

PROPERTY OF THE
PUBLICATIONS BRANCH
EDITORIAL LIBRARY

Diagnosis-Related Groups Using Data From the National Hospital Discharge Survey: United States, 1982

by Robert Pokras and Kurt K. Kubishke, Division of Health Care Statistics

Introduction

This report presents selected estimates for 1982 of diagnosis-related groups (DRG) based on data from the National Hospital Discharge Survey (NHDS). A similar report has been published for 1981.¹ The current plan is to publish reports on DRG's regularly because they determine the reimbursement rates of Medicare inpatients, about 30 percent of all discharges from short-stay non-Federal hospitals.²

Developed at the Yale School of Organization and Management, DRG's are being used by the Health Care Financing Administration, some States, and some third party payers to reimburse hospitals for inpatient care on a prospective basis.³ This approach to health care reimbursement operates on the principle that patients with similar medical conditions should receive similar care and use approximately the same amount of resources; therefore, in general a hospital should be reimbursed the same amount for each patient in a DRG. While there is variation in resource consumption among individuals within a DRG, these are expected to balance across all patients.

DRG's were developed under the guiding principle that "The primary objective in the construction of DRG's was a definition of case type, each of which could be expected to receive similar outputs or services from a hospital."⁴ Their formulation was accomplished using clinical judgment and statistical procedures that classify patients by measuring resource utilization. The first step in this process was to cluster the universe of medical diagnoses into broad, mutually exclusive categories. These groups were formed to be consistent in their anatomical or physiopathological classification, or in a manner in which they are clinically managed. Once these major diagnostic groups were formed, an interactive statistical program (AUTOGROUP⁴) was used to further classify each major group into discrete DRG's. This process incorporated patient information regarding diagnoses (primary and secondary),

procedures, sex, and age to explain maximally a patient's length of stay. In all, there currently are 470 DRG's.

Prospective reimbursement was authorized under the Tax Equity and Fiscal Responsibility Act of 1983. Under this act hospitals participating in the Medicare program were brought into this system beginning with their fiscal year as of October 1, 1983. The Health Care Financing Administration, which operates the Medicare program, is allowing several years for hospitals to make a transition to prospective reimbursement by adjusting DRG payments based on certain hospital characteristics and geographic location. At the end of this phase-in period, care provided to a Medicare inpatient will translate into a pre-established payment based solely on the patient's DRG.

There is an important issue related to the NHDS and the implementation of this prospective reimbursement system: how this system may affect the selection of a patient's principal diagnosis and/or comorbidities. Because the NHDS is designed to collect data on the morbidity of the hospital inpatient population, any external influence on diagnostic practices may affect NHDS data. For example, two patients admitted to a hospital for treatment of chest pain—one diagnosed as having chest pain and the other diagnosed as having angina—will be placed into different DRG's and have different reimbursement rates. There is speculation that in cases such as this prospective reimbursement may influence the selection of a diagnosis,³ which in turn may affect estimates produced from the NHDS. After prospective payment has been in place for a few years, it may be possible to examine trends in NHDS data and determine the magnitude, if any, of this type of effect.

The statistics in this report are based on data collected by means of the NHDS, a continuous survey conducted by the National Center for Health Statistics since 1965. Data for this survey are sampled from short-stay non-Federal general and specialty hospitals in the 50 States and the District of Columbia. The sample for 1982 contained approximately 214,000 medical

records from 426 hospitals. The relevant variables required to produce DRG's (diagnoses, procedures, sex, age, and other variables) were abstracted from the face sheet of each sampled medical record, and NHDS data thereby could be used to produce national estimates of DRG's. These estimates may be of value for hospitals to compare their experience with that of other hospitals. For this reason, statistics in this report are frequency estimates and associated average length of stay for DRG's by hospital bed size and region of the country.

Highlights

The frequency and average length of stay for the most common DRG's are presented by age, region of the country, and hospital bed size (tables 1-4). Age is dichotomized as under 65 years of age and 65 years of age and older. This

allows a comparison with the Medicare population because Medicare covers most hospital costs for approximately 94 percent of discharges 65 years of age and over. Tables 1 and 2 provide regional data, while tables 3 and 4 provide bed-size data for these DRG's. Within each of these sets of tables, the first (tables 1 and 3) are for patients under 65 years of age, and the second (tables 2 and 4) are for patients 65 years of age and over.

