# Diagnosis-Related Groups Using Data From the National Hospital Discharge Survey: United States, 1985

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## Introduction

Diagnosis-related groups (DRG's) are used by the Health Care Financing Administration, some States, and some third-party payers as the basis for reimbursing hospitals for inpatient care.[1] The Federal application of DRG's is the prospective payment system for Medicare inpatients. The necessary patient information (diagnoses, procedures, age, and discharge status) to generate national estimates on hospital utilization for these categories is collected for the National Center for Health Statistics by means of the National Hospital Discharge Survey (NHDS). This report presents selected estimates for 1985 from NHDS on patients discharged from non-Federal short-stay hospitals by DRG.

In an attempt to control rising Medicare costs, the Health Care Financing Administration changed the basis for determining how hospitals are reimbursed for inpatient care. Under the Tax Equity and Fiscal Responsibility Act of 1983,[2] reimbursement for inpatient care changed from fee-for-service to a prospective payment system. Under this system a hospital is reimbursed a preestablished amount based on a series of calculations used to compute the average cost of care for patients with similar conditions and treatments. These similar conditions and treatments are defined as a set of mutually exclusive categories called diagnosis-related groups, or DRG's.

The prospective payment system using DRG's was implemented on October 1, 1983. Individual hospitals started in the system beginning with their first fiscal year after this date. Therefore, by September 30, 1984, all hospitals designated to be under DRG reimbursement were in the system. Two previous reports on DRG's published by the National Center for Health Statistics[3,4] included data on the most frequent DRG's. A more detailed report on DRG's was published in a series 13 *Vital and Health Statistics* report.[5]

DRG's were developed at the Yale School of Organization and Management 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."[6] Initially there were 470 DRG's used in the prospective payment system, each with an associated relative cost weight used to establish the prospective payment for a patient in each DRG. This approach to health care reimbursement operates on the premise that patients with similar medical conditions should receive similar care and use approximately the same resources. Therefore, although there is a variation in resource consumption among patients within a DRG, this variation is expected to balance out across the range of all patients.

A detailed description of the development and construction of DRG's is available,[6] and current DRG's and relative cost weights are published in the Federal Register. DRG's and the relative cost weights are subject to modification for a number of reasons. Therefore, it is important for anyone using DRG data to examine changes in the system that could affect their analysis.

The statistics in this report are based on data collected by the National Center for Health Statistics by means of the National Hospital Discharge Survey (NHDS), which is a continuous voluntary survey conducted since 1965. The data for the survey are obtained from a sample of inpatient medical records from a national sample of short-stay general and specialty hospitals located in the United States. A detailed report on the design of NHDS was published in 1970.[7] In 1985, for the first time, two data collection procedures were used in NHDS. The traditional procedure involves a manual system of data abstraction in the hospitals; the new procedure is an automated method that involves the purchase of data tapes from commercial abstracting services. The new procedure is used in 17 percent of the hospitals.

Approximately 194,800 medical records from 414 hospitals were included in the 1985 survey. 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 U.S. totals, hospital 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 size in tables 1–4. Age is dichotomized as under 65 years of age and 65 years of age and over. This allows a comparison with the Medicare population because Medicare covers most hospital costs for approximately 95 percent of discharges 65 years of age and over. Tables 1 and 2 provide regional data, and tables 3 and 4 provide bed-size data for these DRG's. Tables 1 and 3 contain findings for patients under 65 years of age, and tables 2 and 4 include the survey results 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 36 or over" in table 2 refers only to patients 65 years of age and over because of the table title; "simple pneumonia and pleurisy, age 70 or over 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 2.6 million discharges in 1985. "Cesarean section without substantial comorbidity and/or complication," with 761,000 discharges, and "medical back problems," with 741,000 discharges, also were among the most frequent DRG's in this age group. For patients 65 years of age and older (table 2) "heart failure and shock" was the most common DRG (469,000 discharges), and "simple pneumonia and pleurisy, age 70 or over and/or substantial comorbidity and complication" and "specific cerebrovascular disorders except transient ischemic attacks," with 357,000 and 350,000 discharges respectively, were the next most common DRG's for the elderly.

The average length of stay for specific DRG's in the four regions of the country generally reflected the pattern found for all patients. Regional length-of-stay differences were greater for patients 65 years of age or over than for younger patients. The Northeast had an average length of stay of 6.1 days for patients under 65 years of age, and the West had an average length of stay of 4.7 days, a difference of 1.4 days, or 30 percent greater. For older patients, however, the Northeast had an average length of stay 3.8 days greater than for the elderly patients in the West (11.0 versus 7.2 days), a difference of 53 percent.

