Recent Declines in Hospitalization: United States, 1982–86

Data From the National Health Interview Survey and the National Hospital Discharge Survey

by Abigail J. Moss, Division of Health Interview Statistics, and Mary A. Moien, Division of Health Care Statistics

Introduction

Throughout the 1970's, the rate of hospitalizations for short-stay hospitals steadily increased for all persons. Based on data from the National Hospital Discharge Survey (NHDS), between 1970–79 the hospital discharge rate (that is, the number of hospital discharges per 1,000 civilian persons) increased from 144.3 to 164.8 discharges per 1,000 persons. The greatest increase during this period occurred among the elderly where the discharge rate rose about 23 percent for those persons 65 years of age and over. However, substantial differences in the hospital discharge rates were also observed for persons under 65 years of age, amounting to about a 10-percent increase between 1970 and 1979. By age group, the hospital discharge rates increased about 7 percent for children under 15 years and about 21 percent for persons aged 45–64 years, although among those 15–44 years of age, the overall rate remained about the same.[1]

While the hospital discharge rate was gradually climbing during this period, a different trend was occurring in another hospital use measure, the average length of a hospital stay. Between 1970 and 1979, the average number of days per hospital stay based on NHDS estimates declined 8 percent, from 7.8 to 7.2 days. This reduction in the average length of time people were spending in the hospital for each stay occurred among all age groups. The largest percent of decline, though, was found again among the hospitalized elderly, where an average stay dropped from 13.1 to 10.8 days, an 18-percent reduction.[2,3]

The changes in hospital utilization during the 1970's were the result of several phenomena. Implementation of the medicare program in July 1966 provided greater access to inpatient hospital care for the majority of elderly individuals. Lubitz and

Deacon state that "most of the increase in the discharge rate among the aged was associated with an increase in the percentage of persons using the hospital rather than with an increase in the rate of multiple hospitalizations."[4]

Increases in numbers of hospitalizations of shorter duration contributed to the decrease in average length of stay and at the same time to the increase in discharge rates during this period. Technical improvements in selected surgical procedures also had an effect on both of these trends. The average length of stay for cataract operations, for example, dropped significantly during the 1970's while the number of these procedures increased substantially.[5] The development of new materials for prostheses and new cements in the field of orthopedics and advances in cardiology, including bypass surgery and heart pacemakers, also contributed to increased hospitalizations involving surgery for this period.[4]

In an attempt to contain the medicare costs for hospital treatment, which have continued to escalate since the onset of the program, the Health Care Financing Administration (HCFA) of the Department of Health and Human Services initiated a new system of hospital payment in 1983. Under the Tax Equity and Fiscal Responsibility Act of 1983,[6] reimbursement for inpatient care for medicare patients changed from a fee-for-service system to a prospective payment system. The phasing in of this system began on October 1, 1983, and by September 30, 1984, all designated hospitals were in the system.

Under this cost-containment system, hospitals are reimbursed a preestablished amount based on calculations of the average cost of care for medicare patients with similar conditions and treatments. These mutually exclusive categories of similar conditions and treatments are referred to as diagnosis-related groups or, more commonly, DRG's.[7]

Average costs of treatment have been established for about

467 DRG's, and hospital payments are determined by the DRG group to which the patient's illness is assigned. Because treatment costs for a given illness vary by type of hospital (for example, university teaching hospitals are more costly to operate than community hospitals), the system compensates for this variation by adjusting the fixed DRG reimbursement rates according to the ratio of medical residents to hospital beds.[8] DRG's are now also being used by some States and some other third party payers to reimburse hospitals for inpatient care of the non-medicare population on a prospective basis.[9]

Just as medicare in the late 1960's subsequently brought about dramatic increases in hospitalization rates for the elderly, the major changes in the financing of medical care as just described also appear to have significantly altered the pattern of hospital utilization, but in the opposite direction. Between 1980 and 1983, the overall hospital discharge rates showed little change, fluctuating between 167 and 169 discharges per 1,000 population based on NHDS estimates (figure 1). However, in 1984, after the HCFA prospective payment system based on DRG's began to be phased in, the NHDS hospital discharge rate declined 5 percent, from 167.0 discharges per 1,000 persons in 1983 to 158.5 discharges in 1984.[10] A similar rate of decline is found in the hospital discharge estimates obtained from the National Health Interview Survey (NHIS).[11,12] This marked the first year since the onset of medicare that the discharge rate declined. In 1985, the downward trend continued with the discharge rates from both the NHDS and the NHIS declining another 7 to 8 percent from the 1984 rates.[13,14]

While the 1986 NHDS hospital discharge rates are still incomplete at this printing and the NHIS rates for this period have only recently become available, preliminary indications are that the rate of decline has subsided. Based on NHIS quarter 1 estimates, during the first 3 months of 1986, the downward trend in hospital discharges appeared to be continuing (table 1). However, when the NHIS hospital discharge rates for the remaining three quarters of 1986 were reviewed, they more closely resembled the rates in the last two quarters of 1985.

Changes in hospital utilization as measured by the average length of a hospital stay also have occurred during the last several years. Between 1980 and 1983, estimates of the average length of a hospital stay continued the gradual decline characteristic of the 1970's, from 7.6 to 7.3 days according to the NHIS and from 7.3 to 6.9 days according to the NHDS (figure 2). However, upon implementation of the prospective payment system in 1983, the rate of decline appeared to accelerate.

Between 1983 and 1985, the average length of a hospital stay declined about 8 percent for the NHIS (to 6.7 days) and about 6 percent for the NHDS (to 6.5 days). However, between October 1985 and December 1986, except for one 3-month period, the NHIS quarterly estimates for average length of stay remained at about the same level—6.3 to 6.4 days. The 1986 NHIS annual estimate of 6.6 days per hospital stay is similar to its 1985 estimate. While it now appears that the initial effects of this recent cost-containment system on hospital utilization as measured by hospital discharge rates and average length of stay estimates have subsided, it is still too soon to conclude that further declines will not occur.

Differences between the NHDS and the NHIS

The NHDS obtains its information directly from hospital records of inpatients discharged from short-stay hospitals, exclusive of Federal hospitals, located throughout the 50 States and the District of Columbia. Information is abstracted each year from approximately 200,000 records in over 400 short-stay non-Federal hospitals. The NHIS, in contrast, obtains its information through personal interviews. In a typical year, the NHIS interviewed sample consists of approximately 40,000 households containing about 105,000 persons. Persons sampled in the NHIS represent the U.S. civilian noninstitutionalized population living at the time of interview. Unlike the NHDS, their reported hospitalization estimates include discharges from Federal hospitals, over one-half of which are Veterans Administration hospitals. (Discharges from Federal hospitals constitute approximately 3 percent of the total reported hospitalizations.)

There are a number of differences in the definitions of hospital utilization as measured by the two surveys and the NHDS estimates of utilization and diagnostic and procedure data are usually accepted as the more accurate. The NHDS includes patients who die in the hospital as well as admissions from nursing homes, two areas not included by NHIS. These result in noticeably higher hospitalization estimates, particularly among patients 65 years and over. In addition, hospitalizations of inpatients for durations of less than 1 day are included in the NHDS, but not the NHIS. Further, NHDS information is obtained directly from hospital records, thus minimizing under-reporting, which is characteristic of interview surveys, such as the NHIS, that rely on respondent reports of events. In contrast, the advantage of the NHIS is that it collects extensive
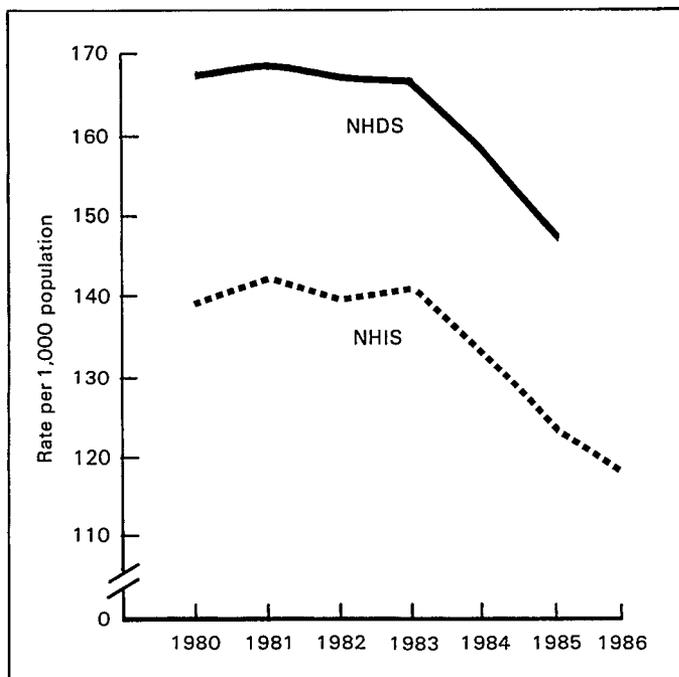