By definition, some DRG's are only for patients in a specific age range. In such a case the DRG title and the table title (tables 1-4) together define the age group of the estimate. That is, the most restrictive case of either the table or DRG title determines the age group of the estimate. For example, "Diabetes, age greater than 35 years" in table 2 only refers to patients 65 years of age and over because of the table title; whereas, "Simple pneumonia and pleurisy, age greater than 69 years

Table 1. Number of discharges and average length of stay of patients under 65 years of age discharged from short-stay hospitals, by selected diagnosis-related groups and geographic regions: United States, 1982

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

Diagnosis-related group	All regions					Average length of stay in days				
	Number in thousands	North	Central	South	West	North	Central	South	West	
All discharges	27,896	5,564	7,929	9,804	4,598	5.9	6.5	6.3	5.6	5.0
Vaginal delivery without complicating diagnoses	2,784	524	765	937	559	2.9	3.4	3.3	2.7	2.2
Medical back problems	790	121	245	298	125	7.2	9.0	7.3	6.8	6.0
Esophagitis, gastroenteritis, and miscellaneous digestive disorders, age 18-69 years without substantial comorbidity and/or complication	673	97	178	320	78	4.1	4.5	4.2	4.2	3.3
Cesarean section without substantial comorbidity and/or complication	649	125	145	258	121	5.7	6.7	6.2	5.3	4.8
Nonradical hysterectomy, age less than 70 years without substantial comorbidity and/or complication	495	70	128	212	85	7.2	7.9	7.6	7.1	6.2
Unrelated operating room procedures	401	75	116	145	65	11.2	13.8	12.0	9.7	10.1
Esophagitis, gastroenteritis, and miscellaneous digestive disorders, age 0-17 years	392	69	111	173	39	3.8	3.9	3.8	3.8	3.3
Psychoses	388	95	118	108	68	16.5	19.1	19.7	13.8	11.6
Alcohol- and substance-induced organic mental syndrome	360	157	90	68	45	10.6	9.8	11.9	10.7	10.9
Dilation and curettage of uterus; conization except for malignancy	345	111	85	118	32	1.8	1.7	1.9	2.0	1.2
Abortion with dilation and curettage of uterus	325	136	65	86	39	1.3	1.0	1.7	1.5	1.1
Bronchitis and asthma, age 0-17 years	313	65	96	118	34	3.9	4.6	3.8	3.8	3.3
Simple pneumonia and pleurisy, age 0-17 years	279	36	86	131	28	4.7	5.3	5.0	4.6	4.1
Tonsillectomy and/or adenoidectomy, age 0-17 years	279	43	106	83	48	1.8	1.7	1.9	2.1	1.2
Inguinal and femoral hernia procedures, age 18-69 years without substantial comorbidity and/or complication	271	76	74	80	42	4.2	4.0	4.4	4.7	3.0
Diabetes, age greater than 35 years	259	52	72	104	30	8.2	9.9	8.7	7.4	6.4
Vaginal delivery with sterilization and/or dilation and curettage of uterus	247	44	57	110	37	3.6	4.2	4.1	3.3	2.8
Other factors influencing health status	242	53	68	75	46	3.5	3.6	3.8	3.2	3.4
Total cholecystectomy with common bile duct exploration, age less than 70 years without substantial comorbidity and/or complication	233	48	63	83	39	7.8	8.1	7.9	8.1	6.7
Bronchitis and asthma, age 18-69 years without substantial comorbidity and/or complication	227	45	62	81	38	5.3	5.9	5.8	4.9	4.6

Table 2. Number of discharges and average length of stay of patients 65 years of age and over discharged from short-stay hospitals, by selected diagnosis-related groups and geographic regions: United States, 1982

[Excludes discharges from non-Federal short-stay hospitals. Excludes newborn infants]