Overall there was a tendency for length of stay to increase with hospital size (tables 3 and 4) for patients under 65 years of age as well as for older patients. However, the average length of stay in small and medium-size hospitals for some of the individual DRG's 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. Though comparison is tenuous on a case-by-case basis, an administrator of a hospital with an average length of stay 2, 3, or more days longer than the national average for a specific DRG may want to examine why the hospital is so far from the norm. This kind of comparison may be worthwhile as a starting point, but it is important to remember that, even within a DRG, average length of stay is not an exact measure of resource consumption.

When making these comparisons of average length of stay, the general downward trend in the lengths of hospital visits for the previous 16 years should be noted. There has been a steady decline in average length of stay in all regions of the country since 1970, with a more precipitous fall in the last 5 years.[5] That is, although average length of stay for all patients aged 65 and over declined 2.6 days during the 11-year period 1970–81, an average drop of 0.24 days per year, the drop from 1981 through 1985 was 1.8 days, or 0.36 days per year.

One of the expected outcomes of the prospective payment system was an overall reduction in length of stay. Given the existing trend it may be difficult to evaluate the effects of DRG's on average length of stay because it decreased significantly before the DRG program and because there is a threshold effect for this variable. That is, at a certain point, length of stay cannot be further reduced. The data in table 5 give the year-to-year percent change in length of stay from 1980 through 1985. It is evident from this table that in 1984 there was a larger reduction in average length of stay than in previous years for patients 65 years of age and over—patients most affected by changes in the Medicare system. However, the change in average length of stay was not significant in 1985 when compared with 1984 for patients under 65 years of age, and it is possible that further reduction in average length of stay may be difficult to obtain.

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 region: United States, 1985

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

| Diagnosis-related group | All regions | Northeast | Midwest | South | West | All regions | Northeast | Midwest | South | West |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number in thousands | | | | | Average length of stay in days | | | | |
| All discharges . . . . . . . . . . . . . . . . . . . . . | 24,548 | 4,816 | 6,288 | 8,930 | 4,514 | 5.5 | 6.1 | 5.9 | 5.2 | 4.7 |
| Vaginal delivery without complicating diagnoses . . . | 2,552 | 463 | 638 | 853 | 599 | 2.6 | 3.0 | 2.9 | 2.6 | 2.0 |
| Cesarean section without substantial comorbidity and/or complication . . . . . . . . . . . | 761 | 133 | 181 | 277 | 170 | 5.0 | 5.8 | 5.3 | 4.9 | 4.4 |
| Medical back problems . . . . . . . . . . . . . . . . | 741 | 123 | 171 | 316 | 131 | 5.6 | 6.9 | 5.8 | 5.6 | 3.8 |
| Nonradical hysterectomy, age less than 70 years without substantial comorbidity and/or complication . . . . . . . . . . . . . . . . . | 503 | 60 | 115 | 221 | 107 | 5.9 | 6.8 | 6.2 | 6.1 | 4.9 |
| Psychoses . . . . . . . . . . . . . . . . . . . . . . | 478 | 125 | 144 | 119 | 90 | 15.5 | 19.0 | 15.9 | 13.6 | 12.4 |
