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CAT Scan Use in Short-Stay Non-Federal Hospitals: United States, 1979–82

by Edmund J. Graves, Division of Health Care Statistics

This report presents statistics on the use of computerized axial tomography scans by inpatients during the period 1979–82. The age and sex of the patients who received these scans, their diagnoses, the types of scans they received, and the expected sources of payment for the scans are shown. In addition, information on the hospitals in which the scans were performed is reported, including the geographic region, size, and ownership of the facility. Hospital use measurements include frequencies, percent distributions, and population-based rates.

The statistics presented in this report are based on data collected by means of the National Hospital Discharge Survey, a continuous survey that has been conducted by the National Center for Health Statistics since 1965. Statistics are presented for discharges from 1979 through 1982. In each of these years data were abstracted from the face sheets of medical records of approximately 220,000 patients discharged from over 400 short-stay non-Federal hospitals. A brief description of the sample design, data collection and estimation procedures, and definition of terms used in this report can be found in the section entitled "Technical notes." A detailed discussion of these items and the survey form used to collect the data have been published.[1,2]

The coding of medical data for hospitalized patients is done according to the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD–9–CM).[3]

Background of CAT scans

A computerized axial tomography (CAT) scanner is a radiographic device that combines the technologies of radiology, computer processing, and cathode ray tube (CRT) display. This radiographic device produces an image of the transverse section of the body part in question. The image resembles an anatomic section.[4] Tomography is defined as a technique of X-ray photography by which a single plane is photographed, with the outlines of structures in other planes eliminated.[5] Computerized tomography, also known as computerized axial tomography and computerized transverse axial tomography, has been rapidly accepted by the American medical community since its development in 1970.[6] The number of CAT scanners in use in hospitals in the United States has grown from a mere handful in 1973, when the technique was introduced in the United States, to 1,716 in 1982.[7] The principles underlying CAT were first elucidated in 1961, and 11 years later the first scanner (designed by G. H. Hounsfield, a researcher with the British firm EMI, Ltd.[8]) became available.[9,10]

Clinical applications and historical background of CAT scanners

The CAT scanner can depict various intracranial or intra-abdominal abnormalities that previously might have required invasive procedures or surgical exploration. CAT scans can generally identify space-occupying lesions of the brain, such as tumors, hematomas, cysts, cerebral infarcts, hemorrhagic changes, calcification, metastatic disease, and hydrocephalus. Body scanners enable technicians to evaluate extensive abnormalities in the liver, retroperitoneal area, pancreas, bladder and related structures, and other pelvic structures.[4]

The major advantage of CAT scanning lies in its ability to provide clear radiographic definition of structures not visible by other techniques. It is a noninvasive procedure without significant risk, morbidity, or discomfort. The quality of CAT scans may be improved if used in conjunction with a dye that produces clearer images, especially of tumors. A disadvantage of the early units was the relatively slow scan time, which not only resulted in image degradation but also necessitated relatively long exposure to radiation. New scanners have been developed that can scan in 5 seconds or less. Motion, which once caused image degradation, is no longer a serious technical

limitation. Scanners that will evaluate cardiac function in a matter of milliseconds are being developed.[4]

The CAT scan provides surgeons with a long-sought method for better diagnosing of low back pain. It can spot spinal anomalies that were missed by the myelogram and by the operating surgeon. It has been reported by one hospital that the success rate for certain back surgeries has increased from 5 to 80 percent, with most of the credit for the success rate increase given to CAT scans.[11] The CAT scan is now used in conjunction with the position emission tomography (PET) scanner to provide an accurate diagnosis of Alzheimer's disease without extensive testing.[12]

The data presented in the National Hospital Discharge Survey have shown a tremendous increase in inpatient use from 1979 through 1982. In spite of the rapid growth of this technology, there are some drawbacks to the use of the CAT scanner. First, a CAT scanner is expensive. In 1974 the cost of a scanner was $300,000. By 1980 this cost had risen to $700,000. This increase was offset partially by the efficiency of the newer models.[13] Second, the cost to the patient is high; the cost of one scan was approximately $250 in 1980.[14] A third drawback is the exposure to radiation. This is a serious deterrent, despite the faster scanning time of new equipment, and limits the number of CAT scans that can be performed on a patient in any one year. Because of concern with the cost and appropriate supply and distribution of this expensive technology, the national health planning program promulgated standards for the purchase and use of CAT scanners. These standards were included in the "National guidelines for health planning," which were published in March 1978.[15] Health planning agencies were to use the standards as benchmarks against which to assess local conditions and needs. The agencies' assessments, based on these standards, determined whether a certificate of need was granted to allow purchase of new or additional equipment.

