Number 169 • May 23, 1989

Advance Data

From Vital and Health Statistics of the National Center for Health Statistics

Hospital Inpatient Surgery: United States, 1983–87

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Introduction

Concerns with rising health care costs, changes in reimbursement for health care, and advances in surgical technology have led to rapid growth in ambulatory surgery in recent years (American College of Surgeons, 1988; Shannon, 1985a). Ambulatory surgery is expected to reduce costs because many surgical procedures have been shown to be less expensive when the patient is not hospitalized (Olson, 1984). However, if increases in ambulatory surgery are not accompanied by decreases in inpatient surgery, the growth in ambulatory surgery could lead to more total surgery and higher total health care costs (Ermann, 1988).

According to data from the National Hospital Discharge Survey (NHDS), total inpatient surgery has not been decreasing. Several types of procedures that can be done on an ambulatory basis have declined for inpatients, but other procedures have increased in frequency.

This report explores the patterns of inpatient surgery from 1983 to 1987, a period of rapid change in the health care system. The implementation in 1983 of a prospective payment system for Medicare patients based on diagnosis-related groups (DRG's) and the rapid growth in health maintenance organizations, preferred- provider organizations, and prospective utilization review in private health insurance systems have helped stimulate increases in ambulatory surgery (Guterman et al., 1988; Schramm and Gabel, 1988). The discharge rate for all patients in short-stay hospitals decreased by 17 percent from 1983 to 1987, but the change in the rate of inpatient surgical procedures was not statistically significant.

This report presents data on inpatient surgical procedures in 1983 and 1987 by age and sex, source of payment, and hospital bed size. Numbers and rates for categories of surgical procedures and specific procedures are examined, including the main surgical procedures for each of four age groups. These data provide a detailed picture of how inpatient surgery has changed as ambulatory surgery has increased.

The data were collected by means of the NHDS, a continuous, voluntary survey conducted by the National Center for Health Statistics since 1965. It encompasses patients discharged from non-Federal short-stay hospitals. In 1983, 418 sample hospitals participated in the survey by supplying approximately 206,000 abstracts of medical records. In 1987, 400 participating hospitals provided approximately 181,000 abstracts. A brief description of the sample design, data collection procedures, estimation process, and sampling errors (table I), along with definitions of the terms used in this report can be found in the section entitled "Technical notes." Detailed discussions of these topics, and the survey form used to collect the data, have been published (NCHS, 1977, 1988a).

Up to four procedures are coded for each NHDS discharge. The coding is done according to the *International Classification of Diseases, 9th Revision, Clinical Modification* (Public Health Service and Health Care Financing Administration, 1980). Codes for nonsurgical diagnostic and therapeutic procedures, such as computerized axial tomography (CAT scan), diagnostic ultrasound, and diagnostic endoscopy, are included in the classification system. Because this study is concerned with changes in surgical patterns, however, nonsurgical procedures are not included. Table II in "Technical notes" shows the nonsurgical codes that are excluded. It should be noted that all obstetrical procedures are included in this study.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control

National Center for Health Statistics
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Other NHDS reports contain data on both surgical and nonsurgical procedures (NCHS, 1986, 1988b).

Highlights

- From 1983 to 1987 the number and rate of inpatient surgical procedures fell by a third for children under 15 years of age but did not change significantly for patients in other age groups.
- From 1983 to 1987 the proportion of inpatient surgeries with private insurance as the expected principal source of payment decreased, and the proportions in the self-pay and other categories increased.
- In 1987 more inpatient surgery was performed in hospitals with 200–299 beds and less inpatient surgery was performed in hospitals with 100–199 beds and 500 beds or more than in 1983.
- From 1983 to 1987 the number of operations on the eye decreased by more than a million; operations on the female genital organs declined by 979,000; operations on the nose, mouth, and pharynx fell by 566,000; and operations on the ear decreased by almost 200,000.
- From 1983 to 1987 the number of obstetrical procedures increased by 1.4 million, and operations on the cardiovascular system rose by 1.1 million.
- For children under 15 years of age (excluding newborn infants), decreasing inpatient procedures included myringotomy; tonsillectomy; adenoidectomy; circumcision; cardiac catheterization; repair of inguinal hernia; and operations on muscles, tendons, fascia, and bursa.
- Decreases were reported for patients 15–44 years of age in inpatient rhinoplasty and repair of nose; dilation and curettage of uterus (D&C); bilateral destruction or occlusion of fallopian tubes; and excision of lesion of skin or tissue, other than tissue debridement.
- Obstetrical procedures that increased from 1983 to 1987 included cesarean section, repair of current obstetric laceration, fetal EKG and other fetal monitoring, artificial rupture of membranes, and manually assisted delivery.
- For patients 45–64 years of age, decreasing inpatient procedures included cataract surgery; repair of inguinal hernia; D&C; biopsy of breast, skin, and subcutaneous tissue; and excision of lesion of skin or tissue, other than tissue debridement.
- Inpatient procedures that increased for patients 45–64 years of age included coronary angioplasty, cardiac catheterization, puncture of vessel, procedures auxiliary to open heart surgery, and excision or destruction of intervertebral disc and spinal fusion.
- The rate of inpatient cataract surgery for patients 65 years of age and over dropped by almost 90 percent from 1983 to 1987.
- Increasing inpatient procedures for patients 65 years of age and over included bypass anastomosis for heart revascularization; cardiac catheterization; puncture of vessel; procedures auxiliary to open heart surgery; biopsy on the digestive system; arthroplasty and replacement of knee; and debridement of wound, infection, and burn.

Inpatient surgery

From 1983 to 1987 discharges in non-Federal short-stay hospitals decreased by 5.4 million, from 38.8 million to 33.4 million (table 1). The discharge rate fell 17 percent, from 1,669.6 to 1,381.6 per 10,000 population. The number of inpatient surgeries did not change significantly. It was 26.2 million in 1983 and 25.7 million in 1987. Likewise, the rate of inpatient surgery per 10,000 population was not significantly different in 1983 (1,128.8) than in 1987 (1,061.6).

The average length of stay for patients with a surgical procedure also did not change significantly. It was 7.0 days in 1983 and 6.6 days in 1987. There was an increase in the proportion of hospitalized patients with one surgical procedure or more, from 45.1 percent in 1983 to 47.4 percent in 1987.