| Esophagitis, gastroenteritis, and miscellaneous digestive disease age 18–69 without substantial comorbidity and/or complication . . . . . . . . . . . | 412 | 62 | 104 | 201 | 46 | 3.5 | 3.8 | 3.6 | 3.5 | 2.8 |
| Unrelated operating room procedure . . . . . . . . . | 317 | 58 | 89 | 115 | 55 | 10.4 | 12.7 | 10.1 | 10.3 | 8.5 |
| Alcohol and substance-induced organic mental syndrome . . . . . . . . . . . . . . . . . . | 310 | 132 | 92 | 51 | 35 | 9.9 | 9.3 | 12.8 | 7.3 | 8.2 |
| Bronchitis and asthma age under 18 . . . . . . . . . | 302 | 54 | 80 | 130 | 38 | 3.5 | 3.3 | 3.9 | 3.6 | 2.8 |
| Back and neck procedures age under 70 without substantial comorbidity and/or complication . . . . | 273 | 35 | 65 | 114 | 60 | 8.9 | 10.0 | 8.6 | 9.3 | 7.7 |
| Esophagitis, gastroenteritis, and miscellaneous digestive disorders age under 18 . . . . . . . . . . | 268 | 46 | 77 | 114 | 31 | 3.3 | 3.0 | 3.4 | 3.7 | 2.3 |
| Angina pectoris . . . . . . . . . . . . . . . . . . . . | 234 | 63 | 49 | 83 | 39 | 4.0 | 4.6 | 4.1 | 3.9 | 3.0 |
| Other antepartum diagnoses with medical complications . . . . . . . . . . . . . . . . | 230 | 37 | 60 | 88 | 45 | 3.6 | 4.3 | 3.7 | 3.5 | 2.9 |
| Vaginal delivery with sterilization and/or dilation and curettage of uterus . . . . . . . . . . . . . . . | 222 | 32 | 44 | 106 | 39 | 3.2 | 3.5 | 3.5 | 3.2 | 2.8 |
| Abortion with dilation and curettage of uterus . . . . | 221 | 81 | 38 | 72 | 30 | 1.6 | 1.7 | 1.6 | 1.5 | 1.4 |
| Uterus and adenexa procedure for non-malignancy except tubal interruption . . . . . . . . . . . . . . . | 217 | 44 | 53 | 75 | 45 | 5.0 | 5.2 | 4.9 | 5.4 | 4.3 |
| Esophagitis, gastroenteritis, and miscellaneous digestive disease age 70 or over and/or substantial comorbidity and/or complication . . . . . . . . . . . | 216 | 34 | 52 | 94 | 37 | 4.7 | 4.9 | 5.1 | 4.7 | 4.0 |
| Simple pneumonia and pleurisy age under 18 . . . . | 211 | 25 | 59 | 102 | 25 | 4.2 | 4.5 | 4.4 | 4.0 | 4.5 |
| Circulatory disorders except acute myocardial infarction, with cardiac catheterization without complex diagnosis . . . . . . . . . . . . . . | 211 | 38 | 70 | 73 | 31 | 2.8 | 2.9 | 2.7 | 3.3 | 2.0 |
| Foot procedures . . . . . . . . . . . . . . . . . . . | 211 | 28 | 50 | 92 | 40 | 3.1 | 3.5 | 3.7 | 2.9 | 2.9 |
| Inguinal and femoral hernia procedures age 18–69 without substantial comorbidity and/or complication . . . . . . . . . . . . . . . . . | 202 | 49 | 52 | 67 | 34 | 2.8 | 2.7 | 2.7 | 3.3 | 1.7 |
| Bronchitis and asthma age 18–69 without substantial comorbidity and/or complication . . . . . . . . . . . | 194 | 41 | 47 | 73 | 34 | 4.5 | 4.9 | 4.2 | 4.8 | 3.6 |
| Circulatory disorders with acute myocardial infarction without cardiovascular complications, discharged alive . . . . . . . . . . . . . . . . . . . | 192 | 40 | 44 | 77 | 31 | 7.7 | 9.1 | 8.1 | 7.3 | 6.5 |
| Vaginal delivery with complicating diagnoses . . . . | 190 | 29 | 49 | 70 | 42 | 3.5 | 4.2 | 3.6 | 3.7 | 2.7 |
| Appendectomy without complicated principal diagnosis age under 70 without substantial comorbidity and/or complication . . . . . . . . . . . | 189 | 35 | 49 | 63 | 43 | 3.7 | 4.1 | 3.8 | 3.7 | 3.4 |
| Tonsillectomy and/or adenoidectomy only, age under 18 . . . . . . . . . . . . . . . . . . . . . | 187 | 33 | 54 | 75 | 27 | 1.5 | 2.0 | 1.3 | 1.6 | 1.1 |
| Other factors influencing health status . . . . . . . . | 186 | 39 | 44 | 59 | 45 | 3.8 | 4.2 | 4.5 | 3.1 | 3.6 |

