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Surgeries in Hospital-Based Ambulatory Surgery and Hospital Inpatient Settings, 2014

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Introduction

Ambulatory surgery (AS), or outpatient surgery, is a planned operation for which the patient is not expected to be admitted to the hospital. Comparison of ambulatory surgery with inpatient surgery is essential for understanding utilization patterns for specific surgical procedures, including changing trends and estimates of total surgical volumes. As the number of surgical procedures capable of being safely performed in an ambulatory setting increases, comparisons of ambulatory surgery with inpatient surgery can also be useful in the evaluation of post-surgical complications, hospital cost savings, and patient experience of care surveys.

Self-reported facility estimates from the American Hospital Association suggest that a growing share of all surgeries at community hospitals in the United States are performed in the AS setting (66 percent in 2014, up from 57 percent in 1994),¹ although an ambiguous definition for AS introduces variation across facility volume estimates. Recent reports on specific surgical procedure trends in a subset of States also point to a shift from the inpatient surgical setting to the AS setting.^{2,3} Nationally representative AS estimates for a broad group of surgical procedures do not yet exist.

This Healthcare Cost and Utilization Project (HCUP) Statistical Brief presents national data on surgeries performed in two hospital settings: hospital inpatient and hospital-based AS settings. The findings in this Statistical Brief represent an update

¹ American Hospital Association. Utilization and Volume. In: Trends Affecting Hospitals and Health Systems. Updated for 2016; chapter 3.

www.aha.org/research/reports/tw/chartbook/ch3.shtml. Accessed November 21, 2016.

² Moore BJ, Steiner CA, Davis PH, Stocks C, Barrett ML. Trends in Hysterectomies and Oophorectomies in Hospital Inpatient and Ambulatory Settings, 2005–2013. HCUP Statistical Brief #214. November 2016. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/reports/statbriefs/sb214-Hysterectomy-Oophorectomy-Trends.pdf. Accessed December 5, 2016.

³ Steiner CA, Weiss AJ, Barrett ML, Fingar KR, Davis PH. Trends in Bilateral and Unilateral Mastectomies in Hospital Inpatient and Ambulatory Settings, 2005–2013. HCUP Statistical Brief #201. February 2016. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/reports/statbriefs/sb201-Mastectomies-Inpatient-Outpatient.pdf. Accessed December 5, 2016.

Highlights

- In 2014, 17.2 million hospital visits (ambulatory or inpatient) included invasive, therapeutic surgeries. Over half of these visits (57.8 percent) occurred in a hospital-owned ambulatory surgery (AS) setting, and the remaining (42.2 percent) were inpatient.
- Private insurance was the primary expected payer for 48.6 percent of AS visits. Medicare was the most common payer among inpatient surgical stays (43.4 percent).
- The following procedures were among the most common invasive, therapeutic ambulatory surgeries:
 - Lens and cataract procedures (99.9 percent performed in AS settings)
 - Excision of semilunar cartilage of knee (98.7 percent in AS)
 - Tonsillectomy (95.6 percent in AS)
 - Decompression peripheral nerve (95.2 percent in AS)
 - Inguinal and femoral hernia repair (92.0 percent in AS)
 - Incision or fusion of joint, destruction of joint lesion (80.4 percent in AS)
 - Operating room (OR) procedures of skin and breast (78.5 percent in AS)
 - Muscle, tendon, and soft tissue OR procedures (71.9 percent in AS)
 - Repair of diaphragmatic, incisional, and umbilical hernia (61.1 percent in AS)
 - Cholecystectomy (60.8 percent in AS)

and expansion of 2012 statistics previously reported.⁴ Procedures performed in freestanding (non-hospital-owned) AS centers were not included because many State AS data sources do not include these types of centers.

The analysis was limited to visits for an invasive surgery commonly performed for therapeutic purposes (i.e., to treat disease or injury); excluded were noninvasive surgeries and surgeries typically used for diagnostic or exploratory purposes (e.g., colonoscopy). The HCUP Surgery Flag software⁵ was used to identify invasive, therapeutic surgeries based on a narrow and targeted definition.⁶

This report presents characteristics of outpatient surgery visits and hospital inpatient stays for invasive, therapeutic surgical procedures. All references to *surgeries*, *outpatient surgeries*, or *ambulatory surgeries* refer to this subset of surgeries. We also present the distribution of outpatient surgeries compared with inpatient surgical procedures by payer, body system, and the most common surgical procedures performed in an outpatient setting overall and by payer. In addition, ambulatory and inpatient volume and procedure rates are compared for each procedure. Unless otherwise noted, volumes and rates are based on all-listed procedure codes.

All differences between estimates noted in the text are statistically significant at the .05 level or better.

⁴ Wier LM, Steiner CA, Owens PL. Surgeries in Hospital-Owned Outpatient Facilities, 2012. HCUP Statistical Brief #188. February 2015. Agency for Healthcare Research and Quality, Rockville, MD. www.hcup-us.ahrq.gov/reports/statbriefs/sb188-Surgeries-Hospital-Outpatient-Facilities-2012.pdf. Accessed December 2, 2016.

⁵ Agency for Healthcare Research and Quality. HCUP Surgery Flag Software. Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated May 2013. www.hcup-us.ahrq.gov/toolssoftware/surgflags/surgeryflags.jsp. Accessed November 21, 2016.

⁶ The narrow surgery definition includes surgical procedures that involve incision, excision, manipulation, or suturing of tissue that penetrates or breaks the skin; typically require use of an operating room; and also require regional anesthesia, general anesthesia, or sedation to control pain.

Findings

Characteristics of invasive, therapeutic surgeries performed in hospital-based ambulatory surgery compared with hospital inpatient settings, 2014

Table 1 presents characteristics of community hospital visits for invasive, therapeutic surgeries performed in the ambulatory (outpatient) surgery setting versus the hospital inpatient setting (admitted to the hospital) in 2014.