Diagnosis-related group	All regions					Average length of stay in days				
	All regions	Northeast	North Central	South	West	All regions	Northeast	North Central	South	West
	Numbers in thousands					Average length of stay in days				
All discharges	10,697	2,283	3,008	3,631	1,774	10.1	12.3	10.3	9.4	8.2
Lens procedures	429	81	127	119	102	2.9	3.0	3.3	3.0	2.4
Atherosclerosis, age greater than 69 years and/or substantial comorbidity and complication	427	99	109	157	62	8.7	10.9	9.0	8.2	6.3
Heart failure and shock.	387	88	108	132	59	9.7	11.8	10.3	8.8	7.7
Esophagitis, gastroenteritis, and miscellaneous digestive disorders, age greater than 69 years and/or substantial comorbidity and complication	376	63	102	169	42	6.7	8.3	6.9	6.3	5.8
Chronic obstructive pulmonary disease.	300	54	76	117	54	9.8	11.9	10.2	8.8	9.2
Specific cerebrovascular disorders except transient ischemic attack	295	64	76	103	52	15.4	20.4	16.2	13.2	12.2
Simple pneumonia and pleurisy, age greater than 69 years and/or substantial comorbidity and complication	276	51	80	106	38	10.7	11.8	10.6	10.7	9.5
Unrelated operating room procedures.	226	59	65	72	29	17.3	20.0	17.5	15.8	15.0
Diabetes, age greater than 35 years	208	49	56	77	24	10.0	13.9	9.7	8.4	8.1
Angina pectoris.	195	49	47	67	32	6.6	8.0	6.4	6.6	4.9
Medical back problems	186	38	58	63	27	9.3	11.5	9.7	7.7	8.8
Cardiac arrhythmia and conduction disorders, age greater than 69 years and/or substantial comorbidity and complication	181	35	51	65	30	7.1	9.1	7.2	7.1	4.8
Circulatory disorders with acute myocardial infarction without cardiovascular complications, discharged alive	174	44	44	62	24	12.2	13.6	12.9	11.8	9.4
Hypertension.	158	28	43	70	17	7.9	8.8	7.7	7.6	8.4
Transient ischemic attacks.	155	39	42	52	22	7.6	9.6	7.8	7.3	4.3
Bronchitis and asthma, age greater than 69 years and/or substantial comorbidity and complication	148	22	38	59	29	8.3	9.2	8.0	8.3	8.0
Transurethral prostatectomy, age greater than 69 years and/or substantial comorbidity and complication	144	29	42	45	28	9.3	11.1	9.5	9.4	6.8
Kidney and urinary tract infections, age greater than 69 years and/or substantial comorbidity and complication	142	23	34	67	17	8.5	9.9	8.8	8.1	7.1
Respiratory neoplasms	137	36	34	43	24	10.9	11.0	11.9	11.2	9.0
Hip and femur procedures except major joint, age greater than 69 years and/or substantial comorbidity and complication	135	27	45	38	25	19.5	25.1	19.9	18.5	14.3

and/or substantial comorbidity and complication” in table 2 would not include a patient under 70 years of age because of the restriction in the DRG title.

The most common DRG for patients under 65 years of age was “Vaginal delivery without complicating diagnoses” (table 1), with an estimated 2.8 million discharges in 1982. “Cesarean section without substantial comorbidity and/or complication,” with 649,000 discharges, also was among the most frequent DRG’s in this age group. For patients 65 years of age and older (table 2), “Lens procedures” was the most common DRG, 429,000, and “Atherosclerosis, age greater than 69 years and/or substantial comorbidity and complication,” 427,000, was the second most common DRG for the elderly.

The average length of stay for specific DRG’s in the four

regions of the country generally reflects the pattern found for all patients: the Northeast and North Central have the longest average length of stay and the West has the shortest. Regional length-of-stay differences were greater for patients 65 years of age or more than for younger patients. The West had an average length of stay of 5.0 days for patients under 65 years of age, and the Northeast had an average length of stay of 6.5 days, a difference of 1.5 days, or 30 percent greater. For older patients, however, the Northeast had an average length of stay 4.1 days greater than the elderly patients in the West (12.3 versus 8.2 days), a difference of 50 percent.

