used for all hospitals in 1980. The second, an automated method used for approximately 34 percent of the respondent hospitals in 1990, involved the purchase of data tapes from abstracting services.

In the manual system, the sample selection and transcription of information from hospital records to abstract forms were performed at the hospitals. The completed forms, along with sample selection control sheets, were forwarded to the National Center for Health Statistics (NCHS) for coding, editing, and weighting. A few of these hospitals have submitted their data via computer printout or tape in recent years. In about 55 percent of the hospitals that participated in the survey in 1980, and about two-thirds of hospitals using this manual system in 1990, the work was performed by their own medical records staff. In the remaining hospitals using the manual system, the U.S. Bureau of the Census personnel, on behalf of NCHS, did the work.

For the automated system, NCHS purchased tapes containing machine-readable medical record data from abstracting services and State data

systems. Records were systematically sampled by NCHS.

The data collected for the survey included items relating to the patient's personal characteristics, including birth date, sex, race, and marital status (but not the patient's name and address); administrative information, including admission and discharge dates, discharge status, and medical record number; and medical information, including diagnoses and surgical and nonsurgical operations or procedures. Beginning in 1977, data pertaining to patient ZIP Code, expected source of payment, and dates of surgery were also collected. (The medical record number and patient ZIP Code are confidential information and are not available to the public.)

#### Presentation of estimates

The relative standard error (RSE) of the estimate and the number of sample records that the estimate was based on are used to identify estimates with relatively low reliability. Because of the complex sample design of the NHDS, estimates of less than 5,000 are not presented; only an asterisk (\*) appears in the tables. Generally, these estimates have an RSE of more than 30 percent or are based on a sample of less than 30 cases. Estimates of 5,000–9,000 are preceded by an asterisk (\*) to indicate they should not be assumed reliable. These estimates are usually based on fewer than 60 cases.

#### Sampling errors and rounding of numbers

The standard error is primarily a measure of sampling variability that occurs by chance, because only a sample rather than the entire universe is surveyed. The RSE of the estimate is obtained by dividing the standard error by the estimate itself. The resulting value is multiplied by 100, so the RSE is expressed as a percent of the estimate.

Estimates of sampling variability for 1980 data were calculated using a customized computer routine based

on an unbiased algebraic estimator of the variance (14). The RSE's for 1980 discharges or first-listed diagnoses, days of care, and procedures are shown in tables I and II.

SESUDAAN software was used to calculate estimates of sampling variability for 1990 data. This software computes standard errors by using a first-order Taylor approximation of the deviation of estimates from their expected values. A description of the software and the approach it uses has been published (15). The constants for RSE curves for 1990 NHDS estimates are presented in table III. The RSE of an

estimate ( $X$ ) can be estimated from the formula:

$$RSE(X) = 100 (\sqrt{a + b/X})$$

where  $X$ ,  $a$ , and  $b$  are as defined in table III.

Estimates have been rounded to the nearest thousand. For this reason, figures within tables do not always add to the totals. Percents and rates were calculated from original, unrounded figures and do not necessarily agree precisely with percents and rates calculated from rounded data.

### Tests of significance

In this report, statistical inference is based on the two-tailed  $t$ -test for independent samples using the Bonferroni critical values for post-hoc multiple comparisons (0.05 level of significance). Critical values were determined for each set of comparisons, that is, within each table. In comparisons of data for all discharges and long-stay discharges, estimates were not from independent samples; therefore, the  $t$ -test used is conservative. Terms such as "higher" and "less" indicate that differences are statistically significant. Terms such as "similar" and "no difference" mean that no statistically significant difference exists between the estimates being compared. A lack of comment on the difference between any two estimates does not mean that the difference was tested and found insignificant.

### Definitions of terms

*Age*—Patient's age at birthday prior to admission to the hospital.

*Average length of stay*—The number of days of care accumulated by patients discharged during the year divided by the number of patients.

*Days of care*—The number of patient days accumulated by a patient at time of discharge. A stay of less than 1 day (patient admission and discharge on the same day) is counted as 1 day in the summation of total days of care. For patients admitted and discharged on different days, the number of days of care is

computed by counting all days from (and including) the date of admission to (but not including) the date of discharge. The terms days of care, patient days, and hospital days are synonymous.