Table 1. Characteristics of hospital visits or stays for invasive, therapeutic surgery performed in hospital-based ambulatory and inpatient settings, 2014

Characteristic	Ambulatory setting	Inpatient setting
Total visits or stays for surgeries		
Total number, N	9,942,200	7,247,600
Percent of total visits or stays for surgeries, %	57.8	42.2
Total surgeries		
Total number, N	11,493,100	10,303,000
Percent of total surgeries, %	52.7	47.3
Number of surgeries per visit or stay, mean	1.2	1.4
Length of stay, mean, days	0.2	6.0
Visits or stays by type of community hospital, %		
By hospital bed size		
Large	53.9	58.3
Medium	26.1	26.3
Small	20.0	15.4
By hospital location, teaching status		
Rural	15.2	6.6
Urban nonteaching	27.1	24.6
Urban teaching	57.8	68.8
By control/ownership of hospital		
Non-Federal government	12.0	11.5
Private not-for-profit	77.2	73.7
Private for-profit	8.0	14.7

Note: Only invasive, therapeutic surgeries that are performed and reliably reported in the hospital-based ambulatory surgery setting were included.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS) and nationwide ambulatory surgery analytic file created from the State Ambulatory Surgery and Services Databases (SASD), weighted for national estimates, 2014

- **In 2014, 17.2 million ambulatory hospital visits or inpatient stays included an invasive, therapeutic surgery; more than half of these visits occurred in the AS setting.**

A total of 17.2 million hospital visits (AS visits or inpatient stays) in the United States included at least one surgery in 2014. Just over half of these visits (57.8 percent) occurred in a hospital-owned AS setting, and the remaining visits (42.2 percent) occurred in the hospital inpatient setting. These visits included nearly 22 million total surgeries, over half of which (52.7 percent) were performed in an outpatient setting. The average number of surgeries performed per visit was slightly higher in the inpatient than in the outpatient setting (1.4 vs. 1.2).

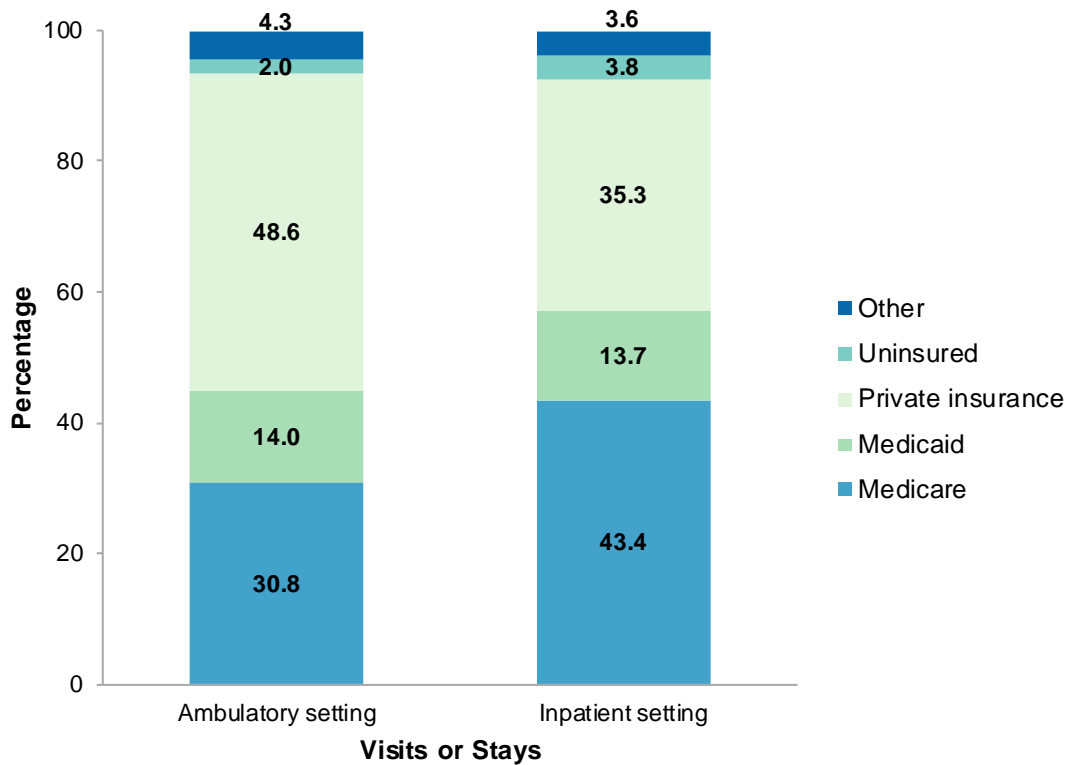
- **The majority of ambulatory and inpatient invasive, therapeutic surgeries were performed at large, urban teaching, and private not-for-profit hospitals.**

Most AS visits and most hospital inpatient surgical stays occurred in large, urban teaching, and private not-for-profit hospitals. However, compared with inpatient surgeries, outpatient surgeries were more likely to be performed in small hospitals (20.0 vs. 15.4 percent) and less likely to be performed in private for-profit hospitals (8.0 vs. 14.7 percent) and in urban teaching settings (57.8 vs. 68.8 percent).

Hospital visits or stays with invasive, therapeutic surgeries by payer, 2014

Figure 1 presents the distribution of hospital visits or stays involving invasive, therapeutic surgeries performed in the ambulatory (outpatient) surgery setting versus the hospital inpatient setting (admitted to the hospital) by expected primary payer in 2014.

Figure 1. Hospital visits or stays with invasive, therapeutic surgeries by expected primary payer, 2014



Notes: Only invasive, therapeutic surgeries that are performed and reliably reported in the hospital-based ambulatory surgery setting were included. "Other" payer includes Workers' Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS) and nationwide ambulatory surgery analytic file created from the State Ambulatory Surgery and Services Databases (SASD), weighted for national estimates, 2014

- **In 2014, private insurance accounted for the largest proportion of AS visits and Medicare accounted for the largest proportion of inpatient invasive, therapeutic surgeries.**