Overall there was a tendency for length of stay to increase with hospital bed size (table 3 and 4) for patients under 65 years of age as well as for older patients, but this pattern is not

Table 3. Number of discharges and average length of stay of patients under 65 years of age discharged from short-stay hospitals, by selected diagnosis-related groups and hospital bed size: United States, 1982

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

Diagnosis-related group	Number in thousands						Average length of stay in days					
	All hospitals	6-99 beds	100-199 beds	200-299 beds	300-399 beds	500 or more beds	All hospitals	6-99 beds	100-199 beds	200-299 beds	300-399 beds	500 or more beds
All discharges	27,896	4,664	4,906	4,459	6,909	6,958	5.9	4.5	5.3	5.7	6.2	6.8
Vaginal delivery without complicating diagnoses	2,784	425	466	433	700	759	2.9	2.4	2.8	2.8	3.1	3.2
Medical back problems	790	170	137	150	185	149	7.2	6.3	7.0	7.5	7.6	7.6
Esophagitis, gastroenteritis, and miscellaneous digestive disorders, age 18-69 years without substantial comorbidity and/or complication	673	191	116	115	143	108	4.1	3.3	4.3	4.6	4.2	4.8
Cesarean section without substantial comorbidity and/or complication	649	75	123	93	175	183	5.7	5.4	5.2	5.5	5.8	6.1
Nonradical hysterectomy, age less than 70 years without substantial comorbidity and/or complication	495	51	111	80	126	125	7.2	7.1	6.5	7.4	7.3	7.5
Unrelated operating room procedures	401	50	65	65	98	123	11.2	6.9	7.7	12.8	13.0	12.5
Esophagitis, gastroenteritis, and miscellaneous digestive disorders, age 0-17	392	82	97	60	78	75	3.8	2.7	3.7	3.8	4.0	4.8
Psychoses	388	34	74	40	137	103	16.5	12.0	14.5	15.1	15.8	20.9
Alcohol- and substance-induced organic mental syndrome	360	105	59	39	97	60	10.6	9.6	13.5	12.9	9.9	9.4
Dilation and curettage of uterus; conization except for malignancy	345	56	78	43	81	87	1.8	1.8	1.7	2.1	1.9	1.9
Abortion with dilation and curettage of uterus	325	36	68	41	78	102	1.3	1.6	1.4	1.5	1.2	1.1
Bronchitis and asthma, age 0-17 years	313	59	79	50	70	56	3.9	3.4	3.8	4.5	4.1	3.8
Simple pneumonia and pleurisy, age 0-17 years	279	85	63	48	49	35	4.7	4.1	4.9	5.0	5.2	4.9
Tonsillectomy and/or adenoidectomy, age 0-17 years	279	52	55	63	68	41	1.8	1.6	1.8	1.9	1.7	1.9
Inguinal and femoral hernia procedures, age 18-69 years without substantial comorbidity and/or complication	271	40	50	45	72	64	4.2	4.2	3.9	4.4	4.2	4.2
Diabetes, age greater than 35 years	259	57	43	53	56	50	8.2	6.2	7.2	8.2	9.4	9.7
Vaginal delivery with sterilization and/or dilation and curettage of uterus	247	47	47	41	47	65	3.6	3.4	3.3	3.5	3.7	3.8
Other factors influencing health status	242	35	38	39	58	73	3.5	3.1	4.0	3.5	3.6	3.4
Total cholecystectomy with common bile duct exploration, age less than 70 years without substantial comorbidity and/or complication	233	44	41	34	65	48	7.8	7.2	7.5	8.4	8.4	7.4
Bronchitis and asthma, age 18-69 years without substantial comorbidity and/or complication	227	60	37	38	45	46	5.3	4.8	5.3	5.0	5.7	5.8

consistent for some of the individual DRG's for which average length of stay in small and medium-size hospitals is equal to or greater than the average length of stay in large hospitals (500 or more beds).