Figure 1.   National Hospital Discharge Survey (NHDS) and National Health Interview Survey (NHIS) short-stay hospital discharge rates: United States, 1980–86

Table 1. Number of discharges from short-stay hospitals per 1,000 persons and average length of stay, by quarter, age, and sex based on data from the National Health Interview Survey and the National Hospital Discharge Survey: United States, 1984–86

	1984				1985				1986			
Age and sex	Jan.–Mar.	Apr.–Jun.	Jul.–Sept.	Oct.–Dec.	Jan.–Mar.	Apr.–Jun.	Jul.–Sept.	Oct.–Dec.	Jan.–Mar.	Apr.–Jun.	Jul.–Sept.	Oct.–Dec.
National Health Interview Survey					Discharge rate per 1,000 persons							
All ages	34.3	33.1	33.2	33.0	32.0	31.1	30.2	30.4	28.1	30.2	29.5	30.2
Under 65 years	28.1	26.8	27.7	27.3	25.9	26.6	25.4	25.1	24.9	23.3	23.9	25.3
Under 15 years	17.8	15.8	15.1	12.4	11.8	14.1	13.6	11.9	12.0	10.0	12.7	13.4
15–44 years	27.8	27.7	27.9	28.9	26.1	25.8	25.4	26.2	26.8	24.8	24.4	26.3
45–64 years	40.6	37.5	41.8	40.7	41.9	43.2	39.4	37.6	35.1	34.7	35.5	36.6
65 years and over	83.0	82.2	75.9	76.9	78.7	65.8	66.6	70.4	52.6	83.1	72.4	67.2
Male	30.0	27.3	28.5	26.3	28.0	26.0	25.2	26.3	23.3	25.6	26.0	26.4
Female, including deliveries	38.3	38.5	37.6	39.2	35.8	36.0	34.9	34.1	32.6	34.5	32.8	33.7
Female, excluding deliveries	31.5	31.7	30.4	32.2	30.1	28.7	28.0	26.2	24.6	27.1	25.7	26.6
National Hospital Discharge Survey												
All ages	41.5	40.2	38.9	37.7	37.9	37.2	36.9	35.9	- - -	- - -	- - -	- - -
Under 65 years	32.8	31.6	31.2	29.9	29.7	29.6	29.8	28.6	- - -	- - -	- - -	- - -
Under 15 years	17.7	15.5	14.1	14.6	15.4	13.8	13.7	14.3	- - -	- - -	- - -	- - -
15–44 years	33.4	32.8	34.0	31.7	30.7	31.6	32.4	30.4	- - -	- - -	- - -	- - -
45–64 years	48.8	47.1	43.8	43.3	44.0	42.9	42.0	40.6	- - -	- - -	- - -	- - -
65 years and over	105.2	103.5	95.9	95.3	97.7	92.4	89.1	89.2	- - -	- - -	- - -	- - -
Male	34.8	33.3	31.6	31.7	32.0	30.9	30.6	30.1	- - -	- - -	- - -	- - -
Female	47.7	46.6	45.7	43.4	43.5	43.0	42.9	41.3	- - -	- - -	- - -	- - -
National Health Interview Survey					Average length of stay							
All ages	7.4	7.0	7.2	7.2	7.3	6.6	6.6	6.4	6.4	6.4	7.1	6.3
Under 65 years	6.8	6.4	6.4	6.4	6.8	5.9	6.0	5.5	6.0	5.7	6.0	5.7
Under 15 years	5.1	6.8	4.8	5.3	6.4	5.0	5.0	4.8	5.8	7.2	6.2	5.1
15–44 years	6.0	5.7	5.9	5.1	5.3	5.2	5.1	4.4	5.1	4.4	5.9	5.7
45–64 years	8.8	7.5	8.0	9.1	9.2	7.1	7.9	7.6	7.8	7.5	6.0	5.9
65 years and over	9.2	8.7	9.5	9.3	8.4	9.0	8.5	9.0	7.9	8.0	10.0	8.1
Male	8.2	7.5	8.8	8.0	8.2	7.4	7.4	6.5	7.3	6.9	7.9	6.6
Female, including deliveries	6.9	6.7	6.1	6.7	6.6	6.1	6.1	6.4	5.8	6.1	6.5	6.1
Female, excluding deliveries	7.6	7.4	6.7	7.4	7.2	6.8	6.8	7.2	6.5	6.9	7.5	6.8
National Hospital Discharge Survey												
All ages	6.9	6.6	6.4	6.5	6.7	6.4	6.3	6.4	- - -	- - -	- - -	- - -
Under 65 years	5.7	5.5	5.4	5.6	5.6	5.5	5.4	5.5	- - -	- - -	- - -	- - -
Under 15 years	4.5	4.3	4.5	4.6	4.5	4.7	4.5	4.4	- - -	- - -	- - -	- - -
15–44 years	5.1	4.9	4.7	4.9	4.9	4.9	4.8	4.8	- - -	- - -	- - -	- - -
45–64 years	7.4	7.1	7.0	7.2	7.3	6.9	6.9	7.1	- - -	- - -	- - -	- - -
65 years and over	9.4	8.9	8.7	8.7	9.0	8.6	8.6	8.6	- - -	- - -	- - -	- - -
Male	7.3	7.0	6.8	6.9	7.0	6.8	6.8	6.9	- - -	- - -	- - -	- - -
Female	6.5	6.3	6.1	6.2	6.5	6.2	6.0	6.0	- - -	- - -	- - -	- - -

demographic and other health-related information not available from hospital records.

Data highlights

This report presents the latest available estimates of hospital discharges and average days per hospital stay from the NHDS and the NHIS. Estimates produced from both surveys when viewed together provide a more complete description of the changes in hospital utilization that have recently taken place among the hospitalized population.

Table 1 contains NHIS and NHDS quarterly estimates of hospital discharge rates and estimates of average length of stay per discharge by age and sex, beginning with the January-March 1984 period and including the most recent quarterly

estimates available from each survey. Table 2 covers the period from 1982–86 (1985 for the NHDS) and includes estimates from both surveys of hospital discharge rates by age and sex. In table 3, unadjusted and age-adjusted hospital discharge rates for the years 1982–86 based on the NHIS are shown by sex, race, family income, poverty level, respondent-assessed health status, and geographic region. These estimates are only for persons under 65 years of age, however, because of the previously mentioned underreporting problems associated with the NHIS hospitalization estimates for the older populations. Table 4 is included for comparative purposes only, showing 1983 and 1985 NHIS hospital discharge rates and estimates of average length of stay for the population 65 years and over by sex, race, family income, poverty level, respondent-assessed health status, and geographic region. Table 5 shows 1982–86
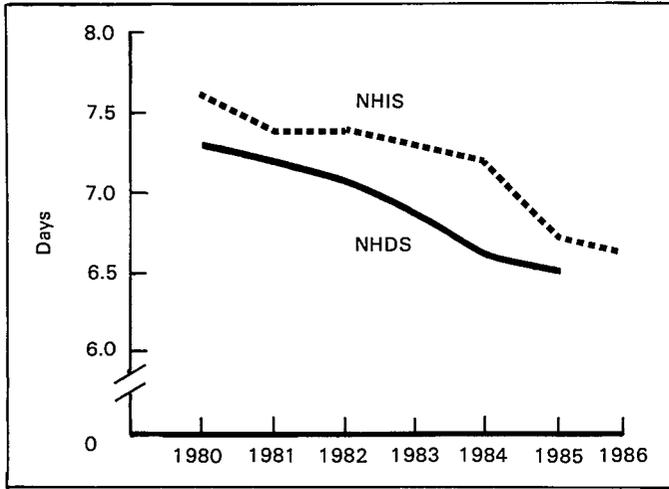
Figure 2. National Hospital Discharge Survey (NHDS) and National Health Interview Survey (NHIS) average length of stay in short-stay hospitals: United States, 1980–86

NHIS estimates and 1982–85 NHDS estimates of average length of stay per hospitalization by age and sex. Table 6 contains unadjusted and age-adjusted NHIS 1982–86 estimates of average number of days per hospital stay for persons under the age of 65 years by sex, race, family income, poverty level, respondent-assessed health status, and geographic region.