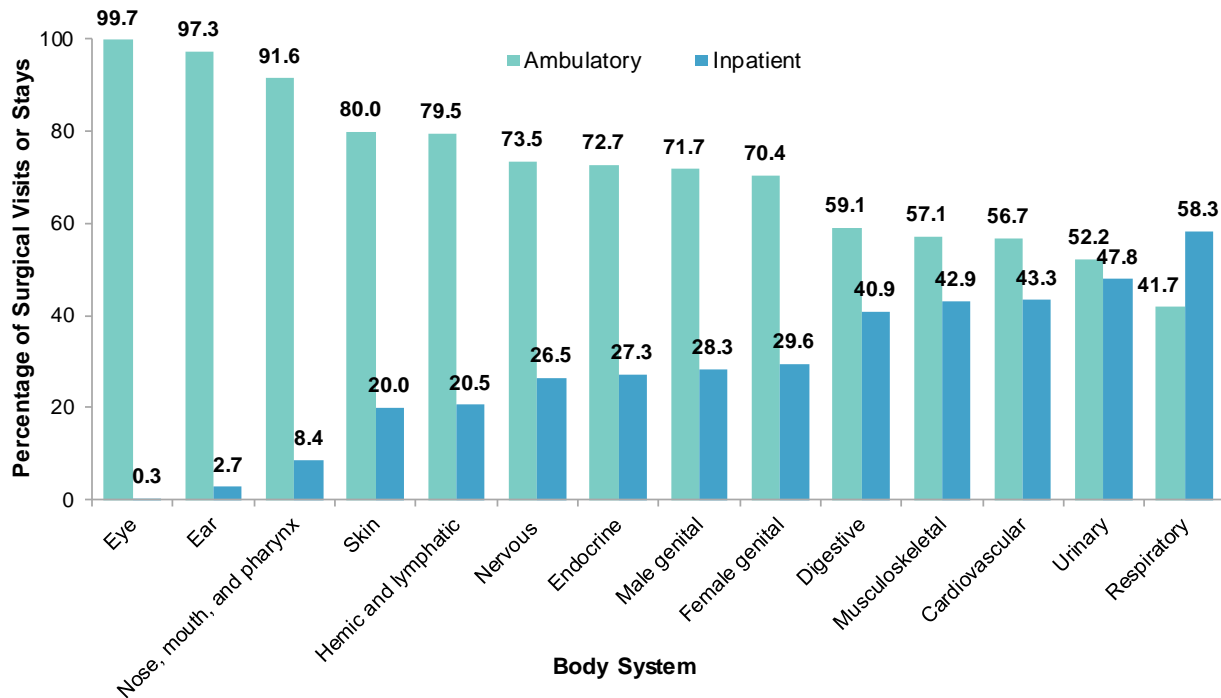
Patients with primary private insurance coverage accounted for 48.6 percent of all AS visits in 2014. Medicare was the second most common payer, accounting for 30.8 percent of AS visits, followed by Medicaid with 14.0 percent of visits. Uninsured patients represented 2.0 percent of AS visits in 2014.

Among surgeries in the inpatient setting, Medicare was the primary expected payer for 43.4 percent of stays, followed by private insurance (35.3 percent) and Medicaid (13.7 percent). Uninsured patients represented 3.8 percent of all inpatient surgical stays in 2014.

Comparison of invasive, therapeutic surgeries by body system in hospital-based ambulatory surgery versus inpatient settings, 2014

Figure 2 shows the distribution of invasive, therapeutic surgeries by body system that were performed in the AS and hospital inpatient settings in 2014.

Figure 2. Ambulatory versus inpatient invasive, therapeutic surgeries in the United States by body system, 2014



Notes: Only invasive, therapeutic surgeries that are performed and reliably reported in the hospital-based ambulatory surgery setting were included. Body systems are based on Clinical Classifications Software (CCS) and Clinical Classifications Software for Services and Procedures. Gastric bypass and volume reduction, which is not classified by the CCS, has been included with the digestive body system.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS) and nationwide ambulatory surgery analytic file created from the State Ambulatory Surgery and Services Databases (SASD), weighted for national estimates, 2014

- **The majority of invasive, therapeutic surgeries on the eye, ear, nose/mouth/pharynx, and skin were performed in an outpatient setting.**

Nearly all surgeries performed on the eye occurred in the AS setting (99.7 percent). The outpatient setting also represented at least 80 percent of hospital visits involving surgeries performed on the ear (97.3 percent), nose/mouth/pharynx (91.6 percent), and skin (80.0 percent).

- **The majority of respiratory invasive, therapeutic surgeries were performed in the inpatient setting.**

Compared with the AS setting, more respiratory surgeries were performed in the inpatient setting (58.3 vs. 41.7 percent). In 2014, this was the only body system that had more surgeries performed in the inpatient setting than the AS setting.

The most common ambulatory invasive, therapeutic surgeries performed, 2014

Table 2 lists the 25 most common, invasive, therapeutic clinically grouped surgeries that were performed in the hospital-based ambulatory surgery setting in the United States in 2014, along with the percentage of these types of surgeries that were performed in the ambulatory versus inpatient setting. Surgeries are ranked from most to least common in the AS setting.

A comprehensive list of the distribution between outpatient and inpatient settings for all specific, invasive, therapeutic surgeries by body system is presented in the appendix.

Table 2. The 25 most common ambulatory invasive, therapeutic surgeries performed in community hospitals in the United States, 2014

All-listed CCS procedures	All AS, %	Surgeries, N ^a		Surgeries, N per 100,000 population ^b		Surgeries performed in ambulatory setting, %
		AS	Inpatient	AS	Inpatient	
Lens and cataract procedures	12.4	1,427,800	1,000	450.1	0.3	99.9
Muscle, tendon, and soft tissue OR procedures	6.6	755,600	295,300	238.2	93.1	71.9
Incision or fusion of joint, destruction of joint lesion	5.3	607,800	147,800	191.6	46.6	80.4
Cholecystectomy and common duct exploration	5.0	577,500	372,600	182.1	117.5	60.8
Excision of semilunar cartilage of knee	4.4	509,900	6,900	160.8	2.2	98.7
Inguinal and femoral hernia repair	3.8	439,100	38,300	138.4	12.1	92.0
Repair of diaphragmatic, incisional, and umbilical hernia	3.3	375,200	239,000	118.3	75.3	61.1
Tonsillectomy and/or adenoidectomy	3.2	366,500	16,800	115.6	5.3	95.6
Decompression peripheral nerve	2.8	323,500	16,300	102.0	5.1	95.2
OR procedures of skin and breast, including plastic procedures on breast	2.8	322,000	88,100	101.5	27.8	78.5
Myringotomy	2.7	308,500	8,300	97.3	2.6	97.4
Lumpectomy, quadrantectomy of breast	2.6	297,600	8,000	93.8	2.5	97.4
Insertion, revision, replacement, removal of cardiac pacemaker or cardioverter/defibrillator	2.4	281,100	245,600	88.6	77.4	53.4
Non-fracture, non-arthroplasty OR procedures on the bone	2.4	277,700	139,800	87.5	44.1	66.5
Hysterectomy, abdominal and vaginal	2.4	271,200	237,500	85.5	74.9	53.3
Partial excision bone	2.2	253,000	358,900	79.8	113.2	41.3
Laminectomy, excision intervertebral disc	1.9	222,000	438,300	70.0	138.2	33.6
Appendectomy	1.8	208,800	238,800	65.8	75.3	46.6
Vascular stents and OR procedures, other than head or neck	1.8	205,400	1,000,500	64.8	315.4	17.0
Testicular, prostate, and penile OR procedures	1.6	189,600	22,100	59.8	7.0	89.6
Vaginal, vulvar, and female pelvic OR procedures	1.6	187,700	74,500	59.2	23.5	71.6
Bunionectomy or repair of toe deformities	1.6	187,200	2,900	59.0	0.9	98.5
OR procedures of mouth, nose, and throat, excluding tonsils and teeth	1.6	178,700	76,400	56.3	24.1	70.1
Plastic procedures on nose	1.5	169,100	14,600	53.3	4.6	92.1
Lymph node biopsies and excisions, bone marrow procedures	1.3	151,100	301,100	47.6	94.9	33.4