The average length of stay associated with a DRG (tables

1-4) allows hospitals to compare their experience with that of other hospitals. While comparison is tenuous on a case-by-case basis, a hospital with an average length of stay 2, 3, or more days longer than the national average for a specific DRG may need to examine why it is so far from the norm. This kind

Table 4. Number of discharges and average length of stay of patients 65 years of age or over discharged from short-stay hospitals, by selected diagnosis-related groups and hospital bed size: United States, 1982

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

Diagnosis-related group	Number in thousands						Average length of stay in days					
	All hospitals	6-99 beds	100-199 beds	200-299 beds	300-399 beds	500 or more beds	All hospitals	6-99 beds	100-199 beds	200-299 beds	300-399 beds	500 or more beds
All discharges	10,697	2,172	1,832	1,907	2,638	2,148	10.1	8.1	9.6	10.2	10.8	11.5
Lens procedures	429	32	94	85	118	99	2.9	2.9	3.0	2.6	3.0	3.1
Atherosclerosis, age greater than 69 years and/or substantial comorbidity and complication	427	90	87	80	107	63	8.7	7.3	8.1	8.8	9.6	10.2
Heart failure and shock	387	113	70	68	82	54	9.7	8.1	9.3	10.5	10.8	11.0
Esophagitis, gastroenteritis, and miscellaneous digestive disorders, age greater than 69 years and/or substantial comorbidity and complication	376	123	60	64	78	51	6.7	5.6	7.2	6.9	8.3	6.5
Chronic obstructive pulmonary disease	300	76	48	58	71	48	9.8	8.1	9.5	10.7	10.6	10.5
Specific cerebrovascular disorders except transient ischemic attack	294	66	54	60	63	50	15.4	11.2	15.8	16.1	14.9	20.1
Simple pneumonia and pleurisy, age greater than 69 years and/or substantial comorbidity and complication	276	98	45	42	56	36	10.7	9.3	10.9	11.7	11.8	11.6
Unrelated operating room procedures	226	29	42	45	58	52	17.3	14.1	17.3	16.0	17.5	19.9
Diabetes, age greater than 35 years	208	50	37	44	44	33	10.0	8.2	9.2	10.3	10.9	12.1
Angina pectoris	195	54	34	40	44	23	6.6	5.9	6.3	6.3	7.6	7.4
Medical back problems	186	45	33	36	41	31	9.3	7.8	8.3	8.5	11.6	10.2
Cardiac arrhythmia and conduction disorders, age greater than 69 years and/or substantial comorbidity and complication	181	49	31	33	37	30	7.1	5.7	6.6	7.8	7.8	8.5
Circulatory disorders with acute myocardial infarction without cardiovascular complications, discharged alive	174	35	27	31	46	35	12.2	11.2	11.6	12.1	12.9	12.9
Hypertension	158	39	31	29	27	32	7.9	6.2	7.3	9.3	7.7	9.6
Transient ischemic attacks	155	36	34	30	32	24	7.6	5.5	7.5	7.6	9.7	8.2
Bronchitis and asthma, age greater than 69 years and/or substantial comorbidity and complication	148	47	31	25	28	17	8.3	6.9	9.6	8.7	8.8	8.2
Transurethral prostatectomy, age greater than 69 years and/or substantial comorbidity and complication	144	14	31	27	38	33	9.3	9.2	8.3	10.2	9.2	9.5
Kidney and urinary tract infections, age greater than 69 years and/or substantial comorbidity and complication	142	48	26	20	31	18	8.5	7.2	9.2	8.5	9.2	9.4
Respiratory neoplasms	137	22	19	19	40	37	10.9	7.7	10.8	10.0	11.8	12.4
Hip and femur procedures except major joint, age greater than 69 years and/or substantial comorbidity and complication	135	16	23	24	40	32	19.5	18.3	18.1	17.9	20.3	21.3

of comparison may be worthwhile as a starting point, but even within a DRG, average length of stay is not an exact measure of resource consumption.

The change to prospective payment for Medicare inpatient

reimbursement is likely to affect areas such as cost savings, quality of care, medical records keeping, and certain areas of medical practice. However, for at least two reasons data currently available on DRG's from the NHDS (this report and a

similar report using 1981 data¹) should not be used to evaluate the success of prospective payment. First, the prospective payment program was not implemented until October 1983, and, second, historical trends must be studied to shed light on short-term changes in hospital utilization.