Age and sex

The number and rate of inpatient surgery did not change significantly for males or females from 1983 to 1987 (table 2). For children under 15 years of age, however, the number and rate of inpatient surgery fell by a third, and the decreases were similar for males and females. Many of the surgical procedures commonly performed on children are relatively uncomplicated and thus are good candidates for ambulatory surgery. Several studies have found that children make more use of ambulatory surgery programs than other age groups (Ermann, 1988). Neither males nor females in any other age group had a significant change in the number or rate of inpatient surgical procedures.

In 1983 and 1987 the number and rate of inpatient surgical procedures were higher for females than for males. Females had over 7.5 million more surgeries and a 71-percent higher rate of surgeries than males each year. Females 15–44 years of age accounted for most of the difference by sex. They had 6.8 million more procedures than males 15–44 years of age in 1983, 7.3 million more in 1987. For

Table 1. Number and rate of discharges and inpatient surgeries: United States, 1983–87

[Data are for non-Federal short-stay hospitals and exclude newborn infants]

Year	Discharges	Inpatient surgeries	Discharges	Inpatient surgeries
	Number in thousands		Rate per 10,000 population	
1983	38,783	26,220	1,669.6	1,128.8
1984	37,162	25,590	1,585.1	1,091.5
1985	35,056	24,799	1,478.9	1,046.2
1986	34,256	25,041	1,431.2	1,046.2
1987	33,387	25,655	1,381.6	1,061.6

Table 2. Number and rate of inpatient surgeries by age and sex: United States, 1983 and 1987

[Data are for non-Federal short-stay hospitals and exclude newborn infants]

Age and sex	1983	1987	1983	1987
	Number in thousands		Rate per 10,000 population	
All ages	26,220	25,655	1,128.8	1,061.6
Male	9,268	9,073	826.2	775.7
Female	16,953	16,583	1,411.4	1,329.8
Under 15 years	1,786	1,195	346.1	228.1
Male	1,062	725	402.4	270.1
Female	724	471	287.2	184.0
15–44 years	12,556	12,577	1,154.1	1,101.6
Male	2,866	2,640	534.2	468.3
Female	9,691	9,937	1,757.0	1,719.3
45–64 years	5,686	5,458	1,277.2	1,206.0
Male	2,542	2,612	1,201.8	1,206.9
Female	3,144	2,847	1,345.4	1,205.2
65 years and over	6,192	6,425	2,261.3	2,153.4
Male	2,798	3,097	2,545.4	2,555.3
Female	3,394	3,328	2,070.8	1,878.5

NOTE: Numbers may not add to totals due to rounding.

both years the rate of inpatient surgery for females in this age group was more than three times the rate for males.

This pattern was not repeated for the other age groups. Males under 15 years of age had a greater number and a higher rate of inpatient surgical procedures than did females under 15 years of age in 1983 and 1987. The rate of inpatient surgery was not significantly different for males and females 45–64 years of age, but females had a greater number of surgeries in 1983. Males 65 years of age and over had a higher rate of inpatient surgery than females in that age group in 1983 and 1987, but females had a greater number of surgeries in 1983.

Source of payment

Table 3 shows numbers and percent distributions of inpatient surgical procedures by expected principal source of payment and hospital bed size. The frequency of inpatient surgeries was also examined for geographic regions of the country and by hospital ownership categories, but no significant changes were found from 1983 to 1987 for those characteristics.

The expected principal source of payment for a surgical procedure is usually entered on the patient's medical record at the time of admission to the hospital. It may be somewhat different from the actual source of payment as determined after discharge (NCHS, 1987).

Private insurance consists of health insurance provided by nongovernmental sources, including Blue Cross, other insurance companies, private industry, and philanthropic organizations. The proportion of inpatient surgeries with private insurance as the expected source of payment decreased from 56.9 percent in 1983 to 51.8 percent in 1987. This decline was primarily due to decreases of more than 40 percent in the number of operations on the eye; operations on the ear; and operations on the nose, mouth, and pharynx. In spite of the overall decline, the number of operations on the cardiovascular system covered by private insurance increased from 797,000 in 1983 to 1,171,000 in 1987.

The self-pay category consists of surgical procedures that are expected to be paid for by patients or their families rather than by private insurance or government programs. The proportion of surgeries in this category increased by 21 percent, from 5.3 percent in 1983 to 6.4 percent in 1987. The increase was most marked for operations on the cardiovascular system. The number of cardiovascular operations in the self-pay category almost doubled, from 55,000 in 1983 to 106,000 in 1987.

Changes from 1983 to 1987 in the proportions of inpatient surgical procedures with Medicare or Medicaid as the expected principal source of payment were not statistically significant. Other payment sources increased from 4.8 percent to 6.8 percent of inpatient surgeries. Other sources include Workers' Compensation, other government programs, no charge, and sources that could not be assigned to any other category.

Hospital bed size

A major change in the number of inpatient surgeries by hospital bed size categories from 1983 to 1987 was the increase, by 2.3 million, in the number of surgeries in hospitals with 200–299 beds. This bed size category accounted for 15.5 percent of inpatient surgeries in 1983 but increased to 24.8 percent in 1987. Most types of inpatient surgery increased in hospitals with

Table 3. Number and percent distribution of inpatient surgeries by expected principal source of payment and bed size: United States, 1983 and 1987

[Data are for non-Federal short-stay hospitals and exclude newborn infants]

Source of payment and bed size	1983	1987	1983	1987
	Number in thousands		Percent distribution	
All expected principal sources of payment	26,220	25,655	100.0	100.0
Private insurance	14,931	13,294	56.9	51.8
Medicare	6,636	6,793	25.3	26.5
Medicaid	2,014	2,182	7.7	8.5
Self-pay	1,389	1,653	5.3	6.4
Other	1,250	1,733	4.8	6.8
All bed sizes	26,220	25,655	100.0	100.0
6–99 beds	2,928	2,817	11.2	11.0
100–199 beds	4,853	3,125	18.5	12.2
200–299 beds	4,073	6,374	15.5	24.8
300–499 beds	7,233	6,976	27.6	27.2
500 beds or more	7,133	6,361	27.2	24.8

200–299 beds, and the numbers of operations on the cardiovascular system and obstetrical procedures more than doubled from 1983 to 1987.