Abbreviations: AS, ambulatory surgery; CCS, Clinical Classifications Software; OR, operating room

Notes: Only invasive, therapeutic surgeries that are performed and reliably reported in the hospital-based ambulatory surgery setting were included. Procedures are based on the Clinical Classifications Software (CCS) and Clinical Classifications Software for Services and Procedures. For more information on the CCS categories, please see the Appendix.

^a The number of discharges was rounded to the nearest 100.

^b Based on population estimates from the U.S. Census Bureau

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS) and nationwide ambulatory surgery analytic file created from the State Ambulatory Surgery and Services Databases (SASD), weighted for national estimates, 2014

- **Lens and cataract procedures were the most common invasive, therapeutic type of surgery performed in an outpatient setting.**

Lens and cataract procedures were the most common type of surgery performed in the AS setting, accounting for 12.4 percent of all outpatient surgeries performed. Nearly all lens and cataract procedures (99.9 percent) were performed in an outpatient setting.

- **Muscle, tendon, and soft tissue operating room (OR) procedures and incision or fusion of joint, destruction of joint lesion were the second and third most common types of outpatient invasive, therapeutic surgery.**

Muscle, tendon, and soft tissue OR procedures (mostly rotator cuff repair and trigger finger surgery) were the second most common type of surgery performed in the AS setting, accounting for 6.6 percent of all outpatient surgeries. Incision or fusion of joint, destruction of joint lesion (mostly knee and shoulder arthroscopies) were ranked third, accounting for 5.3 percent of all outpatient surgeries. The majority of both types of procedures were performed in the outpatient setting (71.9 and 80.4 percent, respectively). Four other musculoskeletal system procedures were also commonly performed in the outpatient setting: excision of semilunar cartilage of knee (4.4 percent), non-fracture, non-arthroplasty OR procedures on the bone (2.4 percent), partial excision bone (2.2 percent), and bunionectomy or repair of toe deformities (1.6 percent).

- **Operations on the digestive system accounted for 4 of the 25 most common ambulatory invasive, therapeutic surgeries and constituted 13.9 percent of all outpatient surgeries.**

Operations on the digestive system accounted for 4 of the 25 most common types of AS and constituted 13.9 percent of all outpatient surgeries: cholecystectomy and common duct exploration (5.0 percent), inguinal and femoral hernia repair (3.8 percent), repair of diaphragmatic, incisional, and umbilical hernia (3.3 percent), and appendectomy (1.8 percent). Approximately 61 percent of all cholecystectomy and all repair of diaphragmatic, incisional, and umbilical hernia surgeries, 92 percent of inguinal and femoral hernia repair surgeries, and 47 percent of appendectomy surgeries were performed in the outpatient setting.

- **Four of the 25 most common outpatient ambulatory invasive, therapeutic surgeries were performed predominantly on women.**

Four of the 25 most common outpatient surgeries were procedures that are performed primarily on women: OR procedures of skin and breast, including plastic procedures on breast (2.8 percent); lumpectomy, quadrantectomy of breast (2.6 percent); hysterectomy, abdominal and vaginal (2.4 percent); and vaginal, vulvar, and female pelvic OR procedures (1.6 percent). The majority of these surgeries were performed in the outpatient setting.

The most common ambulatory invasive, therapeutic surgeries performed by payer, 2014

Table 3 lists the five most common, invasive, therapeutic surgeries that were performed in the hospital-based AS setting by payer in 2014, along with the percentage of these types of surgeries that were performed in the ambulatory versus inpatient setting. Surgeries are ranked from most to least common in the AS setting for patients with expected primary payers of Medicare, Medicaid, private insurance, and uninsured.

Table 3. The five most common ambulatory invasive, therapeutic surgeries performed in community hospitals in the United States by payer, 2014

All-listed CCS procedures	Surgeries, N ^a		Surgeries performed in ambulatory setting, %
	AS	Inpatient	
Medicare			
Lens and cataract procedures	987,600	400	100.0
Insertion, revision, replacement, removal of cardiac pacemaker or cardioverter/defibrillator	206,700	178,400	53.7
Muscle, tendon, and soft tissue OR procedures	186,800	119,600	61.0
Vascular stents and OR procedures, other than head or neck	136,300	551,800	19.8
Inguinal and femoral hernia repair	131,800	19,600	87.1
Medicaid			
Tonsillectomy and/or adenoidectomy	141,500	7,400	95.0
Myringotomy	127,000	3,600	97.2
Cholecystectomy and common duct exploration	108,200	68,600	61.2
Muscle, tendon, and soft tissue OR procedures	83,300	48,600	63.2
Lens and cataract procedures	76,000	300	99.6
Private Insurance			
Muscle, tendon, and soft tissue OR procedures	405,300	91,500	81.6
Incision or fusion of joint, destruction of joint lesion	362,800	51,900	87.5
Cholecystectomy and common duct exploration	328,700	133,900	71.1
Excision of semilunar cartilage of knee	326,200	2,900	99.1
Lens and cataract procedures	324,300	200	99.9
Uninsured			
OR procedures of skin and breast, including plastic procedures on breast	42,300	4,800	89.8
Cholecystectomy and common duct exploration	14,500	31,500	31.5
Lens and cataract procedures	14,800	100	99.3
Appendectomy	13,100	21,100	38.3
Muscle, tendon, and soft tissue OR procedures	11,100	18,100	38.0

Abbreviation: AS, ambulatory surgery; CCS, Clinical Classifications Software; OR, operating room

Notes: Only invasive, therapeutic surgeries that are performed and reliably reported in the hospital-based ambulatory surgery setting were included. Procedures are based on the Clinical Classifications Software (CCS) and Clinical Classifications Software for Services and Procedures. For more information on the CCS categories, please see the Appendix.