For example, from 1981 to 1982 average length of stay decreased 0.4 days for patients 65 years of age and over, and

some specific DRG's also showed a reduction in average length of stay. However, length of stay in short-stay non-Federal hospitals has been decreasing for over a decade (the average length of stay for patients 65 years of age and over was 12.2 days in 1972⁵ compared with 10.1 days in 1982), and it will take more time to understand the effects prospective payment will have, if any, on hospital utilization.

References

¹National Center for Health Statistics, R. Pokras: Diagnosis-related groups using data from the National Hospital Discharge Survey. United States, 1981. *Advance Data From Vital and Health Statistics*. No. 98. DHHS Pub. No. (PHS) 84-1250. Public Health Service. Hyattsville, Md., July 20, 1984.

²National Center for Health Statistics, E. J. Graves: Utilization of short-stay hospitals, United States, 1982 Annual Summary. *Vital and Health Statistics*. Series 13, No. 78. DHHS Pub. No. (PHS) 84-1739. Public Health Service. Washington. U.S. Government Printing Office, Aug. 1984.

³J. Alsofrom: Playing the numbers. *Medical World News*, Oct. 24, 1983, pp. 38-55.

⁴R. B. Fetter, S. Youngsoo, J. L. Freeman, and others: Case mix definition by diagnostic related groups. *Medical Care* 18(2), Supplement. (Copyright 1980: Used with the permission of *Medical Care*.)

⁵National Center for Health Statistics, W. F. Lewis: Utilization of short-stay hospitals, summary of nonmedical statistics, United States, 1972. *Vital and Health Statistics*. Series 13, No. 19. DHEW Pub. No. (HRA) 75-1770. Health Resources Administration. Washington. U.S. Government Printing Office, June 1975.

⁶National Center for Health Statistics, M. G. Sirken: Utilization of short-stay hospitals, summary of nonmedical statistics, United States,

1965. *Vital and Health Statistics*. Series 13, No. 2. PHS Pub. No. 1000. Public Health Service. Washington. U.S. Government Printing Office, Aug. 1967.

⁷National Center for Health Statistics, M. J. Witkin: Utilization of short-stay hospitals by characteristics of discharged patients, United States, 1965. *Vital and Health Statistics*. Series 13, No. 3. PHS Pub. No. 1000. Public Health Service. Washington. U.S. Government Printing Office, Dec. 1967.

⁸National Center for Health Statistics, R. Pokras: Surgical and non-surgical procedures in short-stay hospitals, United States, 1979. *Vital and Health Statistics*. Series 13, No. 70. DHHS Pub. No. (PHS) 83-1731. Public Health Service. Washington. U.S. Government Printing Office, Feb. 1983.

⁹U.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.

¹⁰*Federal Register*. Vol. 48, No. 171, Part II, Rules and Regulations, Sept. 1, 1983.

Technical notes

Survey methodology

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, and 1981. The sample for 1982 consisted of 550 hospitals. Of these, 71 refused to participate and 53 were out of scope either because the hospital had gone out of business or because it failed to meet the definition of a short-stay hospital. Thus 426 hospitals partici-

pated in the survey during 1982 and 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 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 were entered on the face sheet of the medical record.

Statistics produced by 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 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.^{6,7}

Diagnosis-related groups

The diagnosis-related groups (DRG's) used in this report were produced using the most current DRG program available at the time (summer of 1983). This is a computer program that groups patients into DRG's based on diagnostic, surgical, and patient information. The program is maintained and is commercially available at Health Systems International (DRG Support Group, 100 Broadway, New Haven, Conn. 06511). However, the actual program used to produce estimates in this report was obtained from the Health Care Financing Administration.

