

Health Care Financing Note

Leading inpatient surgical procedures for aged Medicare beneficiaries, 1987

by Viola B. Latta and Roger E. Keene

Medicare program data on utilization and charges for short-stay hospital inpatient services are presented. The focus of this article is on trends in total and surgical discharges for selected years (1977-87) and highlights of regional variations in the most frequently reported (leading) surgical procedures performed on aged Medicare hospital insurance beneficiaries during 1987.

Introduction

Trend data for the U.S. census regions are presented for selected calendar years (1977, 1981, 1983, 1986, and 1987) to reflect regional variations in short-stay hospital (SSH) inpatient discharges and discharge rates (total and surgical) for aged Medicare beneficiaries (Table 1). For the 25 leading surgical procedures for aged enrollees, we focus on 1987 data to show regional variations in the number of surgical discharges and surgical discharge rates per 1,000 enrollees (Table 2), total charges and average charges per discharge (Table 3), and the number of total days of care and average length of stay per discharge (Table 4). The article includes a "Technical note" with definitions for the major surgical classifications and the 25 leading surgical procedures in 1987.

Procedure codes for the leading procedures were derived from the *International Classification of Diseases, 9th Revision, Clinical Modification*, (ICD-9-CM) (Public Health Service and Health Care Financing Administration), and only those codes designated as operating room procedures by the Health Care Financing Administration (HCFA) were included in the leading procedures. Thus, some diagnostic and therapeutic surgical procedures may have been more frequently reported than were the leading procedures but were excluded from the list of the leading procedures because they were not performed in an operating room. Although as many as three ICD-9-CM procedure codes are reported on the HCFA Form 1450, only the principal procedure code has been used in this article.

The proportion of SSH discharges involving inpatient surgery for the aged Medicare population has increased substantially since the inception of the Medicare hospital insurance (HI) program. During the first 10 years (1967-76) of Medicare, for example, the

proportion of surgical discharges for aged Medicare beneficiaries was about 32 percent of all discharges (Helbing, 1980). However, the proportion of surgical discharges for the elderly residing in all areas increased from 33 percent in 1977 to 38 percent in 1983, rose to 53 percent in 1984, and climbed steadily to 61 percent in 1987. Among the regions, the proportion of surgical discharges in the Northeast Region increased from 36 percent in 1977 to 68 percent in 1987. The South Region, which had the lowest proportion of surgical discharges (31 percent) in 1977, moved into third place (58 percent) among the regions in 1987. Large geographic variations in the incidence of surgery raise a great many questions regarding local differences in the criteria of appropriate use of surgical services or differential access to surgical specialties that cannot be addressed directly because of the lack of definitive data for measuring potentially pertinent variables.

The increased proportion of reported discharges with surgery since the late 1970s appears to be related to the introduction of the ICD-9-CM diagnostic and procedural coding system and the implementation of the Medicare prospective payment system (PPS) established by Public Law 98-21 and implemented on October 1, 1983. "The increase in the percent of discharges with surgery from 1978 to 1979 was due largely to the changes in coding and reporting practices instituted in 1979. The ICD-9-CM was used to code procedures beginning in 1979, and it was organized differently than earlier versions of the classification system, resulting in a broader definition of surgical procedures"; the ICD-9-CM also included "procedures that had not been coded previously . . ." (Pokras et al., 1989). Further, for services rendered to Medicare enrollees, changes in the way SSHs are paid under PPS encouraged hospitals to become more diligent in adhering to and applying ICD-9-CM medical coding techniques and conventions.

Prior to PPS, there was no monetary incentive for hospitals to promote either complete reporting of patient history or accurate coding of patient diagnoses and surgical procedures on Medicare claims. After PPS, however, the financial position of hospitals could be improved by promoting both reporting and coding precision. Under PPS, payment to hospitals for the care of Medicare patients is based mainly on the coding of the principal diagnosis (condition) that caused the admission of the patient to the hospital. In addition, the reporting and coding of a surgical procedure is a major factor used to determine the preset PPS payment. When hospitals began to recognize that the Medicare payment would be larger for most admissions requiring surgical procedures, the reporting and coding of these procedures began to receive top priority, thus generating the increase in reported surgeries.

Reprint requests: Viola B. Latta, 2502 Oak Meadows Building, 6325 Security Boulevard, Baltimore, Maryland 21207.

Table 1

Total number of discharges, discharges with surgery, and discharge rates for aged Medicare beneficiaries receiving short-stay hospital services, by census region and selected calendar years: 1977-87

Discharges, discharge rate, and year	All areas ¹ of residence	U.S. census region			
		Northeast	North Central	South	West
Total discharges			Number in thousands		
1977	7,850	1,672	2,174	2,635	1,173
1981	9,400	1,950	2,605	3,285	1,436
1983	10,152	2,144	2,785	3,631	1,527
1986	8,917	1,991	2,337	3,146	1,378
1987	9,001	2,012	2,341	3,162	1,486
			Percent change		
1977-87	15	20	8	20	27
Discharge rate			Number per 1,000 enrollees		
1977	334	296	341	360	312
1981	367	325	390	403	338
1983	381	347	403	424	339
1986	316	310	326	342	281
1987	312	310	321	336	295
			Percent change		
1977-87	-7	5	-6	-7	-5
Surgical discharges			Number in thousands		
1977	2,573	609	719	817	411
1981	3,171	743	887	1,008	517
1983	3,810	872	1,045	1,311	563
1986	5,253	1,297	1,307	1,751	872
1987	5,503	1,372	1,346	1,824	935
			Percent change		
1977-87	114	125	87	123	127
Surgical discharge rate			Number per 1,000 enrollees		
1977	110	108	115	112	109
1981	124	124	133	124	122
1983	143	141	151	153	125
1986	186	202	182	190	178
1987	191	211	185	194	186
			Percent change		
1977-87	74	95	61	73	71
Surgical discharges			Percent of all discharges		
1977	33	36	33	31	35
1981	34	38	34	31	36
1983	38	41	38	36	37
1986	59	65	56	56	63
1987	61	68	57	58	63

¹Includes Puerto Rico, Virgin Islands, Guam, American Samoa, and foreign countries not shown separately.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System; data development by the Office of Research and Demonstrations.