The standards published in 1978 were as follows: (1) A CAT scanner (head and body) should operate (for the second and subsequent years of operation) at a minimum of 2,500 medically necessary patient procedures per year, and (2) no additional scanners should be approved unless each scanner in the health service area is performing at a rate greater than 2,500 medically necessary patient procedures per year.

These standards were in effect until November 1982. At that time, the Department of Health and Human Services rescinded the CAT standard from the "National guidelines for health planning."[16] It was decided that the standard did not adequately take into account recent advances in scanner technology. State health planning agencies remain free to develop their own standards for review of certificate-of-need applications to purchase CAT scanners.

The CAT scanner may eventually be supplanted by equipment that has broader capabilities. These are the positron emission tomography (PET) scanner[17] and the nuclear magnetic resonance (NMR) scanner.[18] The latter uses a magnetic field, thus avoiding radiation altogether. Unlike the CAT scanner, which only shows the size of tumor, stroke damage, and so forth, NMR equipment reveals anatomical changes (by examining the chemical and metabolic functioning of organs) that indicate not only current problems but problems that may occur in the future. For example, the NMR scanner reveals the sodium content of brain cells, which aids in ascertaining the extent of stroke damage. The Food and Drug Administration has recent given its approval for the use of the NMR scanner, which makes its use eligible for patient insurance coverage.

Highlights

- The number of CAT scan procedures performed in short-stay hospitals during the period 1979 through 1982 has tripled (from 194,000 to 600,000).
- Approximately 40 percent of all CAT scans performed in short-stay hospitals during the period 1979 through 1982 were performed on patients 65 years of age and over.
- Of the patients who had CAT scans performed, approximately 42 percent expected medicare to pay for them and approximately 39 percent expected private insurance to pay for them.
- Over 25 percent of all CAT scans performed during the period were in the Middle Atlantic Division. However, the West North Central Division had a higher rate of procedures per 10,000 population than the Middle Atlantic Division did.
- Over 40 percent of all CAT scans performed in short-stay hospitals during the period 1979–1982 were performed in hospitals having 500 beds or more.
- About 75 percent of all CAT scans done in short-stay hospitals in the period 1979 through 1982 were done i nonprofit hospitals.
- About 60 percent of all CAT scans performed in short-stay hospitals during the period 1979 through 1982 were performed on the head.

Sex and age of patient

The estimated number of CAT scans performed on inpatients in short-stay non-Federal hospitals has risen from approximately 194,000 in 1979 to 600,000 in 1982: an increase of about 200 percent (table 1). It should be emphasized that these scans are for inpatients only; there are a considerable number of CAT scans performed in outpatient departments, medical clinics, and mobile units. Outpatient departments have the use of in-house scanners if time is available. In addition, 19 percent of all CAT scanners in use have been purchased by hospital outpatient departments and doctor's offices.[19]

The rate of CAT scans per 10,000 population ranged from 8.6 to 26.0 for males during this period while the rate for females ranged from 8.8 to 26.1 for the same period. Although the rates increased over time for each sex, the rates between the sexes showed no significant differences. The number and rate of procedures per 10,000 population by age is smallest for those under 15 years of age and largest for those 65 years of age and over. Rates per 10,000 population for those under 15 years of age ranged from 3.5 to 8.5 during the period 1979–1982, while fo those 65 years and over they ranged from 26.5 to 92.5. Approximately 40 percent of the CAT scans performed on patients were performed on those 65 years of age and over, while only 8 percent were performed on those under 15 years of age. Varia-

Table 1. Number, rate, and percent distribution of CAT scans for patients discharged from short-stay non-Federal hospitals by sex and age: United States, 1979–82

Sex and age	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982
	Number in thousands				Rate per 10,000 population				Percent			
Total	194	306	424	600	8.7	13.6	18.6	26.1	100.0	100.0	100.0	100.0
Sex												
Male	93	152	205	289	8.6	13.9	18.7	26.0	47.9	49.5	48.4	48.2
Female	101	154	219	311	8.8	13.2	18.6	26.1	52.1	50.5	51.6	51.8
Age												
Less than 15 years	18	27	34	44	3.5	5.3	6.6	8.5	9.2	8.9	8.0	7.3
15–44 years	54	74	103	150	5.3	7.1	9.8	14.0	28.1	24.1	24.3	25.0
45–65 years	55	85	114	158	12.4	19.0	25.6	35.6	28.3	27.7	26.8	26.4
65 years and over	67	120	173	248	26.5	46.7	66.0	92.5	34.4	39.3	40.9	41.4

tions in the percent distribution by age showed no significant difference from year to year.