The "Technical notes" contain a brief description of the sample design, the methods used in estimation, and general qualifications of the data for both surveys. The definitions of terms used in this report can also be found in this section. A detailed discussion of these items and the survey forms used to collect the data from both surveys have been published.[15-17]

The 1986 NHIS hospital discharge rates and average length of stay estimates are presented in tables 1–6, and the text primarily focuses on a comparison between the 1983 and 1985 estimates. The 1985 estimates are highlighted instead of the 1986 figures because the 1985 estimates are available from both surveys.

Table 2. Number of discharges from short-stay hospitals per 1,000 persons per year by sex and age based on data from the National Health Interview Survey and the National Hospital Discharge Survey: United States, 1982–86

Sex and age	National Health Interview Survey					National Hospital Discharge Survey				
	1982	1983	1984	1985	1986	1982	1983	1984	1985	1986
Both sexes	Discharge rate per 1,000 persons									
All ages	139.8	140.3	133.6	123.7	118.0	167.9	167.0	158.5	147.9	- - -
Under 15 years	59.4	58.2	61.0	51.3	48.1	71.2	70.8	62.0	57.2	- - -
Under 5 years	91.4	90.1	96.7	81.4	73.8	115.9	116.8	101.5	94.7	- - -
5–14 years	43.0	41.3	41.7	35.3	34.2	48.3	46.6	41.2	37.3	- - -
15–44 years	125.1	122.7	112.2	103.5	102.3	145.0	140.3	132.2	125.1	- - -
15–24 years	113.1	115.2	107.1	92.7	94.5	133.8	129.1	121.4	116.7	- - -
25–44 years	132.3	127.0	115.1	109.3	106.2	151.9	146.9	138.1	129.5	- - -
45–64 years	176.6	172.8	160.6	162.2	142.0	195.5	192.2	183.3	169.5	- - -
45–54 years	152.7	139.3	141.5	141.6	110.6	174.3	167.0	158.3	146.2	- - -
55–64 years	200.8	206.6	179.8	183.0	174.2	217.0	217.5	208.4	193.1	- - -
65 years and over	299.6	321.7	318.0	281.5	275.3	398.8	412.7	400.4	368.3	- - -
65–74 years	265.1	280.7	277.7	247.4	236.8	324.2	334.2	319.6	294.9	- - -
75 years and over	356.7	388.5	382.6	336.5	337.3	511.4	529.4	520.1	476.5	- - -
Male										
All ages	119.8	117.9	112.1	105.5	101.4	139.4	138.8	131.6	123.5	- - -
Under 15 years	65.1	66.9	66.2	60.6	50.7	79.9	79.0	69.2	63.8	- - -
Under 5 years	106.6	107.4	107.1	99.1	85.8	132.9	132.2	114.8	107.3	- - -
5–14 years	43.7	45.4	44.1	40.0	31.8	52.8	50.8	45.2	40.8	- - -
15–44 years	82.8	73.9	65.1	57.6	62.2	87.4	84.3	79.6	75.4	- - -
15–24 years	69.9	68.6	58.2	41.5	48.4	71.3	68.0	63.7	59.9	- - -
25–44 years	90.7	77.0	69.0	66.3	69.2	97.3	94.0	88.5	83.8	- - -
45–64 years	176.2	178.6	175.7	176.6	161.1	196.3	196.6	185.8	176.2	- - -
45–54 years	139.3	133.4	152.2	150.0	118.7	163.9	160.3	153.5	146.1	- - -
55–64 years	215.0	225.7	200.3	204.4	206.1	230.1	234.3	219.4	207.6	- - -
65 years and over	330.0	344.7	334.6	309.7	298.0	428.1	437.2	424.8	393.2	- - -
65–74 years	302.0	312.3	299.6	273.4	264.6	353.3	361.4	345.2	319.9	- - -
75 years and over	384.7	407.1	401.3	379.5	362.6	566.8	575.8	571.2	528.2	- - -
Female										
All ages	158.4	161.2	153.5	140.8	133.6	194.5	193.2	183.6	170.7	- - -
Under 15 years	53.4	49.1	55.6	41.7	45.3	62.0	62.3	54.5	50.2	- - -
Under 5 years	75.3	72.0	85.7	62.8	61.2	98.3	100.6	87.8	81.5	- - -
5–14 years	42.3	37.0	39.4	30.4	36.8	43.5	42.1	37.1	33.6	- - -
15–44 years	165.6	169.6	157.7	147.6	141.0	201.0	194.8	183.1	173.4	- - -
15–24 years	155.1	160.8	155.0	142.7	139.6	195.6	189.6	178.2	172.7	- - -
25–44 years	171.8	174.6	159.1	150.2	141.7	204.2	197.8	185.8	173.8	- - -
45–64 years	176.9	167.6	147.0	149.1	124.6	194.8	188.3	180.9	163.4	- - -
45–54 years	165.3	144.9	131.6	133.8	103.1	183.9	173.3	162.8	146.3	- - -
55–64 years	188.4	189.8	162.0	164.1	146.0	205.5	202.9	198.6	180.2	- - -
65 years and over	278.6	305.9	306.5	261.8	259.4	379.1	396.3	383.9	351.4	- - -
65–74 years	236.8	256.4	260.9	227.1	214.9	301.9	313.3	299.8	275.2	- - -
75 years and over	340.6	377.8	371.7	311.5	322.7	481.2	503.9	492.3	448.5	- - -

Table 3. Unadjusted and age-adjusted number of discharges from short-stay hospitals per 1,000 persons per year under 65 years of age, by selected characteristics based on data from the National Health Interview Survey (NHIS): United States, 1982–86