^a The number of discharges was rounded to the nearest 100.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS) and nationwide ambulatory surgery analytic file created from the State Ambulatory Surgery and Services Databases (SASD), weighted for national estimates, 2014

- **Both lens and cataract procedures and muscle, tendon, and soft tissue OR procedures were among the five most common invasive, therapeutic types of surgery performed in an outpatient setting for all payers.**

Lens and cataract procedures were the most common type of surgery performed in the AS setting among Medicare patients in 2014, with 987,600 surgeries. More lens and cataract procedures were performed during AS visits than the other four most-frequently-performed procedure categories for Medicare patients combined. Lens and cataract procedures also were among the five most common types of surgery performed among the other payers.

Muscle, tendon, and soft tissue OR procedures were the most common type of surgery performed in the AS setting for privately insured patients in 2014, with 405,300 surgeries, although they were still common ambulatory surgeries among other payers as well.

- **Cholecystectomy and common duct exploration surgeries were in the five most common invasive, therapeutic types of surgery performed in an outpatient setting for Medicaid, private insurance, and uninsured.**

Cholecystectomy and common duct exploration were common AS procedures for Medicaid (108,200 surgeries), privately insured (328,700 surgeries), and uninsured (14,500 surgeries). The majority of cholecystectomy surgeries were performed in the AS setting among procedures covered by Medicaid and private insurance (61.2 and 71.1 percent, respectively). In contrast, only 32.5 percent of all cholecystectomy surgeries were performed in the AS setting among uninsured individuals.

Appendix. Invasive, therapeutic surgeries, listed by body system, performed in community hospitals in the United States by setting (ambulatory versus inpatient), 2014

All-listed procedures (CCS number and description)	Surgeries, N ^a		Surgeries, N per 100,000 population ^b		Surgeries performed in ambulatory setting, %
	AS	Inpatient	AS	Inpatient	
Operations on the nervous system					
3: Laminectomy, excision intervertebral disc	222,000	438,300	70.0	138.2	33.6
6: Decompression peripheral nerve	323,500	16,300	102.0	5.1	95.2
9: Other OR therapeutic nervous system procedures	81,900	191,100	25.8	60.3	30.0
Operations on the endocrine system					
10: Thyroidectomy, partial or complete	101,000	29,700	31.8	9.4	77.3
12: Other therapeutic endocrine procedures	39,600	38,500	12.5	12.1	50.7
Operations on the eye					
13: Corneal transplant	29,200	300	9.2	0.1	99.0
15: Lens and cataract procedures	1,427,800	1,000	450.1	0.3	99.9
16: Repair of retinal tear, detachment	106,300	1,000	33.5	0.3	99.1
21: Other extraocular muscle and orbit therapeutic procedures	68,100	6,200	21.5	1.9	91.7
Operations on the ear					
22: Tympanoplasty	27,100	700	8.5	0.2	97.5
23: Myringotomy	308,500	8,300	97.3	2.6	97.4
24: Mastoidectomy	17,100	2,500	5.4	0.8	87.2
26: Other therapeutic ear procedures	29,400	15,600	9.3	4.9	65.3
Operations on the nose, mouth, and pharynx					
28: Plastic procedures on nose	169,100	14,600	53.3	4.6	92.1
30: Tonsillectomy and/or adenoidectomy	366,500	16,800	115.6	5.3	95.6
33: Other OR therapeutic procedures on nose, mouth and pharynx (OR procedures of mouth, nose, and throat, excluding tonsils and teeth)	178,700	76,400	56.3	24.1	70.1
Operations on the respiratory system					
42: Other OR therapeutic procedures on respiratory system and mediastinum	38,200	104,300	12.0	32.9	26.8
Operations on the cardiovascular system					
48: Insertion, revision, replacement, removal of cardiac pacemaker or cardioverter/defibrillator	281,100	245,600	88.6	77.4	53.4
53: Varicose vein stripping, lower limb	29,000	500	9.1	0.1	98.3
57: Creation, revision and removal of arteriovenous fistula or vessel-to-vessel cannula for dialysis	150,500	38,400	47.4	12.1	79.7
61: Other OR procedures on vessels other than head and neck (vascular stents and OR procedures, other than head or neck)	205,400	1,000,500	64.8	315.4	17.0
63: Other non-OR therapeutic cardiovascular procedures	34,900	689,600	11.0	217.4	4.8
Operations on the hemic and lymphatic system					
67: Other therapeutic procedures, hemic and lymphatic system (lymph node biopsies and excisions, bone marrow procedures)	151,100	301,100	47.6	94.9	33.4
Operations on the digestive system					
78: Colorectal resection	7,500	302,500	2.4	95.4	2.4
80: Appendectomy	208,800	238,800	65.8	75.3	46.6

All-listed procedures (CCS number and description)	Surgeries, N ^a		Surgeries, N per 100,000 population ^b		Surgeries performed in ambulatory setting, %
	AS	Inpatient	AS	Inpatient	
84: Cholecystectomy and common duct exploration	577,500	372,600	182.1	117.5	60.8
85: Inguinal and femoral hernia repair	439,100	38,300	138.4	12.1	92.0
86: Other hernia repair (repair of diaphragmatic, incisional, and umbilical hernia)	375,200	239,000	118.3	75.3	61.1
87: Laparoscopy (GI only)	113,500	57,700	35.8	18.2	66.3
94: Other OR upper GI therapeutic procedures	7,800	159,100	2.5	50.2	4.7
96: Other OR lower GI therapeutic procedures	54,400	266,500	17.1	84.0	17.0
99: Other OR gastrointestinal therapeutic procedures	33,500	230,300	10.6	72.6	12.7
244: Gastric bypass and volume reduction ^c	32,300	0	10.2	0.0	100.0
Operations on the urinary system					
100: Endoscopy and endoscopic biopsy of the urinary tract	16,200	161,100	5.1	50.8	9.1
101: Transurethral excision, drainage, or removal urinary obstruction	4,300	104,300	1.4	32.9	4.0
106: Genitourinary incontinence procedures	90,400	24,100	28.5	7.6	79.0
109: Procedures on the urethra	23,600	28,800	7.4	9.1	45.0
112: Other OR therapeutic procedures of urinary tract	28,700	87,100	9.0	27.4	24.8
Operations on the male genital system					
113: Transurethral resection of prostate (TURP)	56,000	29,100	17.7	9.2	65.8
114: Open prostatectomy	3,400	61,600	1.1	19.4	5.2
118: Other OR therapeutic procedures, male genital (testicular, prostate, and penile OR procedures)	189,600	22,100	59.8	7.0	89.6
Operations on the female genital system					
119: Oophorectomy, unilateral and bilateral	99,800	182,400	31.4	57.5	35.4
121: Ligation or occlusion of fallopian tubes	103,800	254,500	32.7	80.2	29.0
124: Hysterectomy, abdominal and vaginal	271,200	237,500	85.5	74.9	53.3
125: Other excision of cervix and uterus	15,900	38,100	5.0	12.0	29.4
129: Repair of cystocele and rectocele, obliteration of vaginal vault	67,400	30,000	21.3	9.5	69.2
132: Other OR therapeutic procedures, female organs (vaginal, vulvar, and female pelvic OR procedures)	187,700	74,500	59.2	23.5	71.6
Operations on the musculoskeletal system					
142: Partial excision bone	253,000	358,900	79.8	113.2	41.3
143: Bunionectomy or repair of toe deformities	187,200	2,900	59.0	0.9	98.5
144: Treatment, facial fracture or dislocation	53,600	27,200	16.9	8.6	66.3
145: Treatment, fracture or dislocation of radius and ulna	119,800	60,100	37.8	19.0	66.6
147: Treatment, fracture or dislocation of lower extremity (other than hip or femur)	142,200	196,600	44.8	62.0	42.0
148: Other fracture and dislocation procedure	110,000	167,600	34.7	52.9	39.6
149: Arthroscopy	97,100	9,600	30.6	3.0	91.0
150: Division of joint capsule, ligament or cartilage	69,300	14,300	21.8	4.5	82.9