Source of payment

Medicare, which is primarily for those 65 years of age and over, was the expected source of payment for approximately 42 percent of all CAT scans performed in short-stay non-Federal hospitals between the years 1979 and 1982, while private insurance was the expected source of payment for about 9 percent (table 2). Medicaid was the expected source of ayment for about 7 percent of the CAT scans, while other payments and self-pay accounted for about 5 percent each. Workmen's compensation accounted for the remaining 2 percent. There was no significant difference in expected source of payment from year to year.

Geographic division

The Middle Atlantic Division recorded the largest number of CAT scan procedures (433,000) performed on patients during the period 1979–82, while the Mountain Division recorded the smallest number of CAT scans about 30,000 (table 3). For most years rates per 10,000 population were highest in the West North Central Division and lowest in the West South Central and Mountain Divisions. In 1982 the rates ranged from

Table 2. Number and percent distribution of CAT scans for patients discharged from short-stay non-Federal hospitals by expected source of payment: United States, 1979–82

Expected source of payment	1979	1980	1981	1982	1979	1980	1981	1982
	Number in thousands				Percent			
All sources	194	306	424	600	100.0	100.0	100.0	100.0
Blue Cross and other private insurance	76	124	161	239	39.1	40.4	38.1	39.9
Medicare	69	129	184	261	35.5	42.0	43.4	43.5
Medicaid	13	21	29	37	6.6	6.8	6.9	6.1
Self-pay	11	17	21	29	5.9	5.6	5.0	4.8
Workmen's compensation	*	*	11	16	*	*	2.5	2.7
Other payments	24	13	17	17	12.2	4.1	4.0	2.9

Table 3. Number, rate, and percent distribution of CAT scans for patients discharged from short-stay non-Federal hospitals by geographic divisions: United States, 1979–82

Geographic division	1979	1980	1981	1982	1979	1980	1981	1982	1979	1980	1981	1982
	Number in thousands				Rate per 10,000 population				Percent			
All divisions	194	306	424	600	8.7	13.6	18.6	26.1	100.0	100.0	100.0	100.0
New England	*5	11	17	27	*4.3	8.7	13.7	21.7	*2.8	3.5	4.0	4.5
Middle Atlantic	50	78	117	188	13.5	21.3	31.8	51.1	26.0	25.6	27.6	31.4
ast North Central	20	29	45	39	4.7	7.0	10.8	9.5	10.2	9.5	10.6	6.6
/est North Central	27	57	71	100	15.7	33.1	41.6	57.8	14.0	18.5	16.8	16.6
South Atlantic	19	34	67	95	5.4	9.2	18.1	25.2	9.8	11.1	15.9	15.8
East South Central	*7	17	17	17	*4.7	11.4	11.8	11.5	*3.5	5.5	4.1	2.8
West South Central	*7	*8	16	20	*3.1	*3.6	6.5	8.0	*3.6	*2.8	3.7	3.3
Mountain	*	*	*8	17	*	*	*6.5	6.6	*	*	*1.8	2.8
Pacific	55	70	66	97	17.8	22.1	20.6	29.8	28.2	22.8	15.5	16.2

6.6 per 10,000 population for the Mountain Division to 57.8 per 10,000 population for the West North Central Division. The differences in the CAT scan rates could not be attributed to the age differences in the population.

Size of hospital

The number and percent of CAT scans performed during the period 1979–82 were lowest in hospitals with less than 100 beds (3 percent in 1982) and largest in hospitals with more than 500 beds (39 percent in 1982) (table 4). In comparison, for all procedures, 11 percent were performed in hospitals with less than 100 beds and 29 percent in hospitals with more than 500 beds. One possible reason for the small number of CAT scan procedures performed in the smallest hospitals may be that CAT scanners are quite expensive and require trained personnel to operate them. Small hospitals often do not have the resources in personnel or finances to purchase and operate them. The standards in the "National guidelines for health planning," which were in effect until November 1982,[15,16] also tended to discourage smaller hospitals from purchasing this equipment. The target of 2,500 patient procedures per year for efficient utilization requires a larger patient population than is available in many smaller hospitals.