Characteristic	Unadjusted discharges					Age-adjusted[1] discharges				
	1982	1983	1984	1985	1986	1982	1983	1984	1985	1986
Sex	Discharge rate per 1,000 persons									
Male	92.5	94.0	88.4	83.2	79.7	97.4	95.2	89.6	84.4	81.2
Female	137.0	139.8	130.6	122.4	114.4	139.5	140.7	131.2	123.0	114.8
Race										
White	113.2	116.7	109.7	103.3	96.9	116.2	116.8	109.7	103.4	97.1
Black	131.9	126.5	119.4	110.4	104.9	142.9	136.1	127.8	118.5	111.4
Family income										
Under $10,000	159.4	153.2	146.1	139.3	131.2	173.4	162.9	154.2	148.0	140.5
Under $5,000	173.8	155.4	144.6	138.5	130.9	187.7	165.9	154.8	149.9	140.0
$5,000–$9,999	150.5	151.7	147.1	139.9	131.5	164.3	160.1	154.5	147.1	140.6
$10,000–$19,999	118.1	117.9	125.8	117.4	112.3	125.1	120.8	128.8	121.1	115.9
$10,000–$14,999	125.0	119.8	136.4	122.7	122.5	133.2	122.7	139.3	126.1	127.5
$15,000–$19,999	112.1	116.2	116.3	113.0	103.6	118.2	119.3	119.4	116.8	106.0
$20,000–$34,999	102.5	112.5	102.6	102.5	96.2	106.5	114.5	104.7	105.8	98.1
$20,000–$24,999	107.3	111.5	111.9	106.3	104.1	112.1	113.9	113.4	110.5	105.3
$25,000–$34,999	99.7	113.2	97.4	100.5	92.4	103.2	114.9	99.7	103.3	94.8
$35,000 or more	95.7	96.2	86.0	80.6	78.2	95.4	94.4	84.8	79.5	77.5
$35,000–$49,999	93.5	99.5	86.7	85.3	78.1	93.7	98.9	86.6	85.2	78.4
$50,000 or more	100.4	89.6	84.7	73.5	78.3	98.6	85.7	80.4	71.0	76.3
NHIS poverty index										
Below poverty line	154.2	140.1	145.6	128.5	128.5	177.1	161.0	165.4	150.4	148.1
Above poverty line	110.4	114.8	105.2	100.7	92.6	113.6	115.3	105.2	100.8	92.2
Assessed health status										
Excellent or good	89.4	90.9	83.5	79.5	75.2	91.4	92.7	85.0	81.1	76.3
Excellent	75.2	73.9	66.1	63.0	61.0	77.0	75.9	67.5	64.4	62.6
Good	133.7	143.1	136.7	132.7	120.6	133.6	142.2	135.2	130.0	120.4
Fair or poor	438.1	410.9	403.0	391.5	372.9	422.0	388.2	393.8	355.3	338.9
Fair	309.2	301.9	297.3	274.7	253.0	310.6	303.7	310.7	265.2	243.2
Poor	843.0	728.2	734.9	721.4	718.0	376.8	215.5	255.8	221.5	196.4
Geographic region										
Northeast	99.3	105.3	101.2	96.2	87.2	101.1	104.1	100.8	95.1	86.3
North Central/Midwest	119.1	122.5	117.1	105.7	98.9	123.9	124.3	118.3	106.9	99.9
South	135.0	133.0	117.7	113.3	112.3	140.4	135.0	119.6	115.4	114.5
West	93.6	96.8	96.1	89.3	80.2	96.6	98.6	97.6	91.0	81.2

[1] Age adjusted by the direct method to the age distribution of the 1980 total civilian noninstitutionalized population of the United States (under 15, 15–24, 25–44, and 45–64 years).

Terms used in this report such as "similar" and "the same" indicate that no statistical significance exists between the statistics being compared. Terms that relate to differences (such as "greater" or "less") indicate that differences are statistically significant. The t-test with a critical value of 1.96 (0.05 level of significance) was used to test all comparisons that are discussed. Lack of comment regarding the difference between any two statistics does not mean that the difference was tested and found to be not significant.

Hospital discharges

In the 2-year period since HCFA introduced its prospective payment system for medicare patients, the overall hospital discharge rate from short-stay non-Federal hospitals dropped from 167.0 discharges per 1,000 civilian population in 1983 to 147.9 discharges in 1985, a decline of about 11 percent according to NHDS figures (table 2). The discharge estimates from the NHIS, although lower, show about a 12-percent decline over this same period.

Although the prospective payment system based on DRG's was initially developed for the population covered by medicare, it was introduced during a period of time of substantial hospital utilization decreases for each of the four major age groups. Indeed, for children there was about a 19-percent reduction in the discharge rate between 1983 and 1985 (from 70.8 to 57.2 discharges per 1,000 population under 15 years of age), the largest decrease of any age group. The discharge estimates for persons 65 years of age and over and all other age groups declined at about the same rate (from 10 to 12 percent).

The overall hospital discharge rate is always higher for females than for males because of the large number of women in their childbearing years (15–44 years of age) who are hospitalized for deliveries and other obstetrical conditions. Nevertheless, proportionately the rate of decline in discharges for males and females during this period was also about the same

Table 4. Number of discharges from short-stay hospitals per 1,000 persons per year and average length of stay for persons 65 years and over, by selected characteristics based on data from the National Health Interview Survey (NHIS): United States, 1983 and 1985

	All discharges		Days per hospital stay	
Characteristic	1983	1985	1983	1985
	Discharge rate per 1,000 persons		Average length of stay	
Sex				
Male	344.7	309.7	9.7	8.4
Female	305.9	261.8	9.2	9.0
Race				
White	316.9	282.8	9.4	8.6
Black	384.1	280.5	10.3	10.0
Family income				
Under $10,000	364.5	295.3	9.3	9.5
$10,000–$19,999	299.8	275.8	9.6	8.5
$20,000–$34,999	239.9	261.2	8.3	7.5
$35,000 or more	300.1	268.7	7.9	7.5
NHIS poverty index				
Below poverty line	367.0	321.2	10.1	11.6
Above poverty line	314.6	272.2	9.1	8.0
Assessed health status				
Excellent or good	198.8	177.0	8.0	8.6
Excellent	159.9	141.9	7.5	7.4
Good	244.0	216.1	8.4	9.5
Fair or poor	569.8	508.5	10.4	8.8
Fair	383.0	339.7	9.5	8.2
Poor	940.7	876.9	11.2	9.2
Geographic region				
Northeast	275.3	265.5	11.7	9.9
North Central/Midwest	323.9	280.1	8.9	8.9
South	367.6	306.8	9.3	8.8
West	297.3	254.3	7.9	6.6

(from 138.8 to 123.5 and from 193.2 to 170.7 discharges per 1,000 males and females, respectively). Hospital discharges also decreased between 1983 and 1985 at about the same rate for men and women aged 65 years and over (437.2 to 393.2 and 396.3 to 351.4 discharges per 1,000 persons, respectively).

Table 3 shows the unadjusted and age-adjusted number of short-stay hospital discharges per 1,000 persons for selected sociodemographic and health-related characteristics. Because the age distributions in the groups shown may differ considerably, comparisons should be made by using the adjusted rates. Age-adjusted data can be compared directly because the rates assume identical distributions in broad age categories for all groups. However, these adjusted or standardized rates do not describe any actual population. They are meaningful only in comparing other similarly adjusted rates. The unadjusted rates are the actual ones, which should be used when describing the hospital rates for the civilian noninstitutionalized population. The procedure for the age adjustment by the direct method is described in the "Technical notes."

Table 3 contains hospital discharge data from the NHIS only because, as previously mentioned, much of the sociodem-

ographic and health-related information contained in the table is not available from the hospital records used by the NHDS to obtain its information. Race, while available from both surveys, is included only from the NHIS. The NHDS cautions its use because race is not stated on approximately 9 percent of all of the medical records the NHDS uses to obtain its information.

Data in table 3 are further limited to persons under 65 years of age because hospitalizations for persons 65 years of age and over are not well reported in the NHIS. Elderly persons are more likely to die or transfer to a long-term-care institution between the hospitalization and the scheduled interview, and as a result are not part of the population represented by the NHIS household sample. In contrast, most persons under 65 years when discharged from the hospital return to a household, and thus are part of the population whose experience is covered by the NHIS household sample. Also, if a sample household member is hospitalized at the time of the survey, other household members are less likely to be found at home to interview, and the hospitalization is not represented in the survey. Although this problem occurs for hospitalizations at all ages, it is greater for hospitalized persons 65 years and over, because there are usually fewer persons in their households to be potential survey respondents.

The hospital discharge rate for black persons under 65 years exceeded that for white persons in all years. The rate of decline in hospital discharges for black and white persons between 1983 and 1985 was similar, approximately 12.7 percent and 11.5 percent, respectively (from 126.5 to 110.4 discharges per 1,000 black persons and from 116.7 to 103.3 discharges per 1,000 white persons).

Data for the 5 years covered in table 3 show a distinct pattern of lower rates of hospital discharges associated with higher levels of family income. In 1985, for instance, the age-adjusted hospital discharge rate was about twice as high for persons with family incomes under $10,000 compared with family incomes of $50,000 or more (148.0 and 71.0 discharges per 1,000 persons aged under 65 years).

Between 1983 and 1985, the (unadjusted) hospital discharge rate declined about 9 percent for persons with family incomes under $10,000 and about 18 percent for persons with incomes of $50,000 or more. The differences between the estimates over this 2-year period for most of the individual income categories shown in table 3, however, are not statistically significant.