All-listed procedures (CCS number and description)	Surgeries, N ^a		Surgeries, N per 100,000 population ^b		Surgeries performed in ambulatory setting, %
	AS	Inpatient	AS	Inpatient	
151: Excision of semilunar cartilage of knee	509,900	6,900	160.8	2.2	98.7
152: Arthroplasty knee	36,500	753,000	11.5	237.4	4.6
153: Hip replacement, total and partial	22,900	523,100	7.2	164.9	4.2
154: Arthroplasty other than hip or knee	50,300	104,500	15.8	33.0	32.5
157: Amputation of lower extremity	34,500	146,600	10.9	46.2	19.1
158: Spinal fusion	37,100	463,800	11.7	146.2	7.4
160: Other therapeutic procedures on muscles and tendons (muscle, tendon, and soft tissue OR procedures)	755,600	295,300	238.2	93.1	71.9
161: Other OR therapeutic procedures on bone (non-fracture, non-arthroplasty OR procedures on the bone)	277,700	139,800	87.5	44.1	66.5
162: Other OR therapeutic procedures on joints (incision or fusion of joint, destruction of joint lesion)	607,800	147,800	191.6	46.6	80.4
164: Other OR therapeutic procedures on musculoskeletal system	37,600	45,700	11.9	14.4	45.1
Operations on the integumentary (skin) system					
166: Lumpectomy, quadrantectomy of breast	297,600	8,000	93.8	2.5	97.4
167: Mastectomy	60,900	42,600	19.2	13.4	58.8
174: Other non-OR therapeutic procedures on skin and breast	16,900	223,400	5.3	70.4	7.0
175: Other OR therapeutic procedures on skin and breast (OR procedures of skin and breast, including plastic procedures on breast)	322,000	88,100	101.5	27.8	78.5

Abbreviations: AS, ambulatory surgery; CCS, Clinical Classifications Software; OR, operating room; GI, gastrointestinal

Notes: Only invasive, therapeutic surgeries that are performed and reliably reported in the hospital-based ambulatory surgery setting were included. Procedures are based on the Clinical Classifications Software (CCS) and the CCS for Services and Procedures. Statistics are based on the "narrow" definition of the HCUP Surgery Flag software.

^a The number of discharges was rounded to the nearest 100.

^b Based on population estimates from the U.S. Census Bureau

^c The gastric bypass and volume reduction CCS category (244) does not exist in the ICD-9-CM categorization. Inpatient gastric bypass and volume reductions are included in alternative categories, such as CCS 94, Other upper GI Therapeutic procedures.

Source: Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), National Inpatient Sample (NIS) and nationwide ambulatory surgery analytic file created from the State Ambulatory Surgery and Services Databases (SASD), weighted for national estimates, 2014

Data Source

The estimates in this Statistical Brief are based upon data from the Healthcare Cost and Utilization Project (HCUP) 2014 National Inpatient Sample (NIS) and 2014 nationwide ambulatory surgery analytic file created from the State Ambulatory Surgery and Services Databases (SASD), weighted for national estimates. This report evaluates both inpatient and outpatient surgery data. SASD from 22 States were used to create the nationwide ambulatory surgery analytic file: California, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Minnesota, Missouri, Nebraska, Nevada, New Jersey, New York, North Carolina, North Dakota, Oklahoma, Oregon, Pennsylvania, South Dakota, and Texas. The ambulatory surgery analytic file included 2.0 million unweighted discharges.

The study population in the ambulatory surgery analytic file includes discharges with invasive, therapeutic surgeries from community, nonrehabilitation hospitals with a service type of either general acute care or children's hospital. Weights for national estimates were developed using stratification on hospital characteristics (census region, bed size, location/teaching status, ownership). Supplemental sources included population denominator data for use with HCUP databases, derived from information available from the Bureau of the Census.⁷

Definitions

Procedures, ICD-9-CM, Current Procedural Terminology (CPT®), and Clinical Classifications Software (CCS)

All-listed procedures include all procedures performed during the hospital stay, whether for definitive treatment or for diagnostic or exploratory purposes. The *first-listed procedure* is the procedure that is listed first on the discharge record. Inpatient data define this as the *principal procedure*—the procedure that is performed for definitive treatment rather than for diagnostic or exploratory purposes (i.e., the procedure that was necessary to take care of a complication).

Procedures on inpatient hospitalization records are coded using the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM); procedures on ambulatory surgery and services records can be coded using either ICD-9-CM or the CPT.

ICD-9-CM and CPT both assign numeric codes to procedures; ICD-9-CM is limited to procedures in the inpatient setting. There are approximately 4,000 ICD-9-CM procedure codes and 9,600 CPT procedure codes.

CCS categorizes ICD-9-CM procedure codes into a manageable number of clinically meaningful categories.⁸ This clinical grouper makes it easier to quickly understand patterns of procedure use. When CPT was used on ambulatory surgery records, the CCS for Services and Procedures⁹ was used to classify procedures into groupings comparable to the CCS.