The number of inpatient surgeries in hospitals with 100–199 beds decreased by 1.7 million from 1983 to 1987. This bed size category accounted for 18.5 percent of inpatient surgeries in 1983, but only 12.2 percent in 1987. The proportion of inpatient surgeries in hospitals with 500 beds or more also decreased, from 27.2 percent in 1983 to 24.8 percent in 1987. Hospitals in both of these size categories experienced especially large decreases in the numbers of operations on the eye, operations on the ear, and operations on the female genital organs.

Surgical procedures

Decreasing procedures

The number and rate of inpatient surgeries are shown in table 4 for 15 procedure categories. Nonsurgical procedures, listed in table II of "Technical notes," have been excluded from the categories. From 1983 to 1987, there were statistically significant decreases in the numbers and rates of procedures in four categories: operations on the eye; operations on the ear; operations on the nose, mouth, and pharynx; and operations on female genital organs.

The number of operations on the eye decreased by more than a million, and the rate decreased by 69 percent from 1983 to 1987. The decrease was mainly from a decline in cataract surgery, which is now commonly done on an ambulatory basis (Shannon, 1985b).

Operations on the ear decreased by almost 200,000 from 1983 to 1987, and the rate decreased by 54 percent. Myringotomy, which made up half of ear operations in 1983, also has been done with increasing frequency on an ambulatory rather than an inpatient basis (Ermann, 1988).

The number of operations on the nose, mouth, and pharynx dropped by 566,000 from 1983 to 1987, and the rate for the category decreased by 40 percent. Several procedures in this category declined in the 5-year period, such as rhinoplasty and repair of nose, forceps extraction and surgical removal of tooth, tonsillectomy, and adenoidectomy. These are all relatively uncomplicated procedures that could be expected to be done on an ambulatory basis.

Operations on the female genital organs decreased almost as much as eye operations. In 1987 there were 979,000 fewer inpatient surgical procedures on the female genital organs than in 1983, and the rate of these procedures decreased by 28 percent in the 5-year period. Among the procedures in the category that decreased in number were bilateral destruction or occlusion of fallopian tubes, conization of cervix, D&C, aspiration curettage of uterus, and biopsy on the female genital organs. Again, these are procedures that could be expected to be done on an ambulatory basis.

Increasing procedures

Two surgical categories increased significantly from 1983 to 1987: operations on the cardiovascular system and obstetrical procedures. In 1987, 1.1 million more cardiovascular operations were reported than in 1983, and the rate of these operations increased by 56 percent.

Specific cardiovascular procedures are shown in table 5. The first, open heart surgery, includes operations on the valves, septa, and vessels of the heart. It does not include removal of coronary artery obstruction (coronary angioplasty) or bypass anastomosis for heart revascularization. In NHDS reports for the years before 1986, these two procedures were included in the open heart surgery category. When they were excluded, the number and rate of open heart surgeries did not change significantly from 1983 to 1987.

Use of coronary angioplasty grew dramatically from 1983 to 1987. The number of procedures increased by 158,000, and the 1987 rate was almost seven times the 1983 rate.

Table 4. Number and rate of inpatient surgeries by surgical category: United States, 1983 and 1987

[Data are for non-Federal short-stay hospitals and exclude newborn infants]

Surgical category and ICD-9-CM code[1]	*1983*	*1987*	*1983*	*1987*
	Number in thousands		Rate per 10,000 population	
All surgical procedures	26,220	25,655	1,128.8	1,061.6
Operations on the nervous system .01–05	648	563	27.9	23.3
Operations on the endocrine system .06–07	105	109	4.5	4.5
Operations on the eye .08–16	1,558	497	67.1	20.5
Operations on the ear .18–20	372	176	16.0	7.3
Operations on the nose, mouth, and pharynx .21–29	1,496	930	64.4	38.5
Operations on the respiratory system .30–34	624	745	26.9	30.8
Operations on the cardiovascular system .35–39	1,836	2,978	79.0	123.2
Operations on the hemic and lymphatic system .40–41	365	398	15.7	16.5
Operations on the digestive system .42–54	4,202	4,288	180.9	177.4
Operations on the urinary system .55–59	1,073	1,083	46.2	44.8
Operations on male genital organs .60–64	845	747	36.4	30.9
Operations on female genital organs .65–71	3,849	2,870	165.7	118.8
Obstetrical procedures .72–75	3,914	5,358	168.5	221.7
Operations on the musculoskeletal system .76–84	3,502	3,313	150.8	137.1
Operations on the integumentary system .85–86	1,830	1,600	78.8	66.2

[1]Procedure groups and code numbers are based on the *International Classification of Diseases, 9th Revision, Clinical Modification*. See table II in "Technical notes" for nonsurgical procedures excluded from each category.

Table 5. Number and rate of cardiovascular operations: United States, 1983 and 1987

[Data are for non-Federal short-stay hospitals and exclude newborn infants]

Cardiovascular operation and ICD-9-CM code[1]	*1983*	*1987*	*1983*	*1987*
	Number in thousands		Rate per 10,000 population	
All cardiovascular operations[2] .35–39	1,836	2,978	79.0	123.2
Open heart surgery .35.1–35.51, 35.53–35.99, 36.2, 36.9, 37.10–37.11, 37.32–37.33, 37.5	58	72	2.5	3.0
Removal of coronary artery obstruction .36.0	26	184	1.1	7.6
Bypass anastomosis for heart revascularization[3] .36.1	191	332	8.2	13.7
Cardiac catheterization .37.21–37.23	508	866	21.9	35.8
Pacemaker insertion, replacement, removal, and repair .37.7–37.8	189	234	8.2	9.7
Puncture of vessel .38.9	147	331	6.3	13.7
Procedures auxiliary to open heart surgery .39.6	56	239	2.4	9.9

[1] Procedure groups and code numbers are based on the *International Classification of Diseases, 9th Revision, Clinical Modification.*
[2] Includes operations not shown in table. Excludes hemodialysis, code 39.95.
[3] The number of discharged patients with bypass anastomosis for heart revascularization was 188,000 in 1983 and 245,000 in 1987.

Bypass surgeries increased from 191,000 in 1983 to 332,000 in 1987. In a growing number of cases, however, more than one bypass has been reported for an individual patient. Bypass procedures using saphenous veins and mammary artery grafts, which are coded separately, are being done during the same operation. In 1983, the 191,000 bypass operations represented 188,000 discharged patients, and in 1987, the 332,000 bypass operations were on 245,000 discharged patients. Thus, the number of discharges with bypass operations increased 30 percent from 1983 to 1987.