The NHIS determinants for classifying persons above or below the poverty level include three variables—family size, number of children under 18 years of age, and family income. The "Technical notes" contain a description of this variable. The change in the hospital discharge rates between 1983 and 1985 for the two poverty status categories included in table 3 mirrors the change found by family income categories.

Data on assessed health status result from asking respondents to assess their own health and that of other family members as excellent, very good, good, fair, or poor. The finding that hospital discharges among persons considered in fair or poor health far exceed the rate for persons in excellent or good health is not surprising. Between 1983 and 1985, hospital discharges (unadjusted) for persons aged under 65 years assessed in excellent or good health declined about 13 percent. While

Table 5. Average length of stay for persons discharged from short-stay hospitals by sex and age based on data from the National Health Interview Survey and the National Hospital Discharge Survey: United States, 1982–86

Sex and age	National Health Interview Survey					National Hospital Discharge Survey				
	1982	1983	1984	1985	1986	1982	1983	1984	1985	1986
Both sexes	Average length of stay									
All ages	7.4	7.3	7.2	6.7	6.6	7.1	6.9	6.6	6.5	- - -
Under 15 years	6.4	6.0	5.5	5.3	6.0	4.6	4.6	4.5	4.6	- - -
Under 5 years	6.8	6.7	6.2	5.1	7.6	5.0	5.0	4.8	4.9	- - -
5–14 years	6.0	5.1	4.6	5.5	4.2	4.1	4.0	4.0	4.1	- - -
15–44 years	5.8	5.5	5.7	5.0	5.3	5.1	5.0	4.9	4.8	- - -
15–24 years	4.8	4.4	4.5	4.3	4.0	4.5	4.4	4.2	4.2	- - -
25–44 years	6.3	6.1	6.3	5.3	5.8	5.5	5.4	5.2	5.1	- - -
45–64 years	8.4	8.4	8.4	8.0	6.8	7.9	7.6	7.2	7.0	- - -
45–54 years	8.0	7.7	7.6	7.0	6.5	7.3	7.1	6.8	6.6	- - -
55–64 years	8.8	8.9	8.9	8.7	7.0	8.3	8.0	7.5	7.4	- - -
65 years and over	9.6	9.4	9.2	8.7	8.5	10.1	9.7	8.9	8.7	- - -
65–74 years	9.8	9.1	9.1	8.4	8.7	9.6	9.2	8.5	8.2	- - -
75 years and over	9.4	9.9	9.3	9.1	8.3	10.6	10.2	9.3	9.2	- - -
Male										
All ages	8.0	8.2	8.2	7.4	7.2	7.5	7.4	7.0	6.9	- - -
Under 15 years	5.0	6.0	4.9	5.4	4.7	4.6	4.5	4.4	4.5	- - -
Under 5 years	4.7	7.0	5.3	5.0	4.9	5.0	4.9	4.6	4.7	- - -
5–14 years	5.4	4.6	4.4	6.0	4.4	4.1	4.0	4.1	4.3	- - -
15–44 years	7.2	7.3	7.4	5.9	6.9	6.3	6.2	6.0	6.1	- - -
15–24 years	5.8	5.4	4.8	5.2	5.2	6.0	5.8	5.6	5.7	- - -
25–44 years	7.8	8.3	8.7	6.2	7.5	6.4	6.3	6.2	6.2	- - -
45–64 years	8.5	8.5	9.1	8.5	7.2	7.8	7.6	7.1	6.9	- - -
45–54 years	7.6	8.2	7.5	6.9	6.8	7.3	7.1	6.7	6.5	- - -
55–64 years	9.1	8.7	10.4	9.8	7.4	8.1	7.9	7.4	7.3	- - -
65 years and over	10.1	9.7	9.5	8.4	8.5	9.8	9.6	8.8	8.4	- - -
65–74 years	10.2	9.6	9.6	8.6	9.4	9.4	9.1	8.4	8.1	- - -
75 years and over	10.1	10.0	9.3	8.1	7.1	10.3	10.2	9.3	8.8	- - -
Female										
All ages	7.0	6.7	6.6	6.3	6.1	6.8	6.6	6.3	6.2	- - -
Under 15 years	8.2	6.0	6.2	5.0	7.5	4.6	4.6	4.6	4.6	- - -
Under 5 years	9.8	6.3	7.3	5.2	11.6	5.1	5.1	5.2	5.3	- - -
5–14 years	6.6	5.7	5.0	4.7	3.9	4.0	4.1	3.9	3.8	- - -
15–44 years	5.1	4.8	5.0	4.7	4.5	4.6	4.6	4.4	4.3	- - -
15–24 years	4.3	4.0	4.4	4.1	3.6	4.0	3.9	3.8	3.7	- - -
25–44 years	5.6	5.2	5.3	5.0	5.0	5.0	5.0	4.8	4.6	- - -
45–64 years	8.4	8.3	7.6	7.4	6.3	8.0	7.6	7.2	7.1	- - -
45–54 years	8.3	7.3	7.8	7.1	6.1	7.3	7.0	6.9	6.7	- - -
55–64 years	8.5	9.1	7.4	7.6	6.5	8.5	8.1	7.5	7.5	- - -
65 years and over	9.2	9.2	9.0	9.0	8.6	10.3	9.8	9.0	9.0	- - -
65–74 years	9.4	8.6	8.7	8.2	8.1	9.7	9.3	8.5	8.3	- - -
75 years and over	9.0	9.8	9.3	9.9	9.1	10.8	10.2	9.3	9.4	- - -

the rate of hospital discharges appears lower for persons in fair health in 1985 than in 1983, this difference may be due to sampling variation. Similarly, hospital discharges did not decline significantly for persons under age 65 years who were considered to be in poor health.

The distribution of hospital discharge rates by region is quite similar for 1983 and 1985; that is, the discharge rates were higher in the North Central or Midwest and the South regions in both years. The hospital discharge rates for the regions with the highest rates declined about 14 percent between 1983 and 1985. The apparent difference in the hospital discharge rates for the same period for the West and Northeast regions, in contrast, were within sampling variation.

Although it is recognized that the NHIS hospital discharge estimates for older persons reflect a substantial undercount, selected NHIS hospital discharge estimates for the older population group are nevertheless shown in table 4 to enable a comparison between the 1983 and 1985 estimates for persons under and over 65 years of age. Among persons 65 years and over living in the community, the hospital discharge rates between 1983 and 1985 declined about 11 percent for white persons and about 27 percent for black persons while for persons under 65 years, the decline was similar for white and black persons, about 12 percent. Hospital discharge rates for persons aged 65 years and over with family income under $10,000 declined about 19 percent while rates for persons of similar age with incomes of $35,000 or more declined about 11 percent. In contrast, among persons under 65 years of age the hospital discharge rate for persons with family income under $10,000 declined about 9 percent and for those with family incomes of $50,000 or more, the hospital discharge rate declined about 18 percent.