**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 region: United States, 1985**

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

| Diagnosis-related group | All regions | Northeast | Midwest | South | West | All regions | Northeast | Midwest | South | West |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number in thousands | | | | | Average length of stay in days | | | | |
| All discharges . . . . . . . . . . . . . . . . . . . . . . | 10,508 | 2,353 | 2,823 | 3,344 | 1,988 | 8.7 | 11.0 | 8.6 | 8.2 | 7.2 |
| Heart failure and shock . . . . . . . . . . . . . . . . | 469 | 123 | 128 | 142 | 76 | 7.9 | 9.7 | 8.0 | 7.1 | 6.7 |
| Simple pneumonia and pleurisy age 70 or over and/or substantial comorbidity and complication . . . . . . . . . . . . . . . . . | 357 | 74 | 98 | 117 | 68 | 9.2 | 11.7 | 9.0 | 8.3 | 8.2 |
| Specific cerebrovascular disorders except transient ischemic attacks . . . . . . . . . . . . . . | 350 | 75 | 87 | 120 | 68 | 12.0 | 17.1 | 12.4 | 10.5 | 8.3 |
| Angina pectoris . . . . . . . . . . . . . . . . . . . . | 316 | 78 | 75 | 107 | 55 | 5.2 | 6.0 | 5.1 | 5.3 | 4.0 |
| Esophagitis, gastroenteritis, and miscellaneous digestive disease age 70 or over and/or substantial comorbidity and complication . . . . . . | 296 | 63 | 79 | 110 | 45 | 6.2 | 8.1 | 6.3 | 5.5 | 4.7 |
| Chronic obstructive pulmonary disease . . . . . . . | 257 | 60 | 53 | 92 | 52 | 8.2 | 10.3 | 8.7 | 7.5 | 6.4 |
| Cardiac arrhythmia and conduction disorders age 70 or over and/or substantial comorbidity and complication . . . . . . . . . . . | 248 | 56 | 67 | 77 | 49 | 5.9 | 7.1 | 5.7 | 5.8 | 5.2 |
| Nutritional and miscellaneous metabolic disorders age 70 or over and/or substantial comorbidity and complication . . . . . . . . . . . . | 217 | 42 | 57 | 76 | 42 | 7.4 | 8.8 | 7.2 | 7.4 | 6.2 |
| Unrelated operating room procedure . . . . . . . . . | 196 | 57 | 51 | 52 | 36 | 16.1 | 21.0 | 15.5 | 15.0 | 11.1 |
| Bronchitis and asthma age 70 or over and/or substantial comorbidity and complication . . . . . . | 188 | 41 | 45 | 68 | 34 | 7.0 | 7.8 | 6.4 | 7.4 | 6.0 |
| Transient ischemic attacks . . . . . . . . . . . . . . | 184 | 42 | 52 | 58 | 33 | 5.7 | 8.4 | 5.3 | 5.2 | 3.9 |
| Atherosclerosis age 70 or over and/or substantial comorbidity and complication . . . . . | 179 | 43 | 38 | 67 | 30 | 7.0 | 10.2 | 6.0 | 6.4 | 4.8 |
| Circulatory disorders with acute myocardial infarction without cardiovascular complications, discharged alive . . . . . . . . . . . . . . . . . . . . | 172 | 38 | 41 | 62 | 31 | 8.9 | 11.1 | 9.1 | 8.2 | 7.6 |
| Transurethral prostatectomy age 70 or over and/or substantial comorbidity or complication . . . . . . . | 169 | 33 | 48 | 57 | 31 | 7.0 | 9.3 | 6.7 | 7.0 | 4.8 |
| Kidney and urinary tract infections age 70 or over and/or substantial comorbidity or complication . . . . . . . . . . . . . . . . . . . . . . | 168 | 32 | 42 | 70 | 25 | 7.7 | 10.4 | 7.3 | 7.0 | 6.7 |
| Major joint procedures . . . . . . . . . . . . . . . . | 168 | 33 | 59 | 38 | 37 | 14.9 | 19.3 | 14.0 | 14.7 | 12.7 |
| Medical back problems . . . . . . . . . . . . . . . . | 158 | 33 | 42 | 51 | 31 | 7.7 | 10.2 | 6.7 | 8.3 | 5.3 |
| Gastrointestinal hemorrhage age 70 or over and/or substantial comorbidity and complication . . . . . . | 153 | 36 | 39 | 47 | 31 | 6.9 | 8.2 | 7.1 | 6.9 | 5.3 |
| Hip and femur procedures except major joint age 70 or over and/or substantial comorbidity and complication . . . . . . . . . . . | 148 | 34 | 41 | 40 | 33 | 15.8 | 22.5 | 13.6 | 13.7 | 14.2 |
| Respiratory neoplasms . . . . . . . . . . . . . . . . | 139 | 33 | 35 | 49 | 21 | 7.9 | 10.4 | 7.4 | 7.4 | 5.9 |
| Lens procedures . . . . . . . . . . . . . . . . . . . | 138 | 49 | 44 | 18 | 26 | 1.8 | 1.9 | 1.9 | 1.9 | 1.3 |
| Diabetes age 36 or over . . . . . . . . . . . . . . . | 137 | 35 | 35 | 50 | 18 | 7.7 | 9.6 | 7.4 | 7.6 | 4.9 |
| Circulatory disorders with acute myocardial infarction and cardiovascular complications, discharged alive . . . . . . . . . . . | 134 | 34 | 32 | 47 | 22 | 11.2 | 13.1 | 11.8 | 9.8 | 10.1 |
| Major small and large bowel procedures age 70 or over and/or substantial comorbidity and complication . . . . . . . . . . . . | 123 | 26 | 34 | 39 | 24 | 16.3 | 18.8 | 15.8 | 15.7 | 15.3 |
| Red blood cell disorders age 18 or over . . . . . . . | 106 | 24 | 26 | 32 | 24 | 6.6 | 8.8 | 6.8 | 6.1 | 4.8 |