The most common cardiovascular procedure, cardiac catheterization, increased by 358,000 from 1983 to 1987. The rate per 10,000 population for this procedure was 63 percent higher in 1987 (35.8) than in 1983 (21.9). In contrast, the frequency of another common procedure category, pacemaker insertion, replacement, removal, and repair, did not change significantly during the 5-year period.

The number and rate of puncture of vessel, which includes arterial and venous catheterization and venous cutdown, more than doubled from 1983 to 1987. Procedures auxiliary to open heart surgery, mainly extracorporeal circulation (use of a heart-lung machine), more than quadrupled. These increases probably reflect increased reporting as well as actual growth in the use of the procedures.

Obstetrical procedures increased by 1.4 million from 1983 to 1987 (table 6). The rate of obstetrical procedures grew from 98.5 per 100 deliveries in 1983 to 137.0 per 100 deliveries in 1987. The majority of these procedures were relatively routine procedures to assist delivery. Episiotomy—with or without forceps or vacuum extraction—accounted for half of all obstetrical procedures in 1983 and a third in 1987. Neither the number or the rate of episiotomies changed significantly from 1983 to 1987. Artificial rupture of membranes, however, more than doubled in frequency reported during the 5-year period, and manually assisted delivery was reported almost five times more frequently in 1987 than in 1983.

The cesarean section rate increased from 20.3 per 100 deliveries in 1983 to 24.4 per 100 deliveries in 1987. This was part of a long-term upward trend in the use of cesarean sections. The rate of cesarean sections was 5.5 per 100 deliveries in 1970, 10.4 per 100 deliveries in 1975, and 16.5 per 100 deliveries in 1980. Detailed studies of the increase in cesarean section rates have been published (Placek and Taffel, 1980; Placek, Taffel, and Moien, 1988; Taffel, Placek, and Liss, 1987).

Repair of current obstetric laceration increased 40 percent, from 12.1 per 100 deliveries in 1983 to 16.9 per 100 deliveries in 1987. This procedure has also been increasing in frequency for some time. In 1970 the rate of obstetric laceration repairs was 5.9 per 100 deliveries; in 1975 it was 7.2 per 100 deliveries; and in 1980 it was 9.4 per 100 deliveries.

Use of fetal EKG and fetal monitoring not otherwise specified increased dramatically from 1983 to 1987. The number grew by 533,000, and the 1987 rate per 100 deliveries

Table 6. Number and rate of obstetrical procedures: United States, 1983 and 1987

[Data are for non-Federal short-stay hospitals]

Obstetrical procedure and ICD-9-CM code[1]	*1983*	*1987*	*1983*	*1987*
	Number in thousands		Rate per 100 deliveries	
All obstetrical procedures .72–75	3,914	5,358	98.5	137.0
Procedures to assist delivery .72–73	2,405	2,938	60.5	75.1
Episiotomy .72.1, 72.21, 72.31, 72.71, 73.6	1,943	1,833	48.9	46.9
Artificial rupture of membranes .73.0	207	476	5.2	12.2
Manually assisted delivery .73.5	81	404	2.0	10.3
Cesarean section .74.0–74.2, 74.4, 74.99	808	953	20.3	24.4
Repair of current obstetric laceration .75.5–75.6	479	660	12.1	16.9
Fetal EKG and fetal monitoring not otherwise specified .75.32, 75.34	114	647	2.9	16.5
Other obstetric procedures .74.3, 74.91, 75.0–75.31, 75.33, 75.35, 75.4, 75.7–75.9	108	161	2.7	4.1

[1] Procedure groups and code numbers are based on the *International Classification of Diseases, 9th Revision, Clinical Modification.*

was 5.7 times the rate in 1983. The rate of other miscellaneous obstetric procedures also increased by more than 50 percent from 1983 to 1987.

Surgical procedures by age

The number and rate of selected surgical categories and procedures are shown by age group in tables 7–10. The specific categories and procedures were chosen because of large numbers of occurrences or because of special interest. Not every category or procedure shown changed in frequency from 1983 to 1987, and not every significant change could be shown.

Under 15 years

Seven surgical categories accounted for 86 percent of the inpatient surgery of children under 15 years of age in 1983, 84 percent in 1987 (table 7). These data exclude surgeries performed on newborn infants. There were statistically significant decreases in the numbers and rates for three of these categories in the 5-year period: operations on the ear; operations on the nose, mouth, and pharynx; and operations on male genital organs.

The number of operations on the ear decreased by 127,000, which was primarily because of the decrease, by 107,000, in the number of myringotomies. The rate of myringotomies declined by 64 percent.

Children under 15 years of age had 213,000 fewer inpatient operations on the nose, mouth, and pharynx in 1987 than in 1983. Tonsillectomies with or without adenoidectomies decreased by 120,000, and there were 37,000 fewer adenoidectomies without tonsillectomies. The rate of adenoidectomies fell the most, 73 percent, while the tonsillectomy rate decreased by 44 percent.

The number and rate of tonsillectomies have been declining for many years (NCHS, 1984). In 1965, 981,000 inpatient tonsillectomies were performed on children under 15 years of age, which was a rate of 165.5 per 10,000 population. The rate decreased 25 percent from 1965 to 1970, 31 percent from 1970 to 1975, and 34 percent from 1975 to 1980.

Operations on the male genital organs declined by 56,000 from 1983 to 1987. The major decrease was in circumcisions. Both the number and rate of circumcisions in 1987 were half what they had been in 1983. However, newborn infants, who were excluded from these data, had a much larger number of circumcisions, approximately 1.2 million in 1983 and 1987. Neither the number nor the rate of circumcisions per 100 male newborn infants changed significantly in the 5-year period.

Certain procedures within other surgical categories also decreased from 1983 to 1987. The number and rate of cardiac catheterizations for children under 15 years of age fell by more than 40 percent, even though the total number of cardiac catheterizations increased during this period. The number and rate of inpatient repairs of inguinal hernias for children were almost cut in half from 1983 to 1987. Operations on muscles, tendons, fascia, and bursa decreased by 39 percent in the 5-year period. None of the leading inpatient surgical procedures done on children increased in frequency from 1983 to 1987.