Hospital ownership

During the period 1979–82, 1,141,000 CAT scans (75 percent) were performed in nonprofit hospitals; 321,000 (21 percent) were performed in State or local government hospitals; the remaining 4 percent were performed in proprietary hospitals (table 5). Within the 4 years there was no significant shift by hospital ownership in the percent of CAT scans performed.

Anatomical site

Of the 1,524,000 CAT scans performed during the period 1979–82, 921,000 (60 percent) were scans of the head (table 6). This is not surprising because head scanners were the first scanners introduced, and the head is the area of the body where this type of noninvasive procedure is most useful. Head scans are used to determine the extent of brain tumors and whether they are operable, and the extent of stroke damage to ascertain the feasibility of cleaning up the stroke debris. The other area of the body where CAT scanning is quite common is the abdomen. There were 180,000 (12 percent) performed on the abdomen.

Of the 600,000 CAT scans performed during 1982, 359,000 were scans of the head (table 7). Of these 359,000

Table 4. Number and percent distribution of CAT scans for patients discharged from short-stay non-Federal hospitals by bed size: United States, 1979–82

Bed size	*1979*	*1980*	*1981*	*1982*	*1979*	*1980*	*1981*	*198*
	Number in thousands				Percent			
All sizes	194	306	424	600	100.0	100.0	100.0	100.0
6–99 beds	*	*7	18	16	*	*2.2	4.4	2.7
100–199 beds	32	53	63	93	16.6	17.2	14.8	15.5
200–299 beds	20	30	51	98	10.3	9.9	12.0	16.4
300–499 beds	51	73	107	158	26.4	23.7	25.2	26.4
500 or more beds	90	144	185	234	46.2	47.0	43.6	39.0

Table 5. Number and percent distribution of CAT scans for patients discharged from short-stay non-Federal hospitals by type of ownership: United States, 1979–82

Type of ownership	*1979*	*1980*	*1981*	*1982*	*1979*	*1980*	*1981*	*1982*
	Number in thousands				Percent			
All hospitals	194	306	424	600	100.0	100.0	100.0	100.0
Nonprofit	140	228	306	467	72.2	74.5	72.0	77.8
Proprietary	10	15	16	21	5.0	4.9	3.8	3.6
State and local government	44	63	102	112	22.8	20.7	24.1	18.6

Table 6. Number, rate, and percent distribution of CAT scans by site of scan for patients discharged from short-stay non-Federal hospitals: United States, 1979–82

Site of CAT scan	*1979*	*1980*	*1981*	*1982*	*1979*	*1980*	*1981*	*1982*	*1979*	*1980*	*1981*	*1982*
	Number in thousands				Rate per 10,000 population				Percent distribution			
All CAT scans	194	306	424	600	8.7	13.6	18.6	26.1	100.0	100.0	100.0	100.0
Head	106	190	266	359	4.7	8.4	11.7	15.6	54.6	62.1	62.7	59.8
Abdomen	15	32	56	77	0.7	1.4	2.4	3.4	7.7	10.5	13.2	12.8
Other specified	*	*8	11	23	*	*0.3	0.5	1.0	*	*2.6	2.6	3.8
Other unspecified	69	75	91	141	3.1	3.3	4.0	6.1	35.6	24.5	21.5	23.5

Table 7. Number and percent of CAT scans, by sites of scans and principal diagnoses for patients discharged from short-stay non-Federal hospitals: United States, 1982

Site of CAT scan and diagnosis and ICD–9–CM code[1]	*Number in thousands*	*Percent*
All head scans	359	100.0
Cerebrovascular disease 400–438	82	22.9
Malignant neoplasm 140–208	29	8.1
Concussion and intracranial injury 850–854	23	6.5
Heart disease 391–392, 393–398, 402, 404, 410, 416, 420–429	20	5.6
All abdomen scans	77	100.0
Malignant neoplasm 140–208	20	26.2

[1]U.S. Public Health Service and Health Care Financing Administration: *International Classification of Diseases, 9th Revision, Clinical Modification.* DHHS Pub. No. (PHS) 80–1260. Public Health Service. Washington. U.S. Government Printing Office, Sept. 1980.

head scans, 82,000 were for cerebrovascular disease, 29,000 were for malignant neoplasm, 23,000 were for concussion and intracranial injury, and 20,000 were for heart disease. The other anatomical site where there were significant numbers of scans was the abdomen. There were 77,000 scans of the abdomen during 1982, and, of these, 20,000 were for suspected neoplasm.