PPS also precipitated changes in SSH admission practices—changes that resulted in an overall decrease in admissions. Thus, the 7-percent decrease in the total discharge rate per 1,000 aged HI enrollees (Table 1) resulted in an increase in the proportion of discharges with surgery. The hospitals' response to PPS also shifted patient care, in some cases, to alternative treatment sites, such as ambulatory surgical centers. Thus, some procedures previously done on an inpatient basis are now being done in the outpatient setting. For instance, Kozak (1989) reports that "The decline in [inpatient] eye surgery was almost all from decreases in cataract surgeries. The rate of lens extraction fell 90 percent, and the rate of insertion of prosthetic lens dropped 88 percent from 1983 to 1987."

In addition to the increase in reported surgeries induced by the new coding system and incentives provided by PPS, a "true" increase in the number of surgical procedures for aged Medicare beneficiaries may have resulted from advances in medical technology. Such advances have made it possible to operate on elderly patients for whom surgery would previously have been considered too risky; this surgery now would necessarily be performed on an inpatient basis. For example, the National Center for Health Statistics reports that the rate of elderly patients undergoing cardiovascular surgery increased 63 percent from 1983 to 1987; "The number and rate of bypass anastomosis for heart revascularization more than doubled. The number of discharged patients 65 years of age and over who had one or

Table 2

Number of discharges with surgery and surgical rates per 1,000 hospital insurance enrollees for aged Medicare beneficiaries discharged from short-stay hospitals, by census region and leading surgical procedures within human organ system: Calendar year 1987

ICD-9-CM codes ¹ for 25 leading surgical procedures within human organ system	All areas ²	U.S. census region				All areas ²	U.S. census region			
		Northeast	North Central	South	West		Northeast	North Central	South	West
		Number of surgical discharges in thousands					Surgical rate per 1,000 enrollees			
Total, all procedures	5,503	1,372	1,346	1,824	935	190.9	211.2	184.7	193.6	185.5
Total, 25 leading procedures	1,254	279	331	420	216	43.5	42.9	45.4	44.6	42.9
Operations on:										
Nervous system (01-05)	114	24	29	39	21	3.9	3.7	4.0	4.1	4.2
03.09	23	4	6	7	6	0.8	0.6	0.8	0.8	1.2
Residual	91	20	23	32	15	3.2	3.1	3.2	3.4	3.0
Endocrine system (06-07)	15	3	4	6	3	0.5	0.4	0.5	0.6	0.5
Eye (08-16)	95	37	20	25	11	3.3	5.6	2.8	2.7	2.2
13.59	26	16	4	4	1	0.9	2.4	0.5	0.4	0.2
Residual	69	21	16	21	10	2.4	3.2	2.2	2.2	2.0
Ear (18-20)	8	2	2	3	1	0.3	0.3	0.3	0.3	0.3
Nose, mouth, and pharynx (21-29)	47	11	12	16	7	1.6	1.8	1.7	1.7	1.4
Respiratory system (30-34)	224	53	53	82	35	7.8	8.1	7.3	8.7	6.9
Cardiovascular system (35-39)	748	152	196	267	130	25.9	23.5	26.9	28.4	25.8
36.01	42	6	12	14	10	1.5	1.0	1.7	1.5	2.0
36.13	30	6	8	10	5	1.0	0.9	1.1	1.1	1.1
36.14	30	5	8	11	6	1.1	0.8	1.1	1.1	1.2
37.74	33	8	8	12	5	1.1	1.2	1.1	1.3	1.0
38.12	48	7	14	18	9	1.7	1.1	1.9	1.9	1.9
38.44	23	5	6	8	4	0.8	0.8	0.8	0.9	0.8
39.29	39	10	9	13	6	1.3	1.5	1.3	1.4	1.2
Residual	503	105	131	181	85	17.5	16.2	18.0	19.2	16.9
Hemic and lymphatic system (40-41)	71	18	18	25	10	2.5	2.7	2.5	2.6	2.0
Digestive system (42-54)	1,057	248	277	370	156	36.7	38.2	38.0	39.3	30.9
45.73	33	8	9	10	6	1.1	1.3	1.3	1.1	1.1
45.76	31	8	8	10	5	1.1	1.2	1.1	1.1	1.0
51.22	124	25	33	45	20	4.3	3.9	4.5	4.8	4.0
53.01	25	7	6	8	2	0.9	1.1	0.9	0.9	0.5
53.02	29	9	8	10	2	1.0	1.3	1.1	1.0	0.5
Residual	815	191	213	287	121	28.3	29.4	29.2	30.5	24.0

See footnotes at end of table.