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, 1985

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

| Diagnosis-related group | All hospitals | 6–99 beds | 100–199 beds | 200–299 beds | 300–499 beds | 500 beds or more | All hospitals | 6–99 beds | 100–199 beds | 200–299 beds | 300–499 beds | 500 beds or more |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number in thousands | | | | | | Average length of stay in days | | | | | |
| All discharges . . . . . . . . . . . . . . . . . . . . . | 24,548 | 3,550 | 4,625 | 4,618 | 5,982 | 5,773 | 5.5 | 4.5 | 4.9 | 5.3 | 5.7 | 6.4 |
| Vaginal delivery without complicating diagnoses . . . . . . . . . . . . . . . . . . . . . | 2,552 | 355 | 437 | 440 | 690 | 630 | 2.6 | 2.1 | 2.5 | 2.5 | 2.7 | 2.9 |
| Cesarean section without substantial comorbidity and/or complication . . . . . . . . . . . | 761 | 81 | 137 | 130 | 212 | 201 | 5.0 | 4.5 | 4.7 | 4.8 | 5.1 | 5.6 |
| Medical back problems . . . . . . . . . . . . . . . . | 741 | 130 | 170 | 166 | 147 | 127 | 5.6 | 6.1 | 5.2 | 5.0 | 6.2 | 5.5 |
| Nonradical hysterectomy, age less than 70 years without substantial comorbidity and/or complication . . . . . . . . . . . . . . . . . | 503 | 65 | 123 | 96 | 112 | 106 | 5.9 | 5.6 | 5.8 | 5.9 | 6.1 | 6.3 |
| Psychoses . . . . . . . . . . . . . . . . . . . . . . | 478 | 67 | 78 | 71 | 142 | 121 | 15.5 | 17.0 | 16.0 | 13.1 | 13.9 | 17.6 |
| Esophagitis, gastroenteritis, and miscellaneous digestive disease age 18–69 without substantial comorbidity and/or complication . . . . . . . . . . . | 412 | 94 | 87 | 82 | 81 | 69 | 3.5 | 2.8 | 3.4 | 3.6 | 3.9 | 3.8 |
| Unrelated operating room procedure . . . . . . . . . | 317 | 21 | 48 | 59 | 84 | 105 | 10.4 | 6.4 | 9.0 | 10.5 | 10.0 | 12.0 |
| Alcohol and substance-induced organic mental syndrome . . . . . . . . . . . . . . . . . . | 310 | 100 | 36 | 51 | 80 | 43 | 9.9 | 8.8 | 8.8 | 11.3 | 11.3 | 8.7 |
| Bronchitis and asthma age under 18 . . . . . . . . . | 302 | 50 | 83 | 64 | 55 | 50 | 3.5 | 3.3 | 3.4 | 3.9 | 3.3 | 3.6 |
| Back and neck procedures age under 70 without substantial comorbidity and/or complication . . . . . . . . . . . . . . . . . | 273 | 25 | 44 | 54 | 57 | 94 | 8.9 | 9.8 | 7.9 | 8.5 | 9.5 | 8.9 |
| Esophagitis, gastroenteritis, and miscellaneous digestive disorders age under 18 . . . . . . . . . . | 268 | 42 | 64 | 53 | 57 | 53 | 3.3 | 2.6 | 3.2 | 3.0 | 3.5 | 4.2 |
| Angina pectoris . . . . . . . . . . . . . . . . . . . . | 234 | 49 | 54 | 55 | 45 | 30 | 4.0 | 3.4 | 3.8 | 4.2 | 4.3 | 4.7 |
| Other antepartum diagnoses with medical complications . . . . . . . . . . . . . . . . | 230 | 35 | 44 | 33 | 58 | 60 | 3.6 | 2.7 | 3.1 | 3.3 | 3.8 | 4.3 |
| Vaginal delivery with sterilization and/or dilation and curettage of uterus . . . . . . . . . . . | 222 | 42 | 47 | 37 | 44 | 53 | 3.2 | 3.0 | 3.1 | 3.2 | 3.3 | 3.4 |
| Abortion with dilation and curettage of uterus . . . . . . . . . . . . . . . . . | 221 | 22 | 36 | 39 | 54 | 70 | 1.6 | 1.5 | 1.5 | 1.6 | 1.7 | 1.5 |
| Uterus and adenexa procedure for non-malignancy except tubal interruption . . . . . . . . . . . . . . | 217 | 28 | 49 | 38 | 50 | 51 | 5.0 | 4.8 | 4.9 | 4.6 | 5.2 | 5.3 |
| Esophagitis, gastroenteritis, and miscellaneous digestive disease age 70 or over and/or substantial comorbidity and/or complication . . . . | 216 | 54 | 41 | 47 | 44 | 30 | 4.7 | 4.0 | 5.0 | 5.1 | 4.6 | 5.4 |
| Simple pneumonia and pleurisy age under 18 . . . . | 211 | 57 | 57 | 40 | 27 | 30 | 4.2 | 3.5 | 4.4 | 4.4 | 4.4 | 4.8 |
| Circulatory disorders except acute myocardial infarction, with cardiac catheterization without complex diagnosis . . . . . . . . . . . . . . | 211 | - | *8 | 39 | 63 | 101 | 2.8 | | *2.5 | 2.4 | 2.6 | 3.2 |
| Foot procedures . . . . . . . . . . . . . . . . . . . | 211 | 48 | 82 | 28 | 32 | 21 | 3.1 | 2.7 | 2.5 | 3.2 | 3.5 | 5.8 |
| Inguinal and femoral hernia procedures age 18–69 without substantial comorbidity and/or complication . . . . . . . . . . . . . . . . . | 202 | 32 | 37 | 44 | 49 | 40 | 2.8 | 2.8 | 3.3 | 2.5 | 2.6 | 2.8 |
| Bronchitis and asthma age 18–69 without substantial comorbidity and/or complication . . . . . . . . . . . . . . . . . | 194 | 36 | 46 | 42 | 34 | 36 | 4.5 | 4.2 | 4.5 | 4.4 | 4.4 | 4.9 |
| Circulatory disorders with acute myocardial infarction without cardiovascular complications, discharged alive . . . . . . . . . . | 192 | 34 | 34 | 44 | 43 | 38 | 7.7 | 6.0 | 8.1 | 8.1 | 7.7 | 8.5 |
| Vaginal delivery with complicating diagnoses . . . . | 190 | 25 | 31 | 32 | 49 | 54 | 3.5 | 2.8 | 3.5 | 3.2 | 3.5 | 4.2 |
| Appendectomy without complicated principal diagnosis age under 70 without substantial comorbidity and/or complication . . . . . . . . . . | 189 | 37 | 36 | 37 | 46 | 32 | 3.7 | 3.9 | 3.5 | 3.5 | 3.8 | 3.9 |
| Tonsillectomy and/or adenoidectomy only, age under 18 . . . . . . . . . . . . . . . . . . . . | 187 | 29 | 50 | 40 | 43 | 26 | 1.5 | 1.4 | 1.5 | 1.3 | 1.8 | 1.4 |
| Other factors influencing health status . . . . . . . . | 186 | 18 | 28 | 38 | 47 | 55 | 3.8 | 4.0 | 3.2 | 5.1 | 3.1 | 3.7 |