15–44 years

Six categories made up approximately 90 percent of the inpatient surgical procedures performed on patients 15–44 years of age (table 8). From 1983 to 1987 there was a statistically significant increase in the

Table 7. Number and rate of inpatient surgeries for patients under 15 years of age: United States, 1983 and 1987

[Data are for non-Federal short-stay hospitals and exclude newborn infants]

Surgical category and ICD-9-CM code[1]	*1983*	*1987*	*1983*	*1987*
	Number in thousands		Rate per 10,000 population	
All surgical procedures[2]	1,786	1,195	346.1	228.1
Operations on the ear .18–20	220	93	42.6	17.7
Myringotomy .20.0	169	62	32.7	11.7
Operations on the nose, mouth, and pharynx .21–29	451	238	87.3	45.4
Tonsillectomy with or without adenoidectomy .28.2–28.3	279	159	54.1	30.3
Adenoidectomy without tonsillectomy .28.6	50	13	9.7	2.6
Operations on the cardiovascular system .35–39	115	98	22.2	18.7
Cardiac catheterization .37.21–37.23	32	19	6.2	3.6
Puncture of vessel .38.9	37	35	7.3	6.6
Operations on the digestive system .42–54	255	211	49.5	40.3
Appendectomy .47.0	75	66	14.5	12.7
Repair of inguinal hernia .53.0–53.1	81	42	15.6	8.0
Operations on male genital organs .60–64	126	70	24.5	13.3
Orchiectomy and orchiopexy .62.3–62.5	27	19	5.2	3.7
Circumcision .64.0	53	26	10.2	5.0
Operations on the musculoskeletal system .76–84	242	201	46.8	38.4
Reduction of fracture .76.7, 79.0–79.6	100	86	19.4	16.4
Operations on muscles, tendons, fascia, and bursa .82–83.1, 83.3–83.9	41	25	7.9	4.8
Operations on the integumentary system .85–86	121	95	23.5	18.2
Excision or destruction of lesion or tissue of skin or subcutaneous tissue .86.2–86.4	51	38	9.9	7.2

[1] Procedure groups and code numbers are based on the *International Classification of Diseases, 9th Revision, Clinical Modification.* See table II in "Technical notes" for nonsurgical procedures excluded from each category.

[2] Includes operations not shown in table.

Table 8. Number and rate of inpatient surgeries for patients 15–44 years of age: United States, 1983 and 1987

[Data are for non-Federal short-stay hospitals]

Surgical category and ICD-9-CM code[1]	1983	1987	1983	1987
	Number in thousands		Rate per 10,000 population	
All surgical procedures[2]	12,556	12,577	1,154.1	1,101.6
Operations on the nose, mouth, and pharynx .21–29	689	431	63.3	37.7
Rhinoplasty and repair of nose .21.8	188	89	17.3	7.8
Operations on the digestive system .42–54	1,432	1,401	131.7	122.7
Appendectomy .47.0	165	186	15.1	16.3
Cholecystectomy .51.2	167	199	15.4	17.4
Division of peritoneal adhesions .54.5	180	194	16.5	17.0
Operations on the female genital organs .65–71	2,915	2,098	267.9	183.7
Oophorectomy and salpingo-oophorectomy .65.3–65.6	314	276	28.9	24.2
Bilateral destruction or occlusion of fallopian tubes .66.2–66.3	564	413	51.9	36.2
Hysterectomy .68.3–68.7	440	406	40.4	35.6
Dilation and curettage of uterus .69.0	731	314	67.2	27.5
Obstetrical procedures .72–75	3,902	5,337	358.6	467.5
Operations on the musculoskeletal system .76–84	1,543	1,376	141.8	120.5
Open reduction of fracture, except jaw .76.79, 79.2–79.3, 79.5–79.6	162	200	14.9	17.5
Excision or destruction of intervertebral disc .80.5, 81.0	143	176	13.1	15.4
Operations on muscles, tendons, fascia, and bursa .82–83.1, 83.3–83.9	190	155	17.4	13.6
Operations on the integumentary system .85–86	740	642	68.0	56.2
Debridement of wound, infection, or burn .86.22	86	137	7.9	12.0
Other excision or destruction of lesion or tissue of skin or subcutaneous tissue .86.21, 86.23–86.4	192	98	17.7	8.6

[1] Procedure groups and code numbers are based on the *International Classification of Diseases, 9th Revision, Clinical Modification*. See table II in "Technical notes" for nonsurgical procedures excluded from each category.
[2] Includes operations not shown in table.

number and rate for one category, obstetrical procedures. The specific procedures in this category were shown in table 6. Patients 15–44 years of age accounted for virtually all of the obstetrical procedures.

Two surgical categories decreased significantly from 1983 to 1987: operations on the nose, mouth, and pharynx and operations on the female genital organs. The number of operations on the nose, mouth, and pharynx decreased by 258,000, and the rate decreased by 40 percent. A major part of the decrease was from the decline in rhinoplasty and repair of nose. The 1987 number and rate for this surgery were less than half of what they had been in 1983.

The number of operations on the female genital organs for patients 15–44 years of age fell by 817,000 from 1983 to 1987. The rate decreased by 31 percent. D&C declined 417,000, and the rate of D&C's decreased by 59 percent. Bilateral destruction or occlusion of fallopian tubes also decreased significantly; 151,000 fewer were performed in 1987 than in 1983, and the 1987 rate was 30 percent lower than the 1983 rate.

Within the category of operations on the integumentary system, one type of procedure, debridement of wound, infection, or burn, increased sharply for patients 15–44 years of age. The rate of this procedure rose 52 percent, and the number was 51,000 higher in 1987 than in 1983. At the same time, other excision or destruction of lesion or tissue of skin and subcutaneous tissue decreased sharply for this age group. The rate was down 51 percent, and the number decreased 94,000 from 1983 to 1987. The decreasing procedures could be expected to have become outpatient procedures (Shannon, 1985c). The increase in debridements may reflect a change in reporting practices.

45–64 years

For patients 45–64 years of age, the seven surgical categories shown in table 9 accounted for more than 80 percent of all inpatient surgical procedures. The number and rate of procedures in one category, operations on the eye, decreased significantly from 1983 to 1987. The number was reduced by 179,000, and the rate declined 62 percent. Decreases in cataract surgery—extraction of lens and insertion of prosthetic lens—accounted for almost all of the decline in eye surgery. The rates of these cataract surgeries, which are often done at the same time, dropped 87 and 84 percent, respectively, from 1983 to 1987.