Table 2—Continued

Number of discharges with surgery and surgical rates per 1,000 hospital insurance enrollees for aged Medicare beneficiaries discharged from short-stay hospitals, by census region and leading surgical procedures within human organ system: Calendar year 1987

ICD-9-CM codes ¹ for 25 leading surgical procedures within human organ system	All areas ²	U.S. census region				All areas ²	U.S. census region			
		Northeast	North Central	South	West		Northeast	North Central	South	West
		Number of surgical discharges in thousands					Surgical rate per 1,000 enrollees			
Urinary system (55-59)	248	63	63	84	36	8.6	9.7	8.7	9.0	7.1
57.49	51	15	12	15	9	1.8	2.3	1.7	1.6	1.7
Residual	197	48	51	69	27	6.8	7.4	7.0	7.3	5.4
Male genital organs (60-64) ³	294	63	76	101	52	25.3	23.5	25.4	26.2	24.9
60.2	236	49	62	81	42	20.3	18.3	20.7	23.6	20.1
Residual	58	14	14	20	10	5.0	5.2	4.7	5.2	7.7
Female genital organs (65-71) ⁴	95	20	25	32	16	5.5	1.6	1.5	1.9	0.9
68.4	29	6	8	9	6	1.7	1.5	1.8	1.6	1.9
Residual	66	14	17	23	10	3.8	0.8	2.3	2.4	2.0
Musculoskeletal system (76-84)	573	118	157	190	105	19.9	18.2	21.5	20.1	20.9
79.35	106	24	27	37	19	3.7	3.6	3.6	3.9	3.8
80.51	22	3	6	9	5	0.8	0.5	0.8	0.9	0.9
81.41	64	11	21	19	13	2.2	1.6	2.9	2.0	2.5
81.51	34	7	9	9	9	1.2	1.1	1.3	1.0	1.7
81.59	36	7	10	12	6	1.2	1.0	1.4	1.3	1.3
81.62	38	8	11	14	5	1.3	1.2	1.5	1.5	1.0
Residual	273	58	73	90	48	9.5	8.9	10.0	9.6	9.5
Integumentary system (85-86)	207	53	51	70	31	7.2	8.2	7.1	7.4	6.2
85.43	47	10	13	16	8	1.6	1.5	1.7	1.7	1.6
86.22	55	15	13	19	7	1.9	2.3	1.9	2.0	1.5
Residual	105	28	25	35	16	3.6	4.3	3.4	3.7	3.2
Miscellaneous diagnostic and therapeutic procedures (87-99)	1,706	507	361	515	320	59.2	78.0	49.5	54.6	63.5

¹The classification codes for the leading surgical procedures were derived from the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM) and are defined in the "Technical note." Some diagnostic procedures may have been more frequently reported than were the leading procedures, but were excluded from the list of the leading procedures because they were not performed in an operating room.

²Includes Puerto Rico, Virgin Islands, Guam, American Samoa, and foreign countries not shown separately.

³Only male population was used to calculate surgical rate per 1,000 enrollees.

⁴Only female population was used to calculate surgical rate per 1,000 enrollees.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System; data development by the Office of Research and Demonstrations.

Table 3

Total charges and average charge per discharge for aged Medicare beneficiaries with inpatient short-stay hospital surgery, by census region and leading surgical procedures within human organ system: Calendar year 1987

ICD-9-CM codes ¹ for 25 leading surgical procedures within human organ system	All areas ²	U.S. census region				All areas ²	U.S. census region			
		Northeast	North Central	South	West		Northeast	North Central	South	West
		Total charges in millions					Average charge per discharge			
Total, all procedures	\$46,601	\$11,624	\$11,093	\$14,813	\$8,951	\$8,467	\$8,472	\$8,244	\$8,120	\$9,574
Total, 25 leading procedures	12,759	2,863	3,253	4,149	2,463	10,175	10,212	9,878	9,819	11,403
Operations on:										
Nervous system (01-05)	1,288	290	318	416	261	11,330	12,099	10,915	10,732	12,200
03.09	220	42	54	68	55	9,579	11,043	9,046	9,326	9,486
Residual	1,068	248	264	348	206	11,736	12,400	11,478	10,875	13,733
Endocrine system (06-07)	110	25	25	40	21	7,211	8,634	6,469	6,896	7,530
Eye (08-16)	338	125	73	89	46	3,545	3,426	3,858	3,539	4,243
13.59	80	48	12	13	4	3,033	3,054	3,321	3,262	3,163
Residual	258	77	61	76	42	3,739	3,667	3,812	3,619	4,200
Ear (18-20)	35	8	10	11	6	4,182	4,147	4,005	4,242	4,533
Nose, mouth, and pharynx (21-29)	220	57	54	72	37	4,689	5,027	4,351	4,522	5,197
Respiratory system (30-34)	3,141	752	734	1,058	589	14,050	14,306	13,816	12,877	16,930
Cardiovascular system (35-39)	10,379	2,120	2,654	3,469	2,111	13,879	13,915	13,553	12,979	16,236
36.01	468	69	130	147	121	11,019	10,667	10,726	10,661	12,103
36.13	894	166	238	299	191	30,066	29,451	29,087	28,707	34,799
36.14	929	167	235	301	223	30,605	30,918	28,828	27,881	37,907
37.74	452	103	111	160	76	13,803	13,740	13,713	13,533	14,633
38.12	408	62	115	150	81	8,490	8,798	8,284	8,427	8,687
38.44	542	115	138	180	109	23,235	22,464	23,392	21,933	26,597
39.29	566	160	130	178	97	14,581	15,921	14,102	13,372	15,851
Residual	6,120	1,278	1,557	2,054	1,213	12,167	12,171	11,885	11,348	14,271
Hemic and lymphatic system (40-41)	626	165	152	206	101	8,794	9,311	8,411	8,290	9,980
Digestive system (42-54)	9,830	2,377	2,429	3,286	1,709	9,296	9,577	8,774	8,873	10,987
45.73	490	122	126	153	88	14,802	14,803	13,702	15,356	15,785
45.76	445	114	110	142	79	14,210	14,591	13,182	14,267	15,320
51.22	1,129	234	282	408	200	9,073	9,308	8,577	9,102	9,869
53.01	71	22	18	24	6	2,835	2,966	2,764	2,833	2,845
53.02	83	27	21	28	8	2,901	3,116	2,626	2,860	3,420
Residual	7,612	1,858	1,872	2,531	1,328	9,340	9,728	8,789	8,819	10,975

See footnotes at end of table.