Table 6.   Unadjusted and age-adjusted average length of stay for all discharges from short-stay hospitals among persons under 65 years of age, by selected characteristics based on data from the National Health Interview Survey (NHIS): United States, 1982–86

| | Unadjusted average length of stay | | | | | Age-adjusted[1] average length of stay | | | | |
Characteristic	1982	1983	1984	1985	1986	1982	1983	1984	1985	1986
Sex					Days per hospital stay					
Male...	7.1	7.5	7.6	7.0	6.7	6.9	7.2	7.2	6.3	6.5
Female...	6.2	5.8	5.8	5.4	5.3	6.6	5.8	5.9	5.3	5.6
Race										
White..	6.3	6.3	6.2	5.9	5.6	6.1	6.0	5.8	5.5	5.5
Black	8.4	7.9	8.5	7.1	7.6	8.7	7.7	8.4	6.8	7.7
Family income										
Under $10,000	7.8	7.5	8.3	7.7	5.5	7.9	7.3	8.0	6.9	5.5
Under $5,000	7.2	8.2	7.6	7.7	6.1	7.0	8.1	7.8	7.2	6.2
$5,000–$9,999	8.3	7.1	8.7	7.7	5.0	8.4	6.8	8.1	6.6	5.0
$10,000–$19,999	6.6	6.6	6.9	6.0	6.6	6.6	6.3	6.5	5.8	6.4
$10,000–$14,999	6.1	6.8	7.2	5.6	6.2	6.1	6.6	6.6	5.3	5.7
$15,000–$19,999	7.0	6.5	6.5	6.4	7.0	6.9	6.1	6.3	6.3	7.1
$20,000–$34,999	6.1	5.5	5.4	5.5	5.8	6.1	5.5	5.1	5.3	5.9
$20,000–$24,999	6.2	5.7	5.3	5.6	5.6	6.3	5.5	5.0	5.1	5.7
$25,000–$34,999	6.1	5.4	5.4	5.5	5.9	6.0	5.4	5.1	5.4	6.1
$35,000 or more....................................	5.5	6.2	5.1	5.3	4.8	5.3	6.1	5.1	5.0	4.7
$35,000–$49,999	5.3	6.4	5.2	5.2	4.7	5.1	6.3	5.2	5.0	4.5
$50,000 or more.................................	5.9	5.9	4.9	5.3	4.9	5.7	5.6	4.8	5.1	5.2
NHIS poverty index										
Below poverty line	7.3	7.4	7.0	6.5	5.5	7.4	7.6	7.0	6.3	5.6
Above poverty line	6.4	6.2	6.2	5.9	5.7	6.4	6.1	5.9	5.6	5.7
Assessed health status										
Excellent or good	5.3	5.4	5.2	5.0	4.7	5.5	5.4	5.2	5.0	4.8
Excellent	4.6	5.0	4.6	4.4	4.3	4.7	5.1	4.7	4.5	4.3
Good	6.6	6.0	6.0	5.8	5.5	6.9	5.8	5.8	5.7	5.5
Fair or poor	9.7	9.4	9.5	8.6	8.5	9.1	9.1	9.1	7.5	9.8
Fair..	8.2	8.2	9.4	8.3	6.7	8.0	8.1	9.0	7.6	6.6
Poor...	11.4	10.8	9.7	9.0	10.4	10.8	10.6	9.4	7.5	15.3
Geographic regon										
Northeast...	7.4	7.0	7.1	7.0	6.0	7.4	6.6	6.7	6.7	5.8
North Central/Midwest..............................	6.7	7.0	6.7	6.3	6.0	6.4	6.6	6.6	6.0	6.0
South..	6.4	6.2	6.6	6.0	5.8	6.4	6.0	6.3	5.6	5.7
West	5.8	6.0	5.2	4.7	5.4	6.0	6.0	5.1	4.4	5.6

[1]Age adjusted by the direct method to the age distribution of the 1980 total civilian noninstitutionalized population of the United States (under 15, 15–24, 25–44, and 45–64 years).

Length of hospital stay

Table 5 contains the NHDS and NHIS estimates of average lengths of hospital stay by age and sex. Although the NHDS and the NHIS data sets produce somewhat different results for specific age and sex groups, both data sources reveal longer stays among the older age groups and shorter stays for females of childbearing age compared with males in the same age group.

As mentioned previously, the overall average length of stay for hospitalized patients has gradually declined since the early 1970's. The year-to-year differences, which are relatively small, however, are seldom statistically significant. This is illustrated in the 1983–85 period as well.

While the 1985 NHDS estimate of 6.5 days per hospital discharge is significantly lower than the 6.9-day-per-stay average in 1983 (about 6 percent), the apparent decline in NHIS corresponding length of stay estimates during this 2-year period

is not statistically significant. Both the NHDS and the NHIS length-of-stay estimates were significantly lower in 1985 than in 1983, however, for males 45–54 years, 65 years and over, and 75 years and over.

Although there is a high level of general agreement between the two surveys, within the specific age and sex groups there are some different findings. Based on the NHIS, hospital stays for children under 5 years of age were significantly shorter, for example, declining from 6.7 days in 1983 to 5.1 days in 1985. The NHDS length-of-stay estimates for children these ages, however, did not indicate a significant decline. Differences were also noted in the NHDS and NHIS length-of-stay estimates among males 15–44 years of age. According to NHIS figures, the average length of a hospital stay among males these ages declined about 19 percent between 1983 and 1985; the corresponding NHDS rates remained virtually unchanged.

Table 6 shows unadjusted and age-adjusted average lengths of stay per hospital discharge for selected sociodemographic

and health-related characteristics. The table is similar to table 3 in that it only contains data from the NHIS for persons under 65 years. This table shows an inverse relationship between family income and length of hospital stay even after adjusting for age. In 1985, for example, the age-adjusted figures show that persons under 65 years of age with family incomes under $10,000 averaged 6.9 days per hospital stay while those with family incomes at $35,000 or more averaged 5.0 days. Between 1983 and 1985, the (unadjusted) average-length-of-stay estimates were about the same for persons these ages whose family income was less than $10,000 while for persons reporting incomes at $35,000 or above, the rates declined about 15 percent.

An inverse relationship is also found in the length-of-stay estimates by respondent-assessed health status. The length-of-stay estimates for persons in poor health declined about 17 percent between 1983 and 1985, from 10.8 to 9.0 days. This is the only health status category in which the 1985 estimate was significantly lower than the 1983 estimate. Similarly, the West was the only region of the country where the 1985 estimate for average length of a hospital stay was significantly different from the 1983 estimate. Specifically, the length-of-stay estimates for the West region declined over 20 percent during this period, from 6.0 to 4.7 days per hospital stay.

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Technical notes

National Hospital Discharge Survey methodology

Source and description of data

The National Hospital Discharge Survey (NHDS) samples the records of inpatients discharged from noninstitutional 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 for patient use and those in which the average length of stay for all patients is less than 30 days are included in the survey. Discharges of all patients from Federal hospitals are excluded. In this report, discharges of newborn infants are also excluded.

The Master Facility Inventory of Hospitals (MFI) is the universe from which the NHDS sample is drawn. The original universe for the survey consisted of 6,965 short-stay hospitals contained in the 1963 MFI. New hospitals were sampled for inclusion in the survey in 1972, 1975, 1977, 1979, 1981, 1983, and 1985.

The number of hospitals participating in the survey varies from year to year, as do the number of abstracts of medical records provided by participating hospitals. This is because each year some of the sampled hospitals refuse to participate in the survey or are found to be out of scope either because they have gone out of business or fail to meet the definition of a short-stay hospital. 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 194,000 abstracts of medical records.

The medical record data consist of 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 have also been collected.

Sample design

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

Until 1985, all 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 within-hospital sampling ratio for selecting sample discharges varied inversely with the probability of selection of the hospital. 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), after which the completed forms were forwarded to NCHS for coding, editing, and weighting procedures.

In 1985, there were two data collection procedures used by the NHDS. The first was the traditional manual system of sample selection and data abstraction previously described. The second was an automated method used in approximately 17 percent of the sample hospitals that involved the purchase of data tapes from commercial abstracting services. For the automated hospitals, tapes containing machine-readable medical record data are subject to NCHS sampling, editing, and weighting procedures. A detailed description of the automated process is to be published.

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.[18,19]

As in any survey, results are subject to nonsampling or measurement errors, which include errors resulting from hospital nonresponse, missing abstracts, information incompletely or inaccurately recorded on the abstract forms, and processing errors. For example, the age and sex of the patient are not stated on the hospital records for about one-half of 1 percent of the discharges. Imputations of these missing items are made by assigning the patient an age or sex consistent with the age or sex of other patients with the same diagnostic code.

If the dates of admission or discharge are not given and cannot be obtained from the monthly sample listing sheet transmitted by the sample hospital, a length of stay is imputed by assigning the patient a length of stay characteristic of the stays of other patients of the same age. About one-tenth of 1 percent of the records are missing the date of admission or discharge.

National Health Interview Survey methodology

Source and description of data

The National Health Interview Survey (NHIS) is a continuous, cross-sectional, nationwide survey conducted by household interview. Each week a probability sample of households is interviewed by personnel of the U.S. Bureau of the Census (as agents for NCHS) to obtain information on the health and other characteristics of each member of the household.