**Table 4. 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 hospital bed size: United States, 1985**

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

| Diagnosis-related group | All hospitals | 6–99 beds | 100–199 beds | 200–299 beds | 300–499 beds | 500 beds or more | All hospitals | 6–99 beds | 100–199 beds | 200–299 beds | 300–499 beds | 500 beds or more |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number in thousands | | | | | | Average length of stay in days | | | | | |
| All discharges | 10,508 | 1,781 | 1,818 | 2,335 | 2,643 | 1,930 | 8.7 | 6.6 | 7.9 | 8.9 | 9.4 | 10.3 |
| Heart failure and shock | 469 | 103 | 91 | 106 | 107 | 62 | 7.9 | 6.6 | 7.8 | 8.4 | 8.6 | 8.7 |
| Simple pneumonia and pleurisy age 70 or over and/or substantial comorbidity and complication | 357 | 103 | 59 | 75 | 74 | 46 | 9.2 | 8.1 | 8.0 | 9.6 | 10.3 | 10.8 |
| Specific cerebrovascular disorders except transient ischemic attacks | 350 | 65 | 61 | 82 | 81 | 62 | 12.0 | 8.5 | 9.6 | 14.3 | 12.4 | 14.3 |
| Angina pectoris | 316 | 76 | 64 | 75 | 65 | 35 | 5.2 | 4.1 | 5.2 | 5.0 | 6.0 | 6.2 |
| Esophagitis, gastroenteritis, and miscellaneous digestive disease age 70 or over and/or substantial comorbidity and complication | 296 | 77 | 59 | 61 | 60 | 39 | 6.2 | 5.0 | 5.6 | 7.0 | 7.3 | 6.3 |
| Chronic obstructive pulmonary disease | 257 | 54 | 57 | 58 | 60 | 28 | 8.2 | 6.6 | 7.3 | 8.7 | 8.7 | 11.1 |
| Cardiac arrhythmia and conduction disorders age 70 or over and/or substantial comorbidity and complication | 248 | 49 | 47 | 57 | 61 | 34 | 5.9 | 4.8 | 5.6 | 6.0 | 6.3 | 7.3 |
| Nutritional and miscellaneous metabolic disorders age 70 or over and/or substantial comorbidity and complication | 217 | 51 | 40 | 48 | 50 | 28 | 7.4 | 6.4 | 7.5 | 7.5 | 7.5 | 8.5 |
| Unrelated operating room procedure | 196 | 15 | 33 | 47 | 59 | 42 | 16.1 | 16.0 | 13.7 | 16.0 | 16.8 | 17.4 |
| Bronchitis and asthma age 70 or over and/or substantial comorbidity and complication | 188 | 41 | 32 | 47 | 39 | 28 | 7.0 | 6.1 | 7.1 | 7.4 | 6.6 | 8.1 |
| Transient ischemic attacks | 184 | 37 | 36 | 42 | 43 | 26 | 5.7 | 4.4 | 4.8 | 6.2 | 6.4 | 7.1 |
| Atherosclerosis age 70 or over and/or substantial comorbidity and complication | 179 | 36 | 31 | 46 | 43 | 23 | 7.0 | 5.0 | 6.4 | 7.5 | 7.8 | 8.3 |
| Circulatory disorders with acute myocardial infarction without cardiovascular complications, discharged alive | 172 | 32 | 31 | 42 | 34 | 32 | 8.9 | 7.0 | 8.9 | 9.0 | 9.9 | 9.7 |
| Transurethral prostatectomy age 70 or over and/or substantial comorbidity or complication | 169 | 19 | 32 | 41 | 46 | 31 | 7.0 | 5.6 | 6.8 | 6.1 | 7.9 | 7.8 |
| Kidney and urinary tract infections age 70 or over and/or substantial comorbidity or complication | 168 | 45 | 29 | 34 | 36 | 25 | 7.7 | 5.9 | 7.2 | 9.5 | 7.7 | 8.9 |
| Major joint procedures | 168 | 12 | 30 | 41 | 50 | 34 | 14.9 | 13.8 | 13.4 | 15.2 | 15.5 | 15.4 |