Table 3—Continued

Total charges and average charge per discharge for aged Medicare beneficiaries with inpatient short-stay hospital surgery, by census region and leading surgical procedures within human organ system: Calendar year 1987

ICD-9-CM codes ¹ for 25 leading surgical procedures within human organ system	U.S. census region					All areas ²	U.S. census region				
	All areas ²	Northeast	North Central	South	West		All areas ²	Northeast	North Central	South	West
	Total charges in millions						Average charge per discharge				
Urinary system (55-59)	\$1,599	\$427	\$391	\$524	\$250	\$6,438	\$6,786	\$6,196	\$6,203	\$6,976	
57.49	209	66	47	61	35	4,076	4,406	3,781	4,038	4,059	
Residual	1,390	361	344	463	215	7,056	7,521	6,745	6,710	7,963	
Male genital organs (60-64)	1,471	348	367	463	258	4,998	5,557	4,808	4,876	4,963	
60.2	1,139	271	290	380	193	4,822	5,517	4,659	4,718	4,567	
Residual	332	77	77	83	65	5,724	5,500	5,500	4,150	6,100	
Female genital organs (65-71)	541	122	143	177	97	5,673	5,947	5,641	5,491	5,943	
68.4	197	41	55	62	38	6,842	7,076	7,027	6,648	6,775	
Residual	344	81	88	115	59	5,212	5,786	5,176	5,000	5,900	
Musculoskeletal system (76-84)	5,750	1,306	1,466	1,828	1,135	10,036	11,044	9,350	9,638	10,780	
79.35	1,111	283	249	361	217	10,439	11,956	9,384	9,761	11,441	
80.51	178	30	45	64	39	7,925	8,782	7,590	7,493	8,569	
81.41	831	145	264	245	175	13,026	13,744	12,350	13,034	13,633	
81.51	468	105	120	123	119	13,586	14,904	12,686	13,214	13,902	
81.59	492	94	137	168	92	13,730	14,142	13,114	13,634	14,553	
81.62	403	98	101	140	64	10,531	12,223	9,305	9,969	12,124	
Residual	2,267	551	550	727	429	8,403	9,500	7,534	8,078	8,938	
Integumentary system (85-86)	1,672	488	390	521	269	8,070	9,152	7,569	7,459	8,581	
85.43	212	48	57	72	35	4,541	4,952	4,500	4,488	4,250	
86.22	742	231	168	222	118	13,416	15,158	12,495	11,861	15,801	
Residual	718	209	165	227	116	6,838	7,464	6,600	6,485	7,250	
Miscellaneous diagnostic and therapeutic procedures (87-99)	9,601	3,013	1,887	2,626	2,060	5,628	5,946	5,230	5,104	6,436	

¹The classification codes for the leading surgical procedures shown in this article were derived from the *International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM)* and are defined in the "Technical note." Some diagnostic procedures may have been more frequently reported than were the leading procedures, but were excluded from the list of the leading procedures because they were not performed in an operating room.

²Includes Puerto Rico, Virgin Islands, Guam, American Samoa, and foreign countries not shown separately.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System; data development by the Office of Research and Demonstrations.

Table 4

Total days of care and average length of stay per discharge for aged Medicare beneficiaries with inpatient short-stay hospital surgery, by census region and leading surgical procedures within human organ system: Calendar year 1987

ICD-9-CM codes ¹ for 25 leading surgical procedures within human organ system	All areas ²	U.S. census region				All areas ²	U.S. census region			
		Northeast	North Central	South	West		Northeast	North Central	South	West
		Total days of care in thousands					Average length of stay			
Total, all procedures	55,271	16,800	12,956	17,631	7,649	10.0	12.2	9.6	9.7	8.2
Total, 25 leading procedures	13,470	3,631	3,456	4,444	1,871	10.7	13.0	10.4	10.6	8.7
Operations on:										
Nervous system (01-05)	1,527	405	373	507	237	13.4	16.9	12.8	13.1	11.1
03.09	287	59	74	93	60	12.5	15.5	12.4	12.9	10.3
Residual	1,240	346	299	414	177	13.6	17.3	13.0	12.9	11.8
Endocrine system (06-07)	115	28	25	45	16	7.5	9.7	6.5	7.9	5.7
Eye (08-16)	325	130	71	85	33	3.4	3.6	3.5	3.4	3.1
13.59	74	46	11	11	3	2.8	3.0	2.9	2.7	2.4
Residual	251	84	60	74	30	3.3	4.0	3.7	3.5	3.0
Ear (18-20)	40	11	11	12	5	4.7	5.8	4.5	4.6	3.5
Nose, mouth, and pharynx (21-29)	279	88	65	93	32	6.0	7.7	5.3	5.8	4.5
Respiratory system (30-34)	3,309	966	761	1,123	447	14.8	18.4	14.3	13.7	12.8
Cardiovascular system (35-39)	7,700	1,893	2,000	2,653	1,130	10.3	12.4	10.2	9.9	8.7
36.01	287	52	87	94	53	6.8	8.1	7.1	6.9	5.3
36.13	467	94	134	161	77	15.7	16.7	16.4	15.5	14.1
36.14	478	96	130	164	85	15.7	17.8	16.0	15.2	14.5
37.74	307	89	73	107	36	9.4	11.9	9.1	9.0	6.9
38.12	395	74	113	152	56	8.2	10.5	8.2	8.5	6.0
38.44	342	85	86	118	53	14.7	16.5	14.7	14.4	12.9
39.29	587	191	135	189	70	15.1	19.0	14.7	14.2	11.5
Residual	4,837	1,212	1,242	1,668	700	9.6	11.5	9.4	9.2	8.2
Hemic and lymphatic system (40-41)	833	257	201	274	96	11.7	14.5	11.1	11.0	9.5
Digestive system (42-54)	11,836	3,373	2,955	3,941	1,505	11.2	13.6	10.7	10.6	9.7
45.73	524	154	140	156	72	15.8	18.7	15.2	15.7	13.0
45.76	483	143	122	150	66	15.4	18.4	14.6	15.1	12.9
51.22	1,343	317	350	487	178	10.8	12.6	10.6	10.9	8.8
53.01	92	30	22	32	6	3.7	4.1	3.5	3.8	2.8
53.02	109	35	28	37	8	3.8	4.1	3.5	3.8	3.4
Residual	9,285	2,694	2,293	3,079	1,175	11.4	14.1	10.8	10.7	9.7

See footnotes at end of table.