*Diagnosis*—A disease or injury (or other factor that influences health status and contact with health services) listed on the medical record of a patient.

- *Principal diagnosis*—The condition established after study to be chiefly responsible for occasioning the admission of the patient to the hospital for care.
- *First-listed diagnosis*—The coded diagnosis identified as the principal diagnosis or listed first on the face sheet or discharge summary of the medical record if the principal diagnosis cannot be identified. The number of first-listed diagnoses is equal to the number of discharges.

*Discharge*—The formal release of a patient by a hospital, that is, the termination of a period of hospitalization by death or disposition to place of residence, nursing home, another hospital, or other location. The terms discharge, patient, and inpatient are synonymous.

*Disposition*—The disposition of a patient on termination of hospitalization is classified in one of six categories in this report:

- *Routine discharge*—Patients who returned to their previous place of residence after discharge.
- *Transfer to another short-term hospital*—Patients who were transferred to another short-term hospital at discharge.
- *Transfer to long-term care institution*—Patients who entered a nursing home or other long-term care institution upon discharge from the hospital.
- *Other live discharges*—Patients who left the hospital against medical advice, patients discharged alive with dispositions other than routine discharge or transfer, and patients discharged alive whose dispositions were not stated.

**Table I. Approximate relative standard errors of estimated numbers of discharges or first-listed diagnoses and all-listed procedures by size of estimate: United States, 1980**

Size of estimate	Number of discharges or first-listed diagnoses	Number of all-listed procedures
5,000 . . . . .	18.0	17.3
10,000 . . . . .	14.9	14.7
50,000 . . . . .	10.1	10.6
100,000 . . . . .	8.8	9.4
300,000 . . . . .	7.1	7.9
500,000 . . . . .	6.5	7.3
1,000,000 . . . . .	5.8	6.7
3,000,000 . . . . .	5.0	5.9
5,000,000 . . . . .	4.7	5.6
10,000,000 . . . . .	4.3	5.2
20,000,000 . . . . .	4.0	4.9
30,000,000 . . . . .	3.8	4.7
40,000,000 . . . . .	3.7	...

**Table II. Approximate relative standard errors of estimated numbers of days of care by size of estimate: United States, 1980**

Size of estimate	Number of days of care
10,000 . . . . .	24.7
30,000 . . . . .	18.9
50,000 . . . . .	16.8
100,000 . . . . .	14.3
300,000 . . . . .	11.2
500,000 . . . . .	10.1
1,000,000 . . . . .	8.8
3,000,000 . . . . .	7.1
5,000,000 . . . . .	6.5
10,000,000 . . . . .	5.7
50,000,000 . . . . .	4.4
100,000,000 . . . . .	4.0
250,000,000 . . . . .	3.5

Table III. Estimated parameters for relative standard error equations for National Hospital Discharge Survey statistics by selected characteristics: United States, 1990

Characteristic	Number of discharges first-listed diagnoses		Number of days of care	
	a	b	a	b
Total	0.00213	228.834	0.00404	1,438.643
Sex				
Male	0.00152	313.079	0.00311	1,853.369
Female	0.00125	311.632	0.00253	1,907.568
Age				
Under 15 years	0.01597	47.166	0.01976	1,248.390
15-44 years	0.00142	299.762	0.00298	1,225.181
45-64 years	0.00157	234.543	0.00278	1,551.060
65 years and over	0.00161	263.223	0.00295	2,110.341
Region				
Northeast	0.00274	56.268	0.00432	972.782
Midwest	0.00487	183.531	0.01289	1,493.015
South	0.00375	343.892	0.00436	1,408.247
West	0.00564	318.914	0.01456	1,361.642
Source of payment				
Private	0.00141	356.276	0.00278	2,855.345
Medicare	0.00233	147.208	0.00773	1,118.298
Medicaid	0.00542	225.144	0.07067	1,495.250
Self pay	0.00571	255.679	0.03949	1,337.799
Number of procedures				
Total	0.00547	92.597	...	...

NOTE: The relative standard error (RSE) for an estimate (X) can be determined by using the equation  $RSE(X) = 100(\sqrt{a+b/X})$ .