Diagnosis

The two leading diagnostic groups for which CAT scans were performed were circulatory diseases (150,000 or 25 percent) and neoplasms (82,000 or 14 percent) (table 8).

Of the 150,000 CAT scans performed on the circulatory system, 96,000, or 64 percent, were performed for cerebrovascular disease; of the 82,000 CAT scans performed because of suspected neoplasms, 71,000 or 86 percent were for suspected malignancy. Other leading diagnoses were injury and poisoning (68,000) and diseases of the nervous system and sense organs (60,000).

Table 8. Number and percent distribution of CAT scans by all-listed diagnoses and ICD–9–CM codes for patients discharged from short-stay non-Federal hospitals: United States, 1982

Diagnosis and ICD–9–CM code[1]	*Number in thousands*	*Percent distribution*
All CAT scans	600	100.0
Infectious and parasitic diseases 001–139	12	2.1
Neoplasms 140–239	82	13.7
Endocrine, nutritional, and metabolic diseases and immunity disorders 240–279	22	3.7
Diseases of the blood and blood-forming organs 280–289	*5	*0.9
Mental disorders 290–319	40	6.7
Diseases of the nervous system and sense organs 320–389	60	10.0
Diseases of the circulatory system 390–459	150	24.9
Diseases of the respiratory system 460–519	19	3.1
Diseases of the digestive system 520–579	39	6.5
Diseases of the genitourinary system 580–629	16	2.7
Complications of pregnancy, childbirth, and the puerperium 630–676	*	*
Diseases of the skin and subcutaneous tissue 680–709	*	*
Diseases of the musculoskeletal system 710–739	50	8.4
Congenital anomalies 740–759	*7	*1.1
Certain conditions originating in the perinatal period 760–779	*	*
Symptoms, signs, and ill-defined conditions 780–799	20	3.3
Injury and poisoning 800–899	68	11.3
Supplementary classifications V01–V82	*5	*0.9

[1]U.S. Public Health Service and Health Care Financing Administration: *International Classification of Diseases, 9th Revision, Clinical Modification.* DHHS Pub. No. (PHS) 80–1260. Public Health Service. Washington. U.S. Government Printing Office, Sept. 1980.

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 standards of reliability or precision
#	Figure suppressed to comply with confidentiality requirements

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No. 98. Diagnosis-related groups using data from the National Hospital Discharge Survey: United States, 1981 (Issued July 20, 1984)

No. 97. The Management of New Pain in Office-Based Ambulatory Care: National Ambulatory Medical Care Survey, 1980 and 1981 (Issued June 13, 1984)

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No. 95. 1982 Summary: National Hospital Discharge Survey (Issued December 27, 1983)

Technical notes

Source of data

The National Hospital Discharge Survey (NHDS) encompasses patients discharged from short-stay hospitals, exclusive of military and Veterans Administration hospitals, located in the 50 States and the District of Columbia. Only hospitals with six or more beds and an average length of stay of less than 30 days for all patients are included in the survey. Discharges of newborn infants are excluded from this report.

The universe of the survey consisted of 6,965 short-stay hospitals contained in the 1963 Master Facility Inventory of Hospitals and Institutions. New hospitals were sampled for inclusion in the survey in 1972, 1975, 1977, 1979, and 1981. In all, 550 hospitals were sampled in 1982. Of these hospitals, 71 refused to participate, and 53 were out of scope. The 426 participating hospitals provided approximately 214,000 abstracts of medical records.

Sample design

All hospitals with 1,000 or more beds in the universe of short-stay hospitals were selected with certainty in the sample. All hospitals with fewer than 1,000 beds were stratified, the primary strata being 24 size-by-region classes. Within each of these 24 primary strata, the allocation of the hospitals was made through a controlled selection technique so that hospitals in the sample would be properly distributed with regard to type of ownership and geographic division. Sample hospitals were drawn with probabilities ranging from certainty for the largest hospitals to 1 in 40 for the smallest hospitals.