Table 4—Continued

Total days of care and average length of stay per discharge for aged Medicare beneficiaries with inpatient short-stay hospital surgery, by census region and leading surgical procedures within human organ system: Calendar year 1987

ICD-9-CM codes ¹ for 25 leading surgical procedures within human organ system	All areas ²	U.S. census region				All areas ²	U.S. census region			
		Northeast	North Central	South	West		Northeast	North Central	South	West
		Total days of care in thousands					Average length of stay			
Urinary system (55-59)	2,130	670	519	690	235	8.6	10.6	8.2	8.2	6.5
57.49	278	99	64	81	33	5.4	6.6	5.2	5.3	3.9
Residual	1,852	571	455	609	202	9.4	11.9	8.9	8.2	7.5
Male genital organs (60-64)	2,036	551	521	686	260	6.9	8.8	6.8	6.8	5.0
60.2	1,622	437	423	545	202	6.9	8.9	6.8	6.8	4.8
Residual	414	114	98	141	58	7.1	8.1	7.0	7.1	5.8
Female genital organs (65-71)	716	174	192	244	101	7.5	8.5	7.6	7.5	6.1
68.4	245	56	69	81	38	8.5	9.7	8.7	8.6	6.8
Residual	471	118	123	163	63	7.1	8.4	7.2	7.1	6.3
Musculoskeletal system (76-84)	7,285	1,999	1,844	2,361	1,047	12.7	16.9	11.8	12.4	9.9
79.35	1,591	496	352	517	221	15.0	21.0	13.3	14.0	11.7
80.51	248	46	65	95	42	11.0	13.5	11.0	11.1	9.1
81.41	791	154	264	239	131	12.4	14.6	12.4	12.7	10.2
81.51	464	116	126	127	94	13.5	16.5	13.3	13.7	11.0
81.59	489	111	137	172	68	13.6	16.6	13.1	13.9	10.8
81.62	576	171	141	198	63	15.0	21.5	13.0	14.2	12.0
Residual	3,126	905	759	1,013	428	11.5	15.6	10.4	11.3	8.9
Integumentary system (85-86)	2,468	845	553	776	282	11.9	15.8	10.7	11.1	9.1
85.43	288	72	90	101	34	6.2	7.4	6.3	6.3	4.1
86.22	1,103	408	230	337	122	19.9	26.7	17.0	18.0	16.3
Residual	1,077	365	243	338	126	10.3	13.0	9.7	9.7	7.9
Miscellaneous diagnostic and therapeutic procedures (87-99)	14,670	5,409	2,864	4,140	2,225	8.6	10.7	7.9	8.0	6.9

¹The classification codes for the leading surgical procedures shown in this article were derived from the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD-9-CM) and are defined in the "Technical note." Some diagnostic procedures may have been more frequently reported than were the leading procedures, but were excluded from the list of the leading procedures because they were not performed in an operating room.

²Includes Puerto Rico, Virgin Islands, Guam, American Samoa, and foreign countries not shown separately.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the Medicare Statistical System; data development by the Office of Research and Demonstrations.

more bypass procedures increased from 66,000 in 1983 to 117,000 in 1987" (Kozak, 1989).

Selected data highlights

Medicare trend data for selected calendar years 1977-87 are presented in Table 1 to highlight utilization patterns by area of residence (U.S. census regions) for aged beneficiaries with surgery performed on an inpatient basis in SSHs. The data show that the proportion of surgical discharges for aged HI enrollees increased from 33 percent of all discharges for aged enrollees in 1977 to 61 percent in 1987 (Figure 1). The surgical rate per 1,000 aged HI enrollees increased 74 percent, indicating that the number of discharges for aged beneficiaries with surgery increased at a faster rate than the total aged HI enrollment population (Figure 2).

- For all aged Medicare beneficiaries receiving SSH inpatient services, the total number of discharges rose from 7.8 million in 1977 to 9.0 million in 1987, an increase of 15 percent.
- However, for aged beneficiaries with SSH inpatient surgery, the number of discharges rose from 2.6 million discharges in 1977 to 5.5 million in 1987, an increase of 114 percent.

- The total SSH discharge rate per 1,000 HI enrollees declined from 334 in 1977 to 312 in 1987, a decrease of 7 percent.
- In contrast, the corresponding surgical discharge rate per 1,000 aged HI enrollees climbed from 110 in 1977 to 191 in 1987, an increase of 74 percent.

Among the regions during the 1977-87 period, the increase in the surgical rate in the West (71 percent) and South (73 percent) Regions was similar to that for all areas (74 percent). The Northeast Region showed the largest increase (95 percent) in the surgical rate, from 108 discharges per 1,000 enrollees in 1977 to 211 discharges per 1,000 enrollees in 1987.

The North Central Region, however, showed an increase (61 percent) in the surgical rate per 1,000 HI enrollees that was substantially less than the increase in the surgical rate for all areas (74 percent). This lower increase reflects the fact that the North Central Region had the highest surgical rate among the regions in 1977 (115 discharges per 1,000 HI enrollees—5 percent above the rate for all areas) and the lowest rate in 1987 (185 discharges per 1,000 enrollees—3 percent below the rate for all areas).