| Medical back problems | 158 | 33 | 29 | 34 | 39 | 23 | 7.7 | 6.3 | 7.3 | 8.6 | 7.6 | 8.7 |
| Gastrointestinal hemorrhage age 70 or over and/or substantial comorbidity and complication | 153 | 32 | 29 | 33 | 34 | 25 | 6.9 | 5.8 | 6.5 | 6.4 | 8.5 | 7.2 |
| Hip and femur procedures except major joint age 70 or over and/or substantial comorbidity and complication | 148 | 20 | 28 | 34 | 41 | 25 | 15.8 | 12.4 | 15.2 | 15.7 | 15.9 | 19.0 |
| Respiratory neoplasms | 139 | 14 | 23 | 31 | 39 | 31 | 7.9 | 6.7 | 7.4 | 7.9 | 7.5 | 9.2 |
| Lens procedures | 138 | 14 | 25 | 30 | 40 | 29 | 1.8 | 1.2 | 1.7 | 1.9 | 1.8 | 2.0 |
| Diabetes age 36 or over | 137 | 31 | 26 | 24 | 32 | 24 | 7.7 | 5.8 | 6.7 | 8.7 | 8.3 | 9.5 |
| Circulatory disorders with acute myocardial infarction and cardiovascular complications, discharged alive | 134 | 24 | 24 | 28 | 40 | 18 | 11.2 | 8.8 | 10.4 | 12.4 | 11.6 | 12.4 |
| Major small and large bowel procedures age 70 or over and/or substantial comorbidity and complication | 123 | 20 | 24 | 30 | 27 | 23 | 16.3 | 13.7 | 16.6 | 15.4 | 17.4 | 18.4 |
| Red blood cell disorders age 18 or over | 106 | 20 | 15 | 27 | 27 | 17 | 6.6 | 4.8 | 5.5 | 7.2 | 7.6 | 7.0 |

**Table 5. Annual percent change in average length of stay by age and region, United States, 1980–85**

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

| Age and region | Year | | | | | |
|---|---|---|---|---|---|---|
| | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
| **Under 65 years** | | | Percent | | | |
| Northeast . . . . . . | +0.27 | −1.73 | −1.88 | −3.10 | −2.64 | −0.32 |
| Midwest . . . . . . . | +1.64 | −2.22 | +1.20 | −2.72 | −2.12 | −1.40 |
| South . . . . . . . . | −0.58 | −0.04 | −2.17 | −0.54 | −6.23 | +0.34 |
| West . . . . . . . . | +1.92 | −0.35 | −2.76 | −1.75 | −0.22 | −5.67 |
| **65 years and over** | | | | | | |
| Northeast . . . . . . | −0.59 | −0.46 | −6.16 | −1.32 | −6.57 | −2.88 |
| Midwest . . . . . . . | +1.50 | −2.56 | −2.30 | −6.42 | −9.68 | −1.63 |
| South . . . . . . . . | −0.99 | −0.39 | −4.38 | −3.41 | −8.05 | −2.71 |
| West . . . . . . . . | −4.37 | −3.49 | −0.52 | −2.87 | −7.81 | −2.25 |

## 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

# References

[1] J. Alsofrom: Playing the numbers. *Med. World News*, Oct. 24, 1983, pp. 38–55.

[2] Tax Equity and Fiscal Responsibility Act. United States Congress, September 3, 1983.

[3] National 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.

[4] 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.

[5] National Center for Health Statistics, R. Pokras: Utilization of short-stay hospitals by diagnosis-related groups, United States, 1980–84. *Vital and Health Statistics*. Series 13, No. 87. DHHS Pub. No. (PHS) 86–1748. Public Health Service. Washington. U.S. Government Printing Office, July 1986.