The population covered by the NHIS is the civilian, resident, noninstitutionalized population of the United States living

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NOTE: A list of references follows the text.

at the time of interview. The sample does not include persons residing in nursing homes, members of the Armed Forces, institutionalized persons, or U.S. nationals living abroad.

The completion rate for the survey has been between 96 and 98 percent over the years. The interviewed sample for 1985 was composed of 34,844 households containing 91,531 persons. The total noninterview rate for the basic health and demographic household questionnaire was 4.3 percent—2.6 percent was due to respondent refusal and the remainder was primarily due to an inability to locate an eligible respondent at home after repeated calls.

The NHIS questionnaire contains two major parts: The first consists of topics that remain the same from year to year. Among these topics are the incidence of acute conditions, the prevalence of chronic conditions, persons limited in activity due to chronic conditions, restriction in activity due to impairment or health problems, and utilization of health care services involving physician care and short-stay hospitalization. The second part consists of questions on special health topics that change each year.

Sample design

The sample of the NHIS follows a multistage probability design that permits a continuous sampling of the civilian non-institutionalized population residing in the United States. The survey is designed so that the sample scheduled for each week is representative of the target population and the weekly samples are additive over time. In 1985, the NHIS adopted several new sample design features although, conceptually, the sampling plan remained the same as the previous design. The major changes included (a) reducing the number of primary sampling locations from 376 to 198 for sampling efficiency, (b) oversampling the black population to improve the precision of the statistics, (c) subdividing the NHIS sample into four separate representative panels to facilitate linkage to other NCHS surveys, and (d) using an all-area frame not based on the decennial census to facilitate NCHS survey linkage and to conduct NHIS followback surveys.

The first stage of the sample design consists of drawing a sample of primary sampling units (PSU's) (376 prior to 1985 and 198 PSU's afterward) from the universe of 1,900 PSU's. Beginning in 1985, the 52 largest PSU's, referred to as self-representing PSU's, are selected into the sample with certainty. The other PSU's, referred to as non-self-representing PSU's, are clustered into 73 strata, and 2 sample PSU's are chosen from each stratum with probability proportional to size.

For purposes of this discussion, the remaining stages can be combined. Ultimately, these "second stage" units, or segments, are defined so that within each, all occupied households are targeted for interview.

Prior to 1985, three types of segments were used: (a) area segments, which are defined geographically; (b) list segments, using 1980 census registers as the frame; and (c) permit segments, using updated lists of building permits issued in sample PSU's since 1980. In the 1985 design, only two types of segments within a PSU are used: area segments, containing an expected eight households, and permit segments, containing an expected four households.

Presentation of estimates

Because the design of NHIS is a complex multistage probability sample, it is necessary to reflect these complex procedures in the derivation of estimates. The NHIS estimates presented in this report are based upon sample person counts for each year weighted to produce national estimates. The weight for each sample person is the product of four component weights: probability of selection, household nonresponse adjustment within segment, first-stage ratio adjustment, and poststratification by age, sex, and race.

The main effect of the ratio-estimating process is to make the sample more closely representative of the target population by age, sex, race, and residence. The poststratification adjustment helps to reduce the component of bias resulting from sampling frame undercoverage; furthermore, this adjustment frequently reduces sampling variance.

Because NHIS estimates are based on a sample, they may differ somewhat from the figures that would have been obtained had a complete census been taken using the same survey and processing procedures. To the extent possible, sampling and nonsampling errors are kept to a minimum by methods built into the survey procedures.

NHIS hospital discharge data are based on hospital discharges reported to have occurred within 6 months of the week of interview. Analysis has shown that there is an increase in underreporting of hospitalizations with an increase in the time interval between the discharge and the interview. The underreporting of discharges within 6 months of the week of interview is estimated to be about 5 percent.[20] Because hospitalization is common in the period immediately preceding death or institutionalization and older persons are much more likely to die than younger ones, the underrepresentation for this specific NHIS estimate of elderly persons in particular may be sizable.

Descriptive material on data collection, field procedures, and questionnaire development in NHIS have been published as well as a detailed description of the sample design, estimation procedure, and qualifications of the data.[14,17]

Age-adjusted rates

This report includes data that have been adjusted by the direct method to the age distribution of the selected standard population, in this case the 1980 total civilian noninstitutionalized population of the United States. Age adjustment by the direct method is accomplished by multiplying the age-specific rate for each age group by the population for the corresponding age group in the standard population. The cross products of the multiplications are summed and divided by the total of the standard population to obtain the age-adjusted rate. Four age groups were used for the age adjustment in this report: under 15, 15–24, 25–44, and 45–64 years.

Sampling errors

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 chances are about 68 out of

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NOTE: A list of references follows the text.

100 that an estimate from the sample would differ from a complete census by less than the standard error. The chances are about 95 out of 100 that the difference would be less than twice the standard error and about 99 out of 100 that it would be less than 2½ times as large. 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 of estimated numbers of hospital discharges are shown in table I. The standard errors for average lengths of stay are shown in table II. Table III contains estimated numbers of discharges based on the NHDS and the NHIS to enable interested readers to derive approximate standard errors of the rates presented in this report.

Definitions of terms

Hospital

NHDS—Short-stay special and general hospitals having 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.

NHIS—Any institution that is named in the listing of hospitals maintained by the American Hospital Association as a general hospital; maternity hospital; eye, ear, nose, and throat hospital; children's hospital; or osteopathic specialty hospital. Hospital departments of an institution may be included.

Patient/inpatient

NHDS—A person who is formally admitted to the inpatient service of a short-stay hospital for observation, care, diagnosis, or treatment. Infants admitted on the day of birth, directly or by transfer from another medical facility, with or without mention of disease, disorder, or immaturity, are included.

Hospital discharge

NHDS—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.

NHIS—The completion of any continuous period of stay of 1 night or more in a hospital as an inpatient.

In this report, all newborn infants, defined as those admitted by birth to the hospital, are excluded from the NHDS estimates whereas all *well* newborn infants admitted by birth to the hospital are excluded from the NHIS estimates.

Hospital discharge rate

NHDS—The ratio of the number of hospital discharges during a year to the number of persons in the civilian population on July 1 of that year.

NHIS—The ratio of the number of hospital discharges during a year to the average number of persons in the civilian noninstitutionalized population of the United States for that year.

Length of hospital stay

NHDS—The total number of days accumulated by a patient at time of discharge. For patients admitted and discharged

Table I. Approximate relative standard errors (in percent) of estimated numbers of hospital discharges based on data from the National Hospital Discharge Survey and the National Health Interview Survey: United States, 1983 and 1985

	National Hospital Discharge Survey		National Health Interview Survey	
Size of estimate	1983	1985	1983	1985
	Relative standard error			
500,000	4.8	4.0	11.5	13.0
1,000,000	4.2	3.5	8.2	9.2
1,500,000	3.9	3.3	6.7	7.5
2,000,000	3.7	3.1	5.8	6.5
3,000,000	3.5	2.9	4.7	5.4
4,000,000	3.3	2.8	4.1	4.7
5,000,000	3.2	2.7	3.7	4.2
10,000,000	2.9	2.4	2.7	3.0
15,000,000	2.8	2.3	2.2	2.5
20,000,000	2.7	2.2	1.9	2.2
30,000,000	2.5	2.1	1.6	1.8
40,000,000	2.5	2.1	1.4	1.6

Table II. Approximate standard errors of average lengths of stay by number of discharges based on data from the National Hospital Discharge Survey and the National Health Interview Survey: United States, 1983 and 1985

	NHDS average length of stay				NHIS average length of stay			
Number of discharges	4 days	6 days	8 days	10 days	4 days	6 days	8 days	10 days
1983				Standard error in days				
500,000	0.2	0.2	0.3	0.4	0.8	1.0	1.2	1.3
1,000,000	0.2	0.2	0.3	0.3	0.6	0.7	0.8	0.9
5,000,000	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4
10,000,000	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3
30,000,000	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2
1985								
500,000	0.1	0.2	0.3	0.3	0.8	0.9	1.2	1.4
1,000,000	0.1	0.2	0.2	0.3	0.6	0.8	0.9	1.1
5,000,000	0.1	0.1	0.2	0.2	0.4	0.5	0.6	0.8
10,000,000	0.1	0.1	0.2	0.2	0.3	0.5	0.6	0.8
30,000,000	0.1	0.1	0.1	0.2	0.3	0.5	0.6	0.8