⁷ Barrett M, McCarty J, Coffey R, Levit K. Population Denominator Data for Use with the HCUP Databases (Updated with 2015 Population Data). HCUP Methods Series Report #2016-04. September 29, 2016. U.S. Agency for Healthcare Research and Quality. www.hcup-us.ahrq.gov/reports/methods/2016-04.pdf. Accessed January 31, 2017.

⁸ Agency for Healthcare Research and Quality. HCUP Clinical Classifications Software (CCS) for ICD-9-CM. Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated October 2016. www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp. January 31, 2017.

⁹ Agency for Healthcare Research and Quality. HCUP Clinical Classifications Software for Services and Procedures. Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated May 2014. www.hcup-us.ahrq.gov/toolssoftware/ccs_svcsproc/ccssvcproc.jsp. Accessed October 31, 2016.

Case definition

For this report, the case definition was based on criteria developed with 2012 ambulatory surgery data and validated against other datasets. To facilitate comparisons across years, the same CCS procedure categories that were selected for inclusion in 2012 were used to create a 2014 nationwide ambulatory surgery analytic file. For this report, records from the SASD meeting the following criteria were included in the nationwide ambulatory surgery analytic file:

- The HCUP Surgery Flag software¹⁰ was used to identify procedures that are classified as a surgery based on a narrow definition (surgery flag value = NARROW). Records with one or more narrow surgery procedures were retained. All procedures that did not meet the narrow surgery definition were dropped from the record.
- A CCS procedure category was included if—
 - The total SASD procedure count across all available States in the CCS category was greater than 4,000
 - At least 25 percent of outpatient procedures in the CCS category were performed in the hospital outpatient setting (as opposed to ambulatory surgery centers, office, and other outpatient settings)
 - There was no evidence of substantial underreporting by hospitals (CCS categories for dental services, wound debridement, and skin graft were excluded based on this criteria)
- A SASD facility was included if—
 - It was identified as a community, nonrehabilitation hospital with a service type of either general acute care or children's hospital
 - The ratio of SASD surgery visits for Medicare fee-for-service patients to Medicare Standard Analytic File surgeries for the facility was within the range of [0.8, 1.2]
 - The facility provided CPT codes for the preponderance of outpatient surgery visits
 - The facility had at least 100 ambulatory surgery visits in 2014

For this report, records from the NIS meeting the following criteria were included:

- The HCUP Surgery Flag software¹¹ was used to identify procedures that are classified as a surgery based on a narrow definition (surgery flag value = NARROW). Records with one or more narrow surgery procedures were retained. All procedures that did not meet the narrow surgery definition were dropped from the record.
- A CCS procedure category was included if it met the above definition for inclusion of ambulatory surgery procedures.

Therefore, the implied hierarchy of surgeries can be considered as follows:

- All surgeries
 - Narrow surgeries
 - Selected narrow surgeries (based on the above criteria)
 - Outpatient surgeries
 - Outpatient surgeries in hospitals or hospital-owned AS facilities

Types of hospitals included in the HCUP National Inpatient Sample

The National Inpatient Sample (NIS) is based on data from community hospitals, which are defined as short-term, non-Federal, general, and other hospitals, excluding hospital units of other institutions (e.g., prisons). The NIS includes obstetrics and gynecology, otolaryngology, orthopedic, cancer, pediatric, public, and academic medical hospitals. Excluded are long-term care facilities such as rehabilitation, psychiatric, and alcoholism and chemical dependency hospitals. Beginning in 2012, long-term acute care hospitals are also excluded. However, if a patient received long-term care, rehabilitation, or treatment for a psychiatric or chemical dependency condition in a community hospital, the discharge record for that stay will be included in the NIS.

¹⁰ Agency for Healthcare Research and Quality. HCUP Surgery Flag Software. Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated February 26, 2016. www.hcup-us.ahrq.gov/toolssoftware/surgflags/surgeryflags.jsp. Accessed October 10, 2016.

¹¹ Ibid.

Types of hospitals included in HCUP State Ambulatory Surgery and Services Databases

This analysis used State Ambulatory Surgery and Services Databases (SASD) limited to data from hospital-owned ambulatory surgery facilities. Although some SASD include data from facilities not owned by a hospital, those facilities were excluded from this analysis. The designation of a facility as hospital-owned is specific to its financial relationship with a hospital that provides inpatient care and is not related to its physical location. Ambulatory surgery performed in hospital-owned facilities may be performed within the hospital, in a facility attached to the hospital, or in a facility physically separated from the hospital. The analysis was further limited to ambulatory surgeries performed at facilities owned by community hospitals. Community hospitals are defined as short-term, non-Federal, general, and other specialty hospitals, excluding hospital units of other institutions (e.g., prisons). We limited the analysis to community hospitals with at least 100 ambulatory surgery visits per year.

Unit of analysis

The unit of analysis is the ambulatory surgery visit or hospital discharge (i.e., the hospital stay), not a person or patient. This means that a person who is admitted to the hospital multiple times in 1 year will be counted each time as a separate discharge from the hospital.

Hospital location

The classification of whether a hospital is in a metropolitan area (*urban*) or nonmetropolitan area (*rural*) is defined from the American Hospital Association (AHA) Annual Survey, using the 1993 U.S. Office of Management and Budget definition.

Payer

Payer is the expected payer for the hospital stay. To make coding uniform across all HCUP data sources, payer combines detailed categories into general groups:

- Medicare: includes patients covered by fee-for-service and managed care Medicare
- Medicaid: includes patients covered by fee-for-service and managed care Medicaid
- Private Insurance: includes Blue Cross, commercial carriers, and private health maintenance organizations (HMOs) and preferred provider organizations (PPOs)
- Uninsured: includes an insurance status of *self-pay* and *no charge*
- Other: includes Workers' Compensation, TRICARE/CHAMPUS, CHAMPVA, Title V, and other government programs

Hospital stays billed to the State Children's Health Insurance Program (SCHIP) may be classified as Medicaid, Private Insurance, or Other, depending on the structure of the State program. Because most State data do not identify patients in SCHIP specifically, it is not possible to present this information separately.

For this Statistical Brief, when more than one payer is listed for a hospital discharge, the first-listed payer is used.