To help interpret the data in this report, two points are worth mentioning. First, the entire NHDS file was used to produce estimates, including outliers. None of the data was excluded, or trimmed, because of an abnormally long length of stay. Second, the NHDS only codes three ICD-9-CM Class 4 procedures:^{8,9} circumcision, code 64.0; episiotomy, code 73.6; and removal of intrauterine contraceptive device, code 97.71. In certain instances Class 4 procedures can alter the DRG designation for a patient. The effect of not coding these procedures in the NHDS on determining DRG's is unknown, but probably quite small. In all other respects, the DRG's presented in this report are consistent with those in the *Federal Register* of Thursday, September 1, 1983.¹⁰

In publications from the National Center for Health Statistics using NHDS data, several schemes have been used to group patients into categories based on either their diagnoses or the procedures performed. These groups were developed to report general purpose statistics to the many users of NHDS data, and any similarity between the titles of those categories and DRG titles is coincidental.

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. Table I shows relative standard errors for discharges and first-listed diagnoses for 1982. The standard errors for average lengths of stay are shown in table II. Estimates have been rounded to the nearest thousand. For this reason detailed figures within tables do not always add to the totals.

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

Patient—A person who is formally admitted to the inpatient service of a short-stay hospital for observation, care, diagnosis, or treatment. In this report the number of patients refers to the number of discharges during the year, including any multiple discharges of the same individual from one or more short-stay hospitals.

Table I. Approximate relative standard errors of estimated number of discharges and first-listed diagnoses: United States, 1982

Size of estimate	Relative standard error
10,000	16.3
50,000	10.2
100,000	8.5
300,000	6.6
500,000	5.9
1,000,000	5.1
4,000,000	4.0

Table II. Approximate standard errors of average lengths of stay by number of discharges: United States, 1982

Number of discharges	Average length of stay in days			
	2	6	10	20
	Standard error in days			
10,000	0.7	1.2	1.7	2.2
50,000	0.3	0.7	1.0	1.4
100,000	0.3	0.6	0.9	1.2
500,000	0.2	0.5	0.8	0.9
1,000,000	0.2	0.5	0.8	0.7
5,000,000	0.2	0.5	0.8	...

NOTE: A list of references follows the text.

Average length of stay—The total number of patient days accumulated at time of discharge by patients discharged during the year divided by the number of patients discharged.

Age—Patient's age refers to age at birthday prior to admission to the hospital inpatient service.

Discharge—Discharge is the formal release of a patient by a hospital; that is, the termination of a period of hospitalization by death or by disposition to place of residence, nursing home, or another hospital. The terms "discharges" and "patients discharged" are used synonymously.

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
North Central. . .	Michigan, Ohio, Illinois, Indiana, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas

Region—Con.

States included—Con.

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

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

Bed size of hospital—Size is 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 is based on the number of beds at or near midyear reported by the hospitals.

Recent Issues of Advance Data From Vital and Health Statistics

No. 104. Fecundity and Infertility in the United States, 1965–82 (In preparation)

No. 103. Use of Services for Family Planning and Infertility: United States, 1982 (Issued Dec. 20, 1984)

No. 102. Use of Contraception in the United States: 1982 (Issued Dec. 4, 1984)

No. 101. 1983 Summary: National Hospital Discharge Survey (Issued Sept. 28, 1984)

No. 100. CAT Scan Use in Short-Stay Non-Federal Hospitals: United States, 1979–82 (Issued Sept. 28, 1984)

Suggested Citation

National Center for Health Statistics, R. Pokras and K. K. Kubishke: Diagnosis-Related Groups Using Data From the National Hospital Discharge Survey, United States, 1982. *Advance Data From Vital and Health Statistics*. No. 105. DHHS Pub. No. (PHS) 85-1250. Public Health Service. Hyattsville, Md., Jan. 18, 1985.

Copyright Information

The National Center for Health Statistics has obtained permission from the copyright holders to reproduce certain quoted material in this report. Further reproduction of this material is prohibited without specific permission of the copyright holders. All other material contained in the report is in the public domain and may be used and reprinted without special permission; citation as to source, however, is appreciated.

U.S. DEPARTMENT OF HEALTH AND
HUMAN SERVICES
Public Health Service
National Center for Health Statistics
3700 East-West Highway
Hyattsville, Maryland 20782

THIRD CLASS MAIL
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