Table III. Number of discharges from short-stay hospitals by sex and age based on data from the National Health Interview Survey and the National Hospital Discharge Survey: United States, 1982–86

Sex and age	National Health Interview Survey					National Hospital Discharge Survey				
	1982	1983	1984	1985	1986	1982	1983	1984	1985	1986
Both sexes					Number in thousands					
All ages	31,746	32,176	30,931	28,917	27,895	38,593	38,783	37,162	35,056	- - -
Under 15 years	3,040	3,000	3,146	2,657	2,499	3,654	3,654	3,208	2,972	- - -
Under 5 years	1,583	1,609	1,747	1,465	1,341	2,014	2,082	1,809	1,708	- - -
5–14 years	1,458	1,391	1,399	1,192	1,158	1,640	1,572	1,399	1,264	- - -
15–44 years	13,297	13,212	12,267	11,430	11,469	15,554	15,269	14,533	13,966	- - -
15–24 years	4,548	4,566	4,181	3,561	3,580	5,439	5,167	4,762	4,521	- - -
25–44 years	8,749	8,646	8,086	7,869	7,888	10,115	10,102	9,771	9,445	- - -
45–64 years	7,801	7,634	7,113	7,219	6,345	8,688	8,558	8,195	7,610	- - -
45–54 years	3,401	3,089	3,146	3,168	2,507	3,893	3,725	3,545	3,298	- - -
55–64 years	4,400	4,545	3,966	4,051	3,838	4,795	4,833	4,650	4,312	- - -
65 years and over	7,607	8,330	8,405	7,612	7,582	10,697	11,302	11,226	10,508	- - -
65–74 years	4,197	4,504	4,523	4,129	4,023	5,231	5,468	5,353	5,011	- - -
75 years and over	3,410	3,826	3,881	3,483	3,559	5,466	5,834	5,874	5,497	- - -
Male										
All ages	13,125	13,051	12,542	11,903	11,589	15,470	15,573	14,899	14,160	- - -
Under 15 years	1,703	1,762	1,746	1,604	1,350	2,098	2,084	1,831	1,698	- - -
Under 5 years	945	981	991	913	798	1,181	1,206	1,046	990	- - -
5–14 years	757	781	755	691	551	917	878	785	708	- - -
15–44 years	4,310	3,902	3,494	3,114	3,423	4,615	4,524	4,305	4,153	- - -
15–24 years	1,388	1,346	1,126	787	906	1,441	1,356	1,241	1,153	- - -
25–44 years	2,922	2,556	2,367	2,326	2,517	3,173	3,167	3,064	3,000	- - -
45–64 years	3,690	3,742	3,692	3,747	3,432	4,143	4,159	3,964	3,776	- - -
45–54 years	1,494	1,426	1,632	1,624	1,301	1,768	1,728	1,666	1,596	- - -
55–64 years	2,196	2,316	2,060	2,123	2,132	2,375	2,431	2,298	2,179	- - -
65 years and over	3,422	3,644	3,610	3,439	3,384	4,614	4,806	4,799	4,533	- - -
65–74 years	2,074	2,176	2,120	1,999	1,982	2,475	2,568	2,526	2,389	- - -
75 years and over	1,348	1,468	1,490	1,440	1,402	2.139	2,238	2,274	2,145	- - -
Female										
All ages	18,621	19,125	18,389	17,014	16,306	23,123	23,210	22,263	20,896	- - -
Under 15 years	1,338	1,238	1,401	1,053	1,150	1,556	1,570	1,377	1,274	- - -
Under 5 years	637	628	756	552	543	834	876	764	718	- - -
5–14 years	701	610	645	501	607	723	694	614	556	- - -
15–44 years	8,987	9,310	8,774	8,316	8,046	10,939	10,745	10,228	9,813	- - -
15–24 years	3,160	3,220	3,055	2,773	2,674	3,997	3,810	3,521	3,368	- - -
25–44 years	5,827	6,090	5,719	5,543	5,371	6,942	6,934	6,707	6,445	- - -
45–64 years	4,111	3,891	3,420	3,473	2,913	4,545	4,400	4,231	3,834	- - -
45–54 years	1,907	1,663	1,514	1,545	1,206	2,125	1,997	1,879	1,701	- - -
55–64 years	2,204	2,229	1,907	1,928	1,707	2,420	2,402	2,352	2,132	- - -
65 years and over	4,184	4,686	4,795	4,173	4,198	6,083	6,496	6,427	5,975	- - -
65–74 years	2,123	2,328	2,403	2,130	2,041	2,757	2,901	2,826	2,623	- - -
75 years and over	2,062	2,358	2,391	2,043	2,157	3,327	3,595	3,600	3,352	- - -

on different days, it includes all days from (and including) the date of admission to (but not including) the date of discharge. A stay of less than 1 day (patient admission and discharge on the same day) is counted as 1 day.

NHIS—The duration in days, exclusive of the day of discharge, of a hospital stay. Stays for patients admitted and discharged on the same day are not counted.

Average length of stay

NHDS and NHIS—The total number of hospital days accumulated at time of discharge by patients discharged, divided by the total number of hospital discharges.

Age

NHDS—The patient's age on the birthday prior to admission to the hospital inpatient service.

NHIS—The person's age on the birthday prior to the interview.

Race

NHIS—The population is divided into three racial groups; "white," "black," and "all other." "All other" includes Aleut, Eskimo, or American Indian; Asian or Pacific Islander; and any other races. Race characterization is based on the respondent's identification of his or her racial background.

Income of family or of unrelated individuals

NHIS—Each member of a family is classified according to the total income of the family of which he or she is a member. Within the household, all persons related to each other by blood, marriage, or adoption constitute a family. Unrelated individuals are classified according to their own incomes.

The income recorded is the total of all income received by members of the family (or by an unrelated individual) in the 12-month period preceding the week of interview. Income from all sources—for example, wages, salaries, rents from property, pensions, and help from relatives—is included.

Respondent-assessed health status

NHIS—The categories related to this concept result from asking the respondent, "Would you say _____'s health is excellent, very good, good, fair, or poor?" As such, it is based on a respondent's opinion and not directly on any clinical evidence.

Poverty

NHIS—Families and unrelated individuals are classified as being above or below the poverty level using the poverty index originated at the Social Security Administration in 1964 and revised by Federal Interagency Committees in 1969 and 1980. The poverty index is based solely on money income and does not reflect the fact that many low-income persons receive noncash benefits such as food stamps, medicaid, and public housing. The index is based on the Department of Agriculture's 1961 economy food plan and reflects the different consumption requirements of families based on their size and composition. The poverty thresholds are updated every year to reflect changes in the Consumer Price Index. Because NHIS data on

family income are collected by income categories rather than specific amounts of money, the NHIS estimates of persons living in poverty will vary slightly from the Current Population Survey estimates.

Geographic region

NHIS—The States are grouped into four regions that correspond to those used by the U.S. Bureau of the Census as follows:

Region	States included—
Northeast	Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, and Pennsylvania.
North Central or Midwest	Ohio, Illinois, Indiana, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Kansas, and Nebraska.
South	Delaware, Maryland, District of Columbia, West Virginia, Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Oklahoma, Arkansas, and Texas.
West	Washington, Oregon, California, Nevada, New Mexico, Arizona, Idaho, Utah, Colorado, Montana, Wyoming, Alaska, and Hawaii.

Symbols

- - - Data not available

. . . Category not applicable

- Quantity zero

0.0 Quantity more than zero but less than 0.05

Z Quantity more than zero but less than 500 where numbers are rounded to thousands

* Figure does not meet standard of reliability or precision

Figure suppressed to comply with confidentiality requirements

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