The number of operations on the cardiovascular system increased by 469,000 from 1983 to 1987, and the rate increased by 60 percent. Most striking was the increase in removal of coronary artery obstruction (coronary angioplasty), which grew from 16,000 in 1983 to 104,000 in 1987. The 1987 rate for coronary angioplasty was 6.5 times the 1983 rate for patients 45–64 years of age.

The number and rate of bypass anastomosis for heart revascularization also increased, but much of the growth was because more than one procedure was being reported per patient. The number of discharged patients in this age group who had bypass surgery was 111,000 in 1983 and 121,000 in 1987, which was not a statistically significant increase.

Cardiac catheterization increased by 163,000, and the rate of this procedure was 56 percent higher in 1987 than in 1983. The number and rate of puncture of vessel reported for patients 45–64 years of age more than doubled, and the number and rate of procedures auxiliary to open heart surgery reported in 1987 were four times the number and rate reported in 1983.

Besides cardiovascular procedures, another specific procedure that increased for the group 45–64 years of

Table 9. Number and rate of inpatient surgeries for patients 45–64 years of age: United States, 1983 and 1987

[Data are for non-Federal short-stay hospitals]

Surgical category and ICD-9-CM code[1]	*1983*	*1987*	*1983*	*1987*
	Number in thousands		Rate per 10,000 population	
All surgical procedures[2]	5,686	5,458	1,277.2	1,206.0
Operations on the eye .08–16	295	116	66.4	25.5
Extraction of lens .13.1–13.6	106	14	23.8	3.1
Insertion of prosthetic lens .13.7	82	13	18.3	2.9
Operations on the cardiovascular system .35–39	753	1,222	169.1	270.0
Removal of coronary artery obstruction .36.0	16	104	3.5	22.9
Bypass anastomosis for heart revascularization[3] .36.1	112	170	25.2	37.7
Cardiac catheterization .37.21–37.23	277	440	62.3	97.2
Puncture of vessel .38.9	36	91	8.2	20.1
Procedures auxiliary to open heart surgery .39.6	29	116	6.4	25.7
Operations on the digestive system .42–54	1,170	1,136	262.9	251.0
Resection of intestine .45.6–45.8	57	76	12.9	16.7
Cholecystectomy .51.2	162	163	36.4	36.1
Repair of inguinal hernia .53.0–53.1	155	99	34.8	22.0
Biopsies on the digestive system[4]	142	147	31.9	32.4
Operations on the urinary system .55–59	299	306	67.1	67.5
Operations on the female genital organs .65–71	685	535	153.8	118.3
Oophorectomy and salpingo-oophorectomy .65.3–65.6	153	163	34.3	36.1
Hysterectomy .68.3–68.7	180	188	40.4	41.6
Dilation and curettage of uterus .69.0	166	48	37.4	10.7
Operations on the musculoskeletal system .76–84	906	811	203.6	179.3
Partial excision of bone .76.2–76.3, 77.6–77.8	84	70	18.8	15.4
Open reduction of fracture, except jaw .76.79, 79.2–79.3, 79.5–79.6	68	86	15.3	19.1
Excision or destruction of intervertebral disc and spinal fusion .80.5, 81.0	89	133	19.9	29.3
Operations on muscles, tendons, fascia, and bursa .82–83.1, 83.3–83.9	116	91	26.1	20.0
Operations in the integumentary system .85–86	559	434	125.6	95.8
Biopsies of breast, skin, and subcutaneous tissue .85.11–85.12, 86.11	80	45	17.9	9.9
Debridement of wound, infection, or burn .86.22	46	67	10.3	14.8
Other excision or destruction of lesion or tissue of skin or subcutaneous tissue .86.21, 86.23–86.4	141	58	31.7	12.9

[1] Procedure groups and code numbers are based on the *International Classification of Diseases, 9th Revision, Clinical Modification*. See table II in "Technical notes" for nonsurgical procedures excluded from each category.
[2] Includes operations not shown in table.
[3] The number of discharged patients with bypass anastomosis for heart revascularizations was 111,000 in 1983 and 121,000 in 1987.
[4] ICD-9-CM codes 42.24, 44.14–44.15, 45.14–45.15, 45.25–45.27, 48.24–48.26, 49.22–49.23, 50.11–50.12, 51.12–51.13, 52.11–52.12, 54.22–54.23.

age was excision or destruction of intervertebral disc and spinal fusion. The number increased from 89,000 in 1983 to 133,000 in 1987.

Certain other procedures decreased significantly in the 5-year period. The number of repair of inguinal hernia was reduced by 56,000, and the rate for the procedure fell 37 percent. The rate of D&C was down 71 percent, and the number decreased by 118,000. There were 35,000 fewer biopsies of breast, skin, and subcutaneous tissue done on an inpatient basis, and the rate for these biopsies decreased by 45 percent. The number of other excision or destruction of lesion or tissue of skin and subcutaneous tissue declined by 83,000, and the rate decreased 59 percent.

65 years and over

Seven surgical categories that accounted for more than 80 percent of the inpatient surgical procedures performed on patients 65 years of age and over are presented in table 10. As was the case for patients 45–64 years of age, operations on the eye decreased significantly from 1983 to 1987, and operations on the cardiovascular system increased significantly.

The number of operations on the eye performed on inpatients 65 years of age and over decreased by 831,000 in the 5-year period. The decline in 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.

The number of operations on the cardiovascular system increased by 602,000 in the 5-year period. 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 more bypass procedures increased from 66,000 in 1983 to 117,000 in 1987, and the rate rose 63 percent during this period.

The number of cardiac catheterizations increased by 190,000 from 1983 to 1987, and the rate for the procedure more than doubled. As was the case for patients 45–64 years of age, the number and rate of puncture of vessel reported for patients 65 years of age and over more than doubled from 1983 to 1987. The number and rate of procedures auxiliary to open heart surgery reported in 1987 were five times those reported for 1983.

Among other specific surgical procedures that increased from 1983 to 1987 was biopsy of the digestive system, which grew by 76,000. In addition, the rate of arthroplasty and replacement of knee almost doubled, and the number of this procedure increased by 47,000.