- *Dead*—Patients who died during an inpatient stay.
- *Not stated*—Patients whose discharge status, that is, alive or dead, was not reported at discharge.

*Expected principal source of payment*—The expected principal source of payment is reported by the patient or the patient’s representative at time of admission and may differ somewhat from the actual source of payment as determined after discharge. In this report, payment sources are grouped as follows:

- *Private insurance*—Insurance provided by nongovernmental sources, including Blue Cross and other insurance companies, private industry, and philanthropic organizations.
- *Medicare*—A nationwide program providing health insurance protection to people 65 years of age and over, people eligible for

Social Security disability payments for more than 2 years, and people with end-stage renal disease.

- *Medicaid*—A joint Federal-State program that provides benefits for people who meet their State’s definition of “low income.”
- *Self-pay*—Patients who expect the costs of hospitalization to be paid for primarily by themselves, spouses, parents, or next of kin.
- *Other sources*—Includes Worker’s Compensation and other government programs, such as CHAMPUS (for dependents of military personnel); other nonprofit sources, such as church welfare; hospitalizations for which there was no charge; and sources that could not be assigned to any other category.
- *Not stated*—In 1990, patients for whom no source of payment was indicated. In 1980, source of payment was imputed for patients who did not indicate one.

*Geographic region*—Hospitals are classified by location in one of the four geographic regions of the United States that correspond to those used by the U.S. Bureau of the Census.

Region	States included
Northeast	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania
Midwest	Michigan, Ohio, Illinois, Indiana, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas
South	Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky,

Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas

West Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Hawaii, and Alaska

*Hospital*—Hospitals with an average length of stay of less than 30 days for all patients. In 1990, hospitals whose specialty was general (medical or surgical) were also included, even if the average length of stay of all patients was 30 days or more. Federal hospitals, hospital units of institutions, and hospitals with less than six beds staffed for patients' use were not included.

*Long-stay patient*—A patient whose length of stay in the hospital was more than 3 weeks.

*Patient*—A person formally admitted to the inpatient service of a short-stay hospital for observation, care, diagnosis, or treatment. Newborn infants, defined as those admitted by birth to the hospital, are excluded from this report. The terms patient, inpatient, and discharge are synonymous.

*Population*—The U.S. resident population, excluding members of the Armed Forces. The population estimates are from tabulations provided by the U.S. Bureau of the Census. The 1990 estimates do not include the results of the 1990 Census.

*Procedure*—Surgical or nonsurgical operations, diagnostic procedures, or special treatments reported on the medical record of a patient. In the NHDS, a maximum of four procedures are coded. Certain procedures that do not carry an operative or anesthetic risk or require highly trained personnel, special facilities, or special equipment were not coded. Lists of the ICD-9-CM codes not used are available in previous reports (10, 16).

---

#### Symbols

- - - Data not available
  - . . . Category not applicable
  - Quantity zero
  - 0.0 Quantity more than zero but less than 0.05
  - Z Quantity more than zero but less than 500 where numbers are rounded to thousands
  - \* Figure does not meet standard of reliability or precision.
-

---

**Suggested citation**

Hall MJ, Kozak LJ. Long-stay patients in short-stay hospitals. Advance data from vital and health statistics; no 229. Hyattsville, Maryland: National Center for Health Statistics. 1993

---

**Copyright information**

All material appearing in this report is in the public domain and may be reproduced or copied without permission; citation as to source, however, is appreciated.

---

**National Center for Health Statistics**

Director  
Manning Feinleib, M.D., Dr. P.H.  
Acting Deputy Director  
Jack R. Anderson

---

U.S. DEPARTMENT OF HEALTH AND  
HUMAN SERVICES  
Public Health Service  
Centers for Disease Control and Prevention  
National Center for Health Statistics  
6525 Belcrest Road  
Hyattsville, Maryland 20782

BULK RATE POSTAGE & FEES PAID PHS/NCHS PERMIT NO. G-281
--

---

OFFICIAL BUSINESS  
PENALTY FOR PRIVATE USE, \$300

---

To receive this publication regularly, contact the National Center for Health Statistics by calling 301-436-8500

---

DHHS Publication No. (PHS) 93-1250