For the 25 leading procedures (excluding those procedures not defined as operating room procedures by HCFA), data in Table 2 focus on regional variations in the types of surgery most frequently

Figure 1

Total discharges and surgical discharges for aged Medicare enrollees receiving short-stay hospital inpatient services: Selected calendar years 1977-87

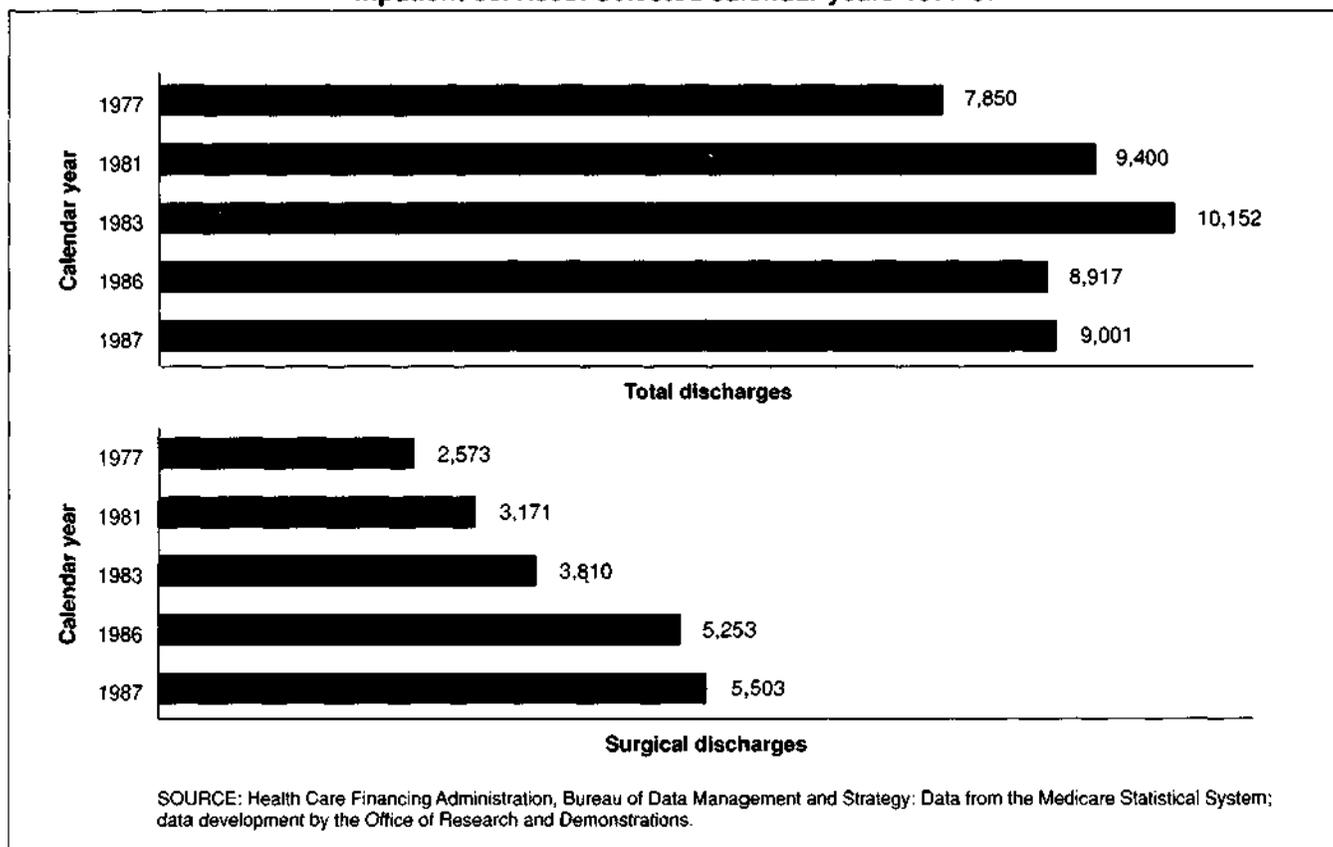
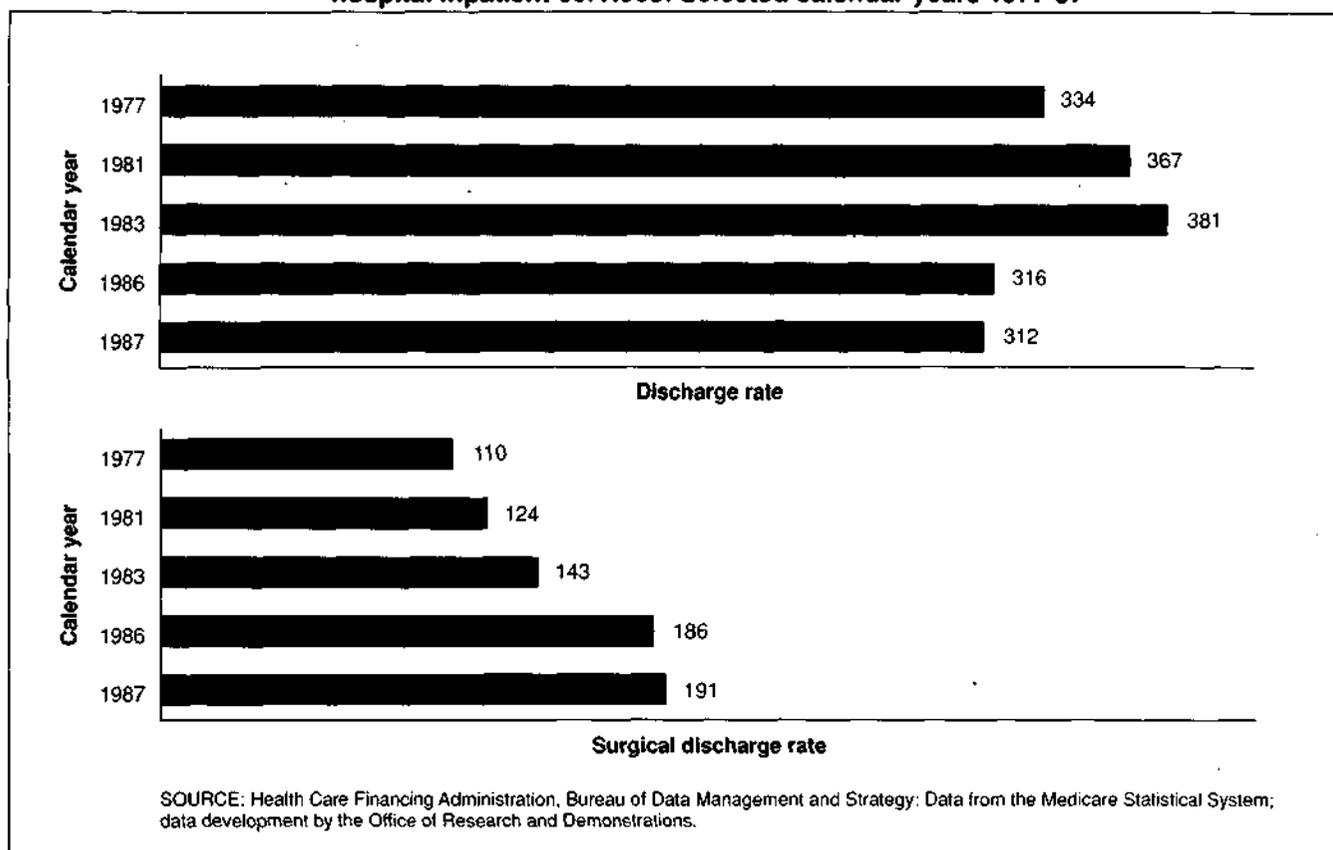