Like patients 15–44 years of age, patients 65 years of age and over were reported to have a significant increase in debridement of wound, infection, or burn. The number of these procedures increased by 45,000, and the rate for the elderly was 58 percent higher in

Table 10. Number and rate of inpatient surgeries for patients 65 years of age and over: United States, 1983 and 1987

[Data are for non-Federal short-stay hospitals]

Surgical category and ICD-9-CM code[1]	1983	1987	1983	1987
	Number in thousands		Rate per 10,000 population	
All surgical procedures[2]	6,192	6,425	2,261.3	2,153.4
Operations on the eye .08–16	1,077	246	393.2	82.4
Extraction of lens .13.1–13.6	501	57	182.8	19.0
Insertion of prosthetic lens .13.7	427	54	156.0	18.0
Operations on the cardiovascular system .35–39	759	1,361	277.0	456.2
Bypass anastomosis for heart revascularization[3] .36.1	67	152	24.6	51.1
Cardiac catheterization .37.21–37.23	138	328	50.4	109.8
Pacemaker insertion, replacement, removal, repair .37.7–37.8	150	174	54.8	58.4
Puncture of vessel .38.9	51	140	18.6	46.9
Procedures auxiliary to open heart surgery .39.6	18	107	6.6	35.7
Operations on the digestive system .42–54	1,344	1,540	490.7	516.0
Resection of intestine .45.6–45.8	133	153	48.6	51.3
Cholecystectomy .51.2	156	172	57.0	57.7
Repair of inguinal hernia .53.0–53.1	140	111	51.1	37.3
Biopsies on the digestive system[4]	189	265	69.1	89.0
Operations on the urinary system .55–59	423	448	154.4	150.0
Transurethral excision or destruction of bladder tissue .57.4	89	76	32.6	25.4
Operations on the male genital organs .60–64	410	442	149.6	148.2
Prostatectomy .60.2–60.6	274	318	99.9	106.7
Operations on the musculoskeletal system .76–84	811	924	296.3	309.6
Reduction of fracture .76.7, 79.0–79.6	175	220	63.8	73.8
Arthroplasty and replacement of knee .81.41–81.47	41	88	14.9	29.7
Arthroplasty and replacement of hip .81.5–81.6	118	161	42.9	53.9
Operations on the integumentary system .85–86	410	430	149.9	144.0
Debridement of wound, infection, or burn .86.22	63	108	22.9	36.2
Other excision or destruction of lesion or tissue of skin or subcutaneous tissue .86.21,86.23–86.4	101	61	37.0	20.6

[1] Procedure groups and code numbers are based on the *International Classification of Diseases, 9th Revision, Clinical Modification*. See table II in "Technical notes" for nonsurgical procedures excluded from each category.
[2] Includes operations not shown in table.
[3] The number of discharged patients with bypass anastomosis for heart revascularization was 66,000 in 1983 and 117,000 in 1987.
[4] ICD-9-CM codes 42.24, 44.14–44.15, 45.14–45.15, 45.25–45.27, 48.24–48.26, 49.22–49.23, 50.11–50.12, 51.12–51.13, 52.11–52.12, 54.22–54.23.

1987 than in 1983. At the same time, other excision or destruction of lesion or tissue of skin and subcutaneous tissue decreased. The number fell by 40,000, and the rate decreased by 44 percent.

Summary

The procedures that decreased in frequency for inpatients from 1983 to 1987 were ones either that have been reported to be performed in growing numbers in ambulatory settings, or that have the characteristics (such as short duration, minimal bleeding, and low complication rates) of procedures that could be done on an ambulatory basis (Ermann, 1988). Thus, the decreases in the number of these procedures performed on inpatients probably does not indicate a decrease in the total number performed.

The increases in inpatient procedures had several possible explanations. Increases in relatively minor procedures such as manually assisted delivery or debridement of wound, infection, or burn probably were from increased reporting rather than sudden growth in the use of these procedures. The implementation of the prospective payment system based on DRG's was expected to result in more complete reporting of secondary diagnoses and procedures (Cohen, Pokras, Meads, and Krushat, 1987). More detailed reporting could result in more favorable reimbursement rates for Medicare patients, and if doctors and hospitals changed their reporting practices for patients covered by Medicare, they were likely to change it for other patients as well (Schramm and Gabel, 1988).

In addition, NHDS data collection procedures changed in 1985 when part of the data began to be purchased from commercial abstracting services (see "Technical notes"). A greater number of procedures per patient have been reported for hospitals using the commercial abstracting services than for the other hospitals in the survey.

Some procedures (for example, coronary angioplasty and use of fetal monitoring) were probably increasing rapidly from 1983 to 1987 because they were in the process of changing from relatively new procedures done on a limited basis to commonly used procedures. However, reasons for the rapid increases in some procedures (such as, coronary bypass and arthroplasty and replacement of knee for patients 65 years of age and over) are not readily apparent and may be cause for concern for health policymakers.

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Technical notes

Survey methodology

Source of data

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

The original universe for the survey consisted of 6,965 hospitals contained in the 1963 National Master Facility Inventory. New hospitals were sampled for inclusion in the survey in 1972, 1975, 1977, 1979, 1981, 1983, and 1985. In all, 553 hospitals were sampled in 1983; 558 were sampled in 1987. Of these, 78 hospitals refused to participate in 1983, and 92 refused in 1987. Another 57 hospitals in 1983 and 66 hospitals in 1987 were out of the scope of the survey either because they had closed or because they did not meet the definition of a short-stay hospital. In 1983, the 418 participating hospitals provided approximately 206,000 abstracts, which contained data on 130,000 surgical procedures. In 1987, 400 participating hospitals supplied 181,000 abstracts that included data on 128,000 surgical procedures.

Sample design and data collection

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

In 1985, for the first time, two data collection procedures were used for the survey. The first was the traditional manual system of sample discharge selection and data abstraction. The second involved the purchase of data tapes from commercial abstracting services. In 1987 this automated method was used in approximately 17 percent of the sample hospitals.

In the manual procedure hospitals, sample discharges were selected using the daily listing sheet of discharges as the sampling frame. These discharges were selected by a random technique, usually based on the terminal digit or digits of the patient's medical record number. The sample selection and abstraction of data from the face sheets and discharge summaries of the medical records were performed by the hospital staff or by representatives of the National Center for Health Statistics (NCHS). The completed forms were forwarded to NCHS for coding, editing, and weighting procedures.