About HCUP

The Healthcare Cost and Utilization Project (HCUP, pronounced "H-Cup") is a family of health care databases and related software tools and products developed through a Federal-State-Industry partnership and sponsored by the Agency for Healthcare Research and Quality (AHRQ). HCUP databases bring together the data collection efforts of State data organizations, hospital associations, and private data organizations (HCUP Partners) and the Federal government to create a national information resource of encounter-level health care data. HCUP includes the largest collection of longitudinal hospital care data in the United States, with all-payer, encounter-level information beginning in 1988. These databases enable research on a broad range of health policy issues, including cost and quality of health services, medical practice patterns, access to health care programs, and outcomes of treatments at the national, State, and local market levels.

HCUP would not be possible without the contributions of the following data collection Partners from across the United States:

Alaska Department of Health and Social Services
Alaska State Hospital and Nursing Home Association
Arizona Department of Health Services
Arkansas Department of Health
California Office of Statewide Health Planning and Development
Colorado Hospital Association
Connecticut Hospital Association
District of Columbia Hospital Association
Florida Agency for Health Care Administration
Georgia Hospital Association
Hawaii Health Information Corporation
Illinois Department of Public Health
Indiana Hospital Association
Iowa Hospital Association
Kansas Hospital Association
Kentucky Cabinet for Health and Family Services
Louisiana Department of Health
Maine Health Data Organization
Maryland Health Services Cost Review Commission
Massachusetts Center for Health Information and Analysis
Michigan Health & Hospital Association
Minnesota Hospital Association
Mississippi State Department of Health
Missouri Hospital Industry Data Institute
Montana Hospital Association
Nebraska Hospital Association
Nevada Department of Health and Human Services
New Hampshire Department of Health & Human Services
New Jersey Department of Health
New Mexico Department of Health
New York State Department of Health
North Carolina Department of Health and Human Services
North Dakota (data provided by the Minnesota Hospital Association)
Ohio Hospital Association
Oklahoma State Department of Health
Oregon Association of Hospitals and Health Systems
Oregon Office of Health Analytics
Pennsylvania Health Care Cost Containment Council
Rhode Island Department of Health
South Carolina Revenue and Fiscal Affairs Office
South Dakota Association of Healthcare Organizations
Tennessee Hospital Association
Texas Department of State Health Services
Utah Department of Health
Vermont Association of Hospitals and Health Systems
Virginia Health Information
Washington State Department of Health
West Virginia Health Care Authority
Wisconsin Department of Health Services
Wyoming Hospital Association

About Statistical Briefs

HCUP Statistical Briefs are descriptive summary reports presenting statistics on hospital inpatient, ambulatory surgery, and emergency department use and costs, quality of care, access to care, medical conditions, procedures, patient populations, and other topics. The reports use HCUP administrative health care data.

About the NIS

The HCUP National Inpatient Sample (NIS) is a national database of hospital inpatient stays. The NIS is nationally representative of all community hospitals (i.e., short-term, non-Federal, nonrehabilitation hospitals). The NIS includes all payers. It is drawn from a sampling frame that contains hospitals comprising more than 95 percent of all discharges in the United States. The vast size of the NIS allows the study of topics at the national and regional levels for specific subgroups of patients. In addition, NIS data are standardized across years to facilitate ease of use. Over time, the sampling frame for the NIS has changed; thus, the number of States contributing to the NIS varies from year to year. The NIS is intended for national estimates only; no State-level estimates can be produced.

The 2012 NIS was redesigned to optimize national estimates. The redesign incorporates two critical changes:

- Revisions to the sample design—starting with 2012, the NIS is now a *sample of discharge records from all HCUP-participating hospitals*, rather than a sample of hospitals from which all discharges were retained (as is the case for NIS years before 2012).
- Revisions to how hospitals are defined—the NIS now uses the *definition of hospitals and discharges supplied by the statewide data organizations* that contribute to HCUP, rather than the definitions used by the American Hospital Association (AHA) Annual Survey of Hospitals.

The new sampling strategy is expected to result in more precise estimates than those that resulted from the previous NIS design by reducing sampling error: for many estimates, confidence intervals under the new design are about half the length of confidence intervals under the previous design. The change in sample design for 2012 necessitates recomputation of prior years' NIS data to enable analysis of trends that uses the same definitions of discharges and hospitals.

About the SASD

The HCUP State Ambulatory Surgery and Services Databases (SASD) include encounter-level data for ambulatory surgeries and may also include various types of outpatient services such as observation stays, lithotripsy, radiation therapy, imaging, chemotherapy, and labor and delivery. The specific types of ambulatory surgery and outpatient services included in each SASD vary by State and data year. All SASD include data from hospital-owned ambulatory surgery facilities. In addition, some States include data from facilities not owned by a hospital. The designation of a facility as hospital-owned is specific to its financial relationship with a hospital that provides inpatient care and is not related to its physical location. Hospital-owned ambulatory surgery and other outpatient care facilities may be contained within the hospital, physically attached to the hospital, or located in a different geographic area. In order to provide information that is comparable across all States, analysis was restricted to hospital-owned ambulatory surgery.

For More Information

For other information on procedures and treatments, including procedures in the ambulatory surgery setting, refer to the HCUP Statistical Briefs located at www.hcup-us.ahrq.gov/reports/statbriefs/sb_procedures.jsp.

For additional HCUP statistics, visit:

- HCUP Fast Stats at www.hcup-us.ahrq.gov/faststats/landing.jsp for easy access to the latest HCUP-based statistics for health information topics
- HCUPnet, HCUP's interactive query system, at www.hcupnet.ahrq.gov/

For more information about HCUP, visit www.hcup-us.ahrq.gov/.

For a detailed description of HCUP and more information on the design of the National (Nationwide) Inpatient Sample (NIS) and State Ambulatory Surgery and Services Databases (SASD), please refer to the following database documentation:

Agency for Healthcare Research and Quality. Overview of the National (Nationwide) Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated December 2016. www.hcup-us.ahrq.gov/nisoverview.jsp. Accessed January 31, 2017.

Agency for Healthcare Research and Quality. Overview of the State Ambulatory Surgery and Services Databases (SASD). Healthcare Cost and Utilization Project (HCUP). Rockville, MD: Agency for Healthcare Research and Quality. Updated June 2016. www.hcup-us.ahrq.gov/sasdooverview.jsp. Accessed January 31, 2017.

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AHRQ welcomes questions and comments from readers of this publication who are interested in obtaining more information about access, cost, use, financing, and quality of health care in the United States. We also invite you to tell us how you are using this Statistical Brief and other HCUP data and tools, and to share suggestions on how HCUP products might be enhanced to further meet your needs. Please e-mail us at hcup@ahrq.gov or send a letter to the address below:

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