Figure 2
Discharge rate and surgical discharge rate per 1,000 aged Medicare enrollees receiving short-stay hospital inpatient services: Selected calendar years 1977-87



performed on aged Medicare beneficiaries in the SSH inpatient setting. Table 2 data include the number of surgical discharges and surgical rates per 1,000 HI enrollees for aged Medicare enrollees undergoing specific surgical procedures in 1987. Surgical rates for ICD-9-CM code 60.2 (transurethral prostatectomy) are based on the number of male HI enrollees. Similarly, the number of female HI enrollees is the basis of the surgical rates for ICD-9-CM code 68.4 (total abdominal hysterectomy).

During 1987, discharges for the 25 leading procedures accounted for 23 percent (1.3 million) of all surgical discharges (5.5 million). Among the leading procedures, the largest number of discharges (236,000) was reported for ICD-9-CM code 60.2 (transurethral prostatectomy). For every 1,000 aged male HI enrollees residing in all areas, 20.3 discharges for transurethral prostatectomies were recorded. Males living in the Northeast Region (18.3 of every 1,000) were slightly less likely to have this surgery, and males living in the South Region (23.6 per 1,000 male HI enrollees) were more likely to have a transurethral prostatectomy.

After transurethral prostatectomy, the highest rates of SSH inpatient surgical procedures per 1,000 aged HI enrollees were reported for:

- ICD-9-CM code 51.22 (total cholecystectomy—4.3 of every 1,000 enrollees).

- ICD-9-CM code 79.35 (open reduction of fracture with internal fixation—3.7 of every 1,000 enrollees).
- ICD-9-CM code 81.41 (total knee replacement—2.2 of every 1,000 enrollees).

On the other hand, the lowest rates (fewer than 1 of every 1,000 HI enrollees) were reported for:

- ICD-9-CM code 03.09 (other exploration and decompression of the spinal cord).
- ICD-9-CM code 13.59 (other extracapsular extraction of lens).
- ICD-9-CM code 38.44 (resection of vessel with replacement aorta, abdominal).
- ICD-9-CM code 53.01 (repair of direct inguinal hernia).
- ICD-9-CM code 80.51 (excision of intervertebral disc).

It should be noted that during this period, the place of service for most lens surgery shifted from inpatient settings to outpatient settings of hospitals or to free-standing surgical centers.

Surgical rates for some of the leading procedures varied substantially among the census regions. For example:

- The surgical rate per 1,000 enrollees for ICD-9-CM code 13.59 (other extracapsular extraction of lens) ranged from 0.2 in the West Region to 2.4 in the Northeast, a difference of 1100 percent. This

variation may be in part the result of the relative scarcity of ambulatory surgical centers in the Northeast Region. Of all the ambulatory surgical centers (897) in the United States as of January 1988, only 97 centers were located in the Northeast Region.

- The surgical rate for ICD-9-CM code 53.02 (repair of indirect inguinal hernia) ranged from 0.5 in the West Region to 1.3 in the Northeast, a difference of 160 percent.
- Similarly, the surgical rate per 1,000 enrollees for ICD-9-CM code 53.01 (repair of direct inguinal hernia) varied 120 percent among the regions, ranging from 0.5 in the West Region to 1.1 in the Northeast Region.

Data presented in Table 3 highlight regional variations in hospital total charges and average charges per discharge. In 1987, the SSH total charges for all inpatient surgical procedures performed on aged Medicare HI enrollees amounted to \$46.6 billion. More than 27 percent (\$12.8 billion) of the total charges was for the 25 leading surgical procedures. The average charge per discharge for aged Medicare beneficiaries discharged from SSHs in 1987 ranged from \$8,120 in the South Region to \$9,574 in the West Region, a difference of 18 percent.