For the automated procedure hospitals, tapes containing machine-readable medical record data were purchased from commerical abstracting services. These tapes were subject to NCHS sampling, editing, and weighting procedures.

The medical abstract form and the abstract service data tapes contain items relating to the personal characteristics of the patient, including birth data, 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 procedures. Since 1977, patient zip code, expected source of payment, and dates of procedures have been collected. The medical record number and patient zip code are considered confidential information and are not available to the public.

Presentation of estimates

Statistics produced by NHDS are derived by a complex estimating procedure. The basic unit of estimation is the sample inpatient discharge. The estimating procedure used to produce 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 (NCHS, 1967a, 1967b).

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

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

Standard errors and rounding of numbers

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

NOTE: See list of references following the text.

Table I. Approximate relative standard errors for the number of surgical procedures: United States, 1983 and 1987

Size of estimate	*1983*	*1987*
5,000	17.1	18.3
10,000	14.0	15.3
25,000	10.9	12.4
50,000	9.2	10.8
100,000	7.8	9.4
250,000	6.5	8.0
500,000	5.7	7.2
1,000,000	5.1	6.5
2,500,000	4.4	5.8
5,000,000	4.0	5.3
10,000,000	3.6	4.9
25,000,000	3.3	4.5

for numbers of surgical procedures are shown in table I for 1983 and 1987.

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

Tests of significance

In this report, the determination of statistical inference is based on the two-tailed Bonferroni test for multiple comparisons using a 0.05 level of significance. Terms relating to differences, such as "higher" and "less," indicate that the differences are statistically significant. Terms such as "similar" and "no difference" mean that no statistically significant difference exists between the estimates being compared. A lack of comment on the difference between any two estimates does not mean that the difference was tested and found to be not significant.

Definitions of terms

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

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

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

Discharge rate—The ratio of the number of hospital discharges during a year to the number of people in the civilian population on July 1 of that year is the discharge rate.

Expected principal source of payment—The expected principal source of payment is reported by the patient or the patient's representative at the time of admission. In this report, payment sources are grouped as follows:

- *Private insurance*—Private insurance is provided by nongovernmental sources, including Blue Cross and other insurance companies, private industry, and philanthropic organizations.
- *Medicare*—Medicare is a nationwide program providing health insurance protection to people 65 years of age and over, people eligible for Social Security disability payments for more than 2 years, and people with end-stage renal disease.
- *Medicaid*—Medicaid is a joint Federal-State program that provides benefits for people, including the elderly, who meet their State's definition of "low income."
- *Self-pay*—The self-pay category consists of patients who expect the costs of hospitalization to be paid for primarily by themselves, spouses, parents, or next of kin.
- *Other*—Other sources include Workers' Compensation and other government programs, such as CHAMPUS (for dependents of military personnel); other nonprofit sources, such as church welfare; hospitalizations for which there was no charge; and sources that could not be assigned to any other category.

Hospital—Hospital refers to short-stay general and special hospitals that have six beds or more for inpatient use and an average length of stay of less than 30 days. Military and Veterans Administration hospitals are not included.

Patient—A patient is a person who is formally admitted to the inpatient service of a short-stay hospital for observation, care, diagnosis, or treatment. The number of patients refers to the number of discharges during the year including multiple discharges of the same individual from one or more short-stay hospitals. All newborn infants, defined as those admitted by birth to the hospital, are excluded from this report. The terms patient, inpatient, and discharge are used synonymously.

Population—The population estimates used in computing rates are from published and unpublished estimates of the U.S. civilian population on July 1 of the data year. These estimates are provided by the U.S. Bureau of the Census and are consistent with population estimates published in *Current Population Reports,* Series P-25.

Rate of surgical procedures—The ratio of the number of surgical procedures during the year to the number of persons in the civilian population on July 1 of that year determines the rate of surgical procedures.

Surgical procedure—A surgical procedure is a surgical operation listed by the physician on the medical record of a patient discharged from the inpatient service of a short-stay hospital. In the NHDS, all terms listed on the face sheet of the medical record under captions such as operation, operative procedures, operations and/or special treatments are transcribed in the order listed. A maximum of four 4-digit codes are assigned per sample discharge according to the *International Classification of Diseases, 9th Revision, Clinical Modification* (ICD–9–CM) (Public Health Service and Health Care Financing Administration, 1980). Although both surgical and nonsurgical procedures are coded, nonsurgical procedures are excluded from this report. Table II shows the nonsurgical codes that are excluded.

NOTE: See list of references following the text.

Table II. Code numbers for procedure categories and nonsurgical procedures excluded from each category

[Based on the *International Classification of Diseases, 9th Revision, Clinical Modification*]

Procedure category	*Category code*	*Nonsurgical codes excluded*
Operations on the nervous system	01–05	03.31
Operations on the endocrine system	06–07	
Operations on the eye	08–16	11.21,12.21,14.11,16.22
Operations on the ear	18–20	20.31
Operations on the nose, mouth, and pharynx	21–29	29.11
Operations on the respiratory system	30–34	31.41–31.42,33.21–33.23,34.21–34.22
Operations on the cardiovascular system	35–39	39.95
Operations on the hemic and lymphatic system	40–41	
Operations on the digestive system	42–54	42.21–42.23,44.11–44.13,45.11–45.13,45.21–45.24,48.21–48.22,51.11,54.21
Operations on the urinary system	55–59	55.21–55.22, 56.31, 57.31–57.32, 58.21–58.22
Operations on the male genital organs	60–64	60.19
Operations on the female genital organs	65–71	68.11–68.12,70.22
Obstetrical procedures	72–75	
Operations on the musculoskeletal system	76–84	80.20–80.29
Operations on the integumentary system	85–86	
Miscellaneous diagnostic and therapeutic procedures	87–99	87.01–99.99

☆U. S. GOVERNMENT PRINTING OFFICE:1989-241-281:80025

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No. 163. AIDS Knowledge and Attitudes for August 1988 (Issued December 15, 1988)

Suggested citation

National Center for Health Statistics, L. J. Kozak. 1989. Hospital inpatient surgery: United States, 1983–87. *Advance Data From Vital and Health Statistics.* No. 169. DHHS Pub. No. (PHS) 89-1250. Public Health Service. Hyattsville, Md.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
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Centers for Disease Control
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DHHS Publication No. (PHS) 89-1250

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