Sample discharges were selected within the hospitals using the daily listing sheet of discharges as the sampling frame. These discharges were selected by a random technique, usually on the basis of the terminal digit or digits of the patient's medical record number, a number assigned when the patient was admitted to the hospital. The within-hospital sampling ratio for selecting sample discharges varied inversely with the probability of selection of the hospital.

Data collection and estimation

The sample selection and the transcription of information from the hospital records for abstract forms were performed by the hospital staff or by representatives of the National Center for Health Statistics or by both. The data were abstracted from the face sheets of the medical records. All discharge diagnoses and procedures were listed on the abstract in the order of the principal one, or the first-listed one if the principal one was not identified, followed by the order in which all other diagnoses or procedures were entered on the face sheet of the medical record.

Statistics produced by the NHDS are derived by a complex estimating procedure. The basic unit of estimation is the sample inpatient discharge abstract. The estimating procedure used to produce essentially unbiased national estimates in the NHDS has three principal components: inflation by reciprocals of the probabilities of sample selection, adjustment for nonresponse, and ratio adjustment to fixed totals. These components of estimation are described in appendix I of two earlier publications.[20,21]

Sampling errors and rounding of numbers

The standard error is a measure of the sampling variability that occurs by chance because only a sample, rather than an entire universe, is surveyed. The relative standard error of the estimate is obtained by dividing the standard error by the estimate itself and is expressed as a percent of the estimate. Relative standard errors for procedures are shown in table I.

Estimates have been rounded to the nearest thousand. For this reason detailed figures within tables do not always add to the totals. Rates and average lengths of stay were calculated from original unrounded figures and will not necessarily agree precisely with rates or average lengths of stay calculated from rounded data.

Tests of significance

In this report, the determination of statistical inference is based on the two-tailed Bonferroni test for multiple comparisons. Terms relating to differences such as "higher" and "less" indicate that the differences are statistically significant. Terms such as "similar" or "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 to be not significant.

Definition of terms

Hospitals and hospital characteristics

Hospitals—Short-stay special and general hospitals have six or more beds for inpatient use and an average length of stay of less than 30 days. Federal hospitals and hospital units of institutions are not included.

Table I. Approximate relative standard errors of estimated numbers of all-listed procedures: United States, 1982

Size of estimate	*Relative standard error*
5,000	15.4
10,000	13.7
25,000	11.5
50,000	10.2
100,000	9.2
500,000	7.4
1,000,000	6.8
3,000,000	6.1
5,000,000	5.8
10,000,000	5.4
15,000,000	5.2
20,000,000	5.1
25,000,000	5.0

NOTE: A list of references follows the text.

Bed size of hospital—Measured by the number of beds, cribs, and pediatric bassinets regularly maintained (set up and staffed for use) for patients; bassinets for newborn infants are not included. In this report the classification of hospitals by bed size reported by the hospitals is based on the number of beds at or near midyear.

Type of ownership of hospital—Determined by the organization that controls and operates the hospital. Hospitals are grouped as follows:

- *Voluntary nonprofit*—Hospitals operated by a church or another nonprofit organization.
- *Government*—Hospitals operated by a State or local government.
- *Proprietary*—Hospitals operated by individuals, partnerships, or corporations for profit.

Procedure—One or more surgical or nonsurgical operations, procedures, or special treatments assigned by the physician to patients discharged from the inpatient service of short-stay hospitals. In the NHDS all terms listed on the face sheet (summary sheet) of the medical record under the captions "operation," "operative procedures," "operations and/or special treatment," and the like are transcribed in the order listed. A maximum of four procedures are coded.

Rate of procedures—The ratio of the number of all-listed procedures during a year to the number of persons in the civilian population on July 1 of that year.

Demographic terms

Age—Refers to the age of the patient on the birthday prior to admission to the hospital inpatient service.

Census division—One of the nine geographic divisions of the United States corresponding to those used by the Bureau of the Census:

Division	*States included*
New England	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
Middle Atlantic	New Jersey, New York, Pennsylvania
South Atlantic	Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia
East North Central	Illinois, Indiana, Michigan, Ohio, Wisconsin
East South Central	Alabama, Kentucky, Mississippi, Tennessee
West North Central	Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
West South Central	Arkansas, Louisiana, Oklahoma, Texas
Mountain	Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming
Pacific	Alaska, California, Hawaii, Oregon, Washington

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National Center for Health Statistics
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