Regional variations in the average charge per discharge were substantial for some of the leading surgical procedures. For example:

- For ICD-9-CM code 36.14 (aortocoronary bypass of four or more coronary arteries), the highest average charge per discharge (\$37,907) was recorded for the West Region and was 36 percent higher than the lowest average charge (\$27,881) for enrollees residing in the South Region.
- A difference of 33 percent in the average charge per discharge was shown for ICD-9-CM code 86.22 (excisional debridement of wound, infection, or burn), which ranged from \$11,861 in the South Region to \$15,801 in the West.
- For ICD-9-CM code 81.62 (other replacement of head of femur), the average charge per discharge ranged from \$9,305 in the North Central Region to \$12,223 in the Northeast Region, a difference of 31 percent.
- ICD-9-CM code 79.35 (open reduction of fracture with internal fixation of femur) had an average charge ranging from \$9,384 in the North Central Region to \$11,956 in the Northeast, a difference of 27 percent.

In Table 4, we present the number of total days of care and the average length of stay (ALOS) for aged Medicare beneficiaries with inpatient surgical procedures performed during 1987. Differences in the ALOS per discharge among the census regions were substantial for many of the leading surgical procedures. For example:

- The ALOS per discharge for aged Medicare beneficiaries with surgery ranged from 8.2 days in the West Region to 12.2 days in the Northeast, a difference of 49 percent.

- The largest regional variation in ALOS for the leading surgical procedures was shown for ICD-9-CM code 60.2 (transurethral prostatectomy)—an ALOS that ranged from 4.8 days in the West Region to 8.9 days in the Northeast, a difference of 85 percent.
- For ICD-9-CM code 79.35 (open reduction of fracture with internal fixation, femur), the ALOS ranged from 11.7 days in the West Region to 21.0 days in the Northeast, a difference of 79 percent.
- Similarly, the ALOS for ICD-9-CM code 81.62 (other replacement of head of femur) ranged from 12.0 days in the West Region to 21.5 days in the Northeast, a difference of 79 percent.

Definition of terms

Short-stay hospital—General and special hospitals certified as participating facilities under Medicare and reporting average stays of fewer than 25 days.

Discharge—The formal release of an inpatient from a hospital. All discharges including those persons who died during their hospitalization are included.

Hospital charges—The hospital's charges for room, board, and ancillary services as recorded on the billing form (HCFA-1450).

Surgery—Includes any operative procedures recorded on the patient's billing form defined as surgery in the *International Classification of Diseases, 9th Revision, Clinical Modification, Volume 3*. This includes procedures involving incision, excision, amputation, introduction, endoscopy, repair, destruction, suture, or manipulation. For the purposes of this article, only the procedures classified as operating room procedures by HCFA were selected to appear in the list of the 25 leading procedures.

Annual surgical rate per 1,000 enrollees—A ratio of the total number of discharges with inpatient surgery (multiplied by 1,000) to the number of persons entitled to benefits as of July 1 of that year.

Sources and limitations of data

The data shown in this article were derived from the Health Care Financing Administration (HCFA) short-stay hospital inpatient stay record file. This file is generated by linking information from three HCFA master program files for Medicare beneficiaries. Thus, the statistical stay record provides information on the patient, the hospital, and the hospitalization.

The data are based on short-stay hospital stay records contained in the 20-percent inpatient stay record file. Therefore, the data are subject to sampling variability. Sample counts were multiplied by a factor of 5 to estimate population totals. The data were extracted from the short-stay hospital inpatient records received and processed in HCFA as of December 1988. Therefore, 1987 discharges recorded after that date were not included.

The surgical procedure information recorded on the sample discharge records used to prepare this article were coded based on the *International Classification*

of Diseases, 9th Revision, Clinical Modification, Volume 3. Three- or four-digit codes were assigned for the principal surgical procedure of each sample bill record.

Incompleteness of data files

The incompleteness of the MEDPAR (Medicare provider analysis and review) stay record files used to prepare this article is a result of the inherent administrative time lag between the time when a bill (HCFA-1450) is submitted for payment and when it is posted to the central records. A complete count of Medicare discharges from short-stay hospitals in 1987 will probably amount to about 3 percent more than the total figures used in this study.

Acknowledgments

The technical expertise and advice of Patricia Speller, Medical Coding Policy Staff, Bureau of Data Management and Strategy, is gratefully acknowledged. Special thanks to the reviewers: Charles Helbing, Herb Silverman, Marian Gornick, and Bill Sobaski of the Office of Research and Demonstrations (ORD). Data were generated by Will Kirby; statistical support services were provided by Brenda Bailey and Brenda Boos; and graphics were developed by Thaddeus Holmes, all of ORD.

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Technical note

Definitions of the leading ICD-9-CM surgical procedures

ICD-9-CM code	Procedure
03.09	Other exploration and decompression of spinal canal.
13.59	Other extracapsular extraction of lens.
36.01	Single vessel percutaneous transluminal coronary angioplasty without mention of thrombolytic agent.
36.13	Aortocoronary bypass of three coronary arteries.
36.14	Aortocoronary bypass of four or more coronary arteries.
37.74	Insertion of replacement of epicardial lead (electrode) into epicardium.
38.12	Endarterectomy, other vessels of head and neck.
38.44	Resection of vessel with replacement, aorta, abdominal.
39.29	Other (peripheral) vascular shunt or bypass.
45.73	Right hemicolectomy.
45.76	Sigmoidectomy.
51.22	Total cholecystectomy.
53.01	Repair of direct inguinal hernia.
53.02	Repair of indirect inguinal hernia.
57.49	Other transurethral excision or destruction of lesion or tissue.
60.2	Transurethral prostatectomy.
68.4	Total abdominal hysterectomy.
79.35	Open reduction of fracture with internal fixation—femur.
80.51	Excision of intervertebral disc.
81.41	Total knee replacement.
81.51	Total hip replacement with use of methyl methacrylate.
81.59	Other total hip replacement.
81.62	Other replacement of head of femur.
85.43	Unilateral extended simple mastectomy.
86.22	Excisional debridement of wound, infection, or burn.