[6] R. B. Fetter, S. Youngsoo, J. L. Freeman, et al.: Case mix definition by diagnostic related groups. *Med. Care* 18(2), Supplement. (Copyright 1980: Used with the permission of *Medical Care*.)

[7] National Center for Health Statistics, W. R. Simmons and G. A. Schnack: Development of the design of the NCHS Hospital Discharge Survey. *Vital and Health Statistics*. Series 2, No. 39. DHEW Pub. No. (HRA) 77–1199. Health Resources Administration. Washington. U.S. Government Printing Office, May 1977.

[8] National 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.

[9] National Center for Health Statistics, M. J. Witken: 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.

# 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 beds or more 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 consists 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, 1981, 1983, and 1985. In all, 558 hospitals were sampled in 1985. Of these hospitals, 82 refused to participate, and 62 were out of scope. The 414 participating hospitals provided approximately 194,800 abstracts of medical records.

### Sample design and data collection

All hospitals with 1,000 beds or more 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 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. The within-hospital sampling ratio for selecting sample discharges varied inversely with the probability of selection of the hospital.

In the 1985 survey, two data-collection procedures were used for the first time. One was the traditional manual system of sample selection and data abstraction. The other was an automated method used in approximately 17 percent of the sample hospitals, involving the purchase of data tapes from commercial abstracting services.

In the manual hospitals, sample discharges were selected 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. The sample selection and abstraction of data from the face sheet and discharge summary of the medical records were performed by the hospital staff or by representatives of the National Center for Health Statistics (NCHS). The completed forms were forwarded to NCHS for coding, editing, and weighting procedures.

For the automated hospitals, tapes containing machine-readable medical record data were purchased from commercial abstracting services. These tapes are subject to NCHS sampling, editing, and weighting procedures. A detailed description of the automated process is to be published.

The Medical Abstract Form and the abstract service data tapes contain items relating to the personal characteristics of the patient, including birth date, sex, race, and marital status but not 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. Since 1977, patient zip code, expected source of payment, and dates of surgery also have been collected. (The medical record number and patient zip code are considered confidential information and are not available to the public.)

### Presentation of estimates

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.[8,9]

Based on consideration of the complete sample design of NHDS, the following guidelines are used for presenting NHDS estimates in this report.

● If the sample is less than 30, the value of the estimate is not reported. Only an asterisk (*) is shown in the tables.
● If the sample size is 30–59, the value of the estimate is reported but should be used with caution. The estimate is preceded by an asterisk (*) in the tables.

### Diagnosis-related groups

The DRG's to which this report refers were produced using the DRG program available in the summer of 1983 and are identical to those in the Friday, August 31, 1984, issue of the Federal Register. This is a computer program that groups patients into DRG's based on diagnostic, surgical, and patient information. The actual program used to produce estimates in this report was obtained from the Health Care Financing Administration. The entire NHDS file, including outliers, was used to produce estimates. No data were excluded or trimmed because of abnormal length of stay.

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 1985 relative standard errors for discharges. 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.

**Table I. Approximate relative standard errors of estimated number of discharges and first-listed diagnoses: United States, 1985**

| Size of estimate | Relative standard error |
|---|---|
| 10,000 | 10.6 |
| 50,000 | 6.7 |
| 100,000 | 5.7 |
| 300,000 | 4.4 |
| 500,000 | 4.0 |
| 1,000,000 | 3.5 |
| 4,000,000 | 2.1 |

**Table II. Approximate standard errors of average lengths of stay by number of discharges: United States, 1985**

| Number of discharges | Average length of stay in days | | | |
|---|---|---|---|---|
| | 2 | 6 | 10 | 20 |
| | Standard error in days | | | |
| 10,000 | 0.4 | 0.9 | 1.5 | 2.7 |
| 50,000 | 0.2 | 0.6 | 1.0 | 1.8 |
| 100,000 | 0.2 | 0.5 | 0.8 | 1.6 |
| 500,000 | 0.1 | 0.4 | 0.6 | 1.1 |
| 1,000,000 | 0.1 | 0.3 | 0.5 | 1.0 |
| 5,000,000 | 0.1 | 0.3 | 0.4 | 0.8 |

### Tests of significance

In this report, the determination of statistical inference is based on the two-tailed Bonferroni test for multiple comparisons. Terms such as "higher" and "less" in relation to differences 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 the difference was tested and found to be not significant.

## Definitions of terms used in this report

*Patient*—A person who is formally admitted to the inpatient service of a short-stay hospital for observation, care, diagnosis, or treatment is considered a patient. 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 short-stay hospital or more.

*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.

*Average length of stay*—The average length of stay is 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.

*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 